UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, DC 20549

FORM 10-Q

(Mark One)

☒ **QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the quarterly period ended December 31, 2022

☐ **TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934**

For the transition period from to .

Commission file number 001-38042

ARROWHEAD PHARMACEUTICALS, INC.

(Exact name of registrant as specified in its charter)

Delaware	**46-0408024**
(State or other jurisdiction of incorporation or organization)	**(I.R.S. Employer Identification No.)**

177 E. Colorado Blvd, Suite 700
Pasadena, California 91105
(626) 304-3400
(Address and telephone number of principal executive offices)

Former name, former address, and former fiscal year, if changed since last report: N/A

Securities registered pursuant to Section 12(b) of the Exchange Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common Stock, par value $0.001 per share	**ARWR**	**The Nasdaq Global Select Market**

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant has submitted electronically every Interactive Data File required to be submitted pursuant to Rule 405 of Regulation S-T (§ 232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit such files). Yes ☒ No ☐

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	☒	Accelerated Filer	☐
Non-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 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

The number of shares of the registrant's common stock outstanding as of February 1, 2023 was 108,310,163.

PART I. FINANCIAL INFORMATION

ITEM 1. FINANCIAL STATEMENTS

Arrowhead Pharmaceuticals, Inc.
Consolidated Balance Sheets
(In thousands, except per share amounts)

	December 31, 2022	September 30, 2022
	(unaudited)	
ASSETS		
Current assets:		
Cash, cash equivalents and restricted cash	$ 202,249	$ 108,005
Accounts receivable	39,568	1,410
Short term investments	299,582	268,391
Prepaid expenses	8,412	7,289
Other current assets	25,188	20,204
Total current assets	574,999	405,299
Property and equipment, net	147,314	110,297
Intangible assets, net	11,537	11,962
Long-term investments	115,774	105,872
Right-of-use assets	41,655	58,291
Other assets	210	218
Total Assets	**$ 891,489**	**$ 691,939**
LIABILITIES, NONCONTROLLING INTEREST AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 796	$ 2,868
Accrued expenses	48,174	46,856
Accrued payroll and benefits	4,094	12,251
Lease liabilities	2,664	2,776
Deferred revenue	66,281	74,099
Total current liabilities	122,009	138,850
Long-term liabilities:		
Lease liabilities, net of current portion	79,470	78,800
Deferred revenue, net of current portion	40,789	55,950
Liability related to the sale of future royalties	252,849	—
Total long-term liabilities	373,108	134,750
Commitments and contingencies (Note 7)		
Noncontrolling interest and stockholders' equity:		
Common stock, $0.001 par value: Authorized 145,000 shares; issued and outstanding 106,140 and 105,960 shares	199	198
Additional paid-in capital	1,239,178	1,219,213
Accumulated other comprehensive loss	(258)	(136)
Accumulated deficit	(862,080)	(820,755)
Total Arrowhead Pharmaceuticals, Inc. stockholders' equity	377,039	398,520
Noncontrolling interest	19,333	19,819
Total noncontrolling interest and stockholders' equity	396,372	418,339
Total Liabilities, Noncontrolling Interest and Stockholders' Equity	**$ 891,489**	**$ 691,939**

The accompanying notes are an integral part of these unaudited consolidated financial statements.

Arrowhead Pharmaceuticals, Inc.
Consolidated Statements of Operations and Comprehensive Loss
(In thousands, except per share amounts)
(unaudited)

	Three Months Ended December 31,	
	2022	**2021**
Revenue	**$ 62,546**	**$ 27,439**
Operating expenses:		
Research and development	83,695	65,765
General and administrative	20,985	24,995
Total operating expenses	**104,680**	**90,760**
Operating loss	(42,134)	(63,321)
Other income (expense):		
Interest (expense) income, net	(167)	1,156
Other income (expense), net	507	(707)
Total other income	**340**	**449**
Loss before income tax expense and noncontrolling interest	**(41,794)**	**(62,872)**
Income tax expense	17	—
Net loss including noncontrolling interest	**$ (41,811)**	**$ (62,872)**
Net loss attributable to noncontrolling interest, net of tax	(486)	—
Net loss attributable to Arrowhead Pharmaceuticals, Inc.	$ (41,325)	$ (62,872)
Net loss per share attributable to Arrowhead Pharmaceuticals, Inc.:		
Basic	$ (0.39)	$ (0.60)
Diluted	$ (0.39)	$ (0.60)
Weighted-average shares used in calculating		
Basic	106,039	104,534
Diluted	106,039	104,534
Other comprehensive loss, net of tax:		
Foreign currency translation adjustments	(122)	(39)
Comprehensive loss	**$ (41,933)**	**$ (62,911)**

The accompanying notes are an integral part of these unaudited consolidated financial statements.

Arrowhead Pharmaceuticals, Inc.
Consolidated Statements of Stockholders' Equity
(in thousands)
(unaudited)

	Common Stock	Amount ($)	Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Non-controllling Interest	Totals
Balance at September 30, 2021	**104,327**	**$ 197**	**$ 1,053,386**	**$ (69)**	**$ (644,692)**	**$ —**	**$ 408,822**
Stock-based compensation	—	—	24,504	—	—	—	24,504
Exercise of stock options	208	—	2,145	—	—	—	2,145
Common stock - restricted stock units vesting	263	—	—	—	—	—	—
Foreign currency translation adjustments	—	—	—	(39)	—	—	(39)
Net loss for the three months ended December 31, 2021	—	—	—	—	(62,872)	—	(62,872)
Balance at December 31, 2021	**104,798**	**$ 197**	**$ 1,080,035**	**$ (108)**	**$ (707,564)**	**$ —**	**$ 372,560**

	Common Stock	Amount ($)	Additional Paid-In Capital	Accumulated Other Comprehensive Loss	Accumulated Deficit	Non-controllling Interest	Totals
Balance at September 30, 2022	**105,960**	**$ 198**	**$ 1,219,213**	**$ (136)**	**$ (820,755)**	**$ 19,819**	**$ 418,339**
Stock-based compensation	—	—	19,390	—	—	—	19,390
Exercise of stock options	82	—	576	—	—	—	576
Common stock - restricted stock units vesting	98	1	(1)	—	—	—	—
Foreign currency translation adjustments	—	—	—	(122)	—	—	(122)
Interest in joint venture	—	—	—	—	—	(486)	(486)
Net loss for the three months ended December 31, 2022	—	—	—	—	(41,325)	—	(41,325)
Balance at December 31, 2022	**106,140**	**$ 199**	**$ 1,239,178**	**$ (258)**	**$ (862,080)**	**$ 19,333**	**$ 396,372**

The accompanying notes are an integral part of these unaudited consolidated financial statements.

Arrowhead Pharmaceuticals, Inc.
Consolidated Statements of Cash Flows
(in thousands)
(unaudited)

	Three Months Ended December 31,	
	2022	**2021**
CASH FLOWS FROM OPERATING ACTIVITIES:		
Net loss	$ (41,811)	$ (62,872)
Adjustments to reconcile net loss to net cash flow from operating activities		
Stock-based compensation	19,390	24,504
Depreciation and amortization	2,689	2,573
Amortization (accretion) of note premiums/discounts	690	(280)
Non-cash interest expense on liability related to the sale of future royalties	2,849	—
Changes in operating assets and liabilities:		
Accounts receivable	(38,157)	10,105
Prepaid expenses and other current assets	10,529	(450)
Accounts payable	(2,072)	(5,389)
Accrued expenses	(7,203)	(2,290)
Deferred revenue	(22,979)	(27,439)
Operating lease liabilities	559	230
Net cash used in operating activities	(75,516)	(61,308)
CASH FLOWS FROM INVESTING ACTIVITIES:		
Purchases of property and equipment	(38,911)	(5,778)
Purchases of investments	(111,199)	(65,875)
Proceeds from sales and maturities of investments	69,416	38,268
Net cash used in investing activities	(80,694)	(33,385)
CASH FLOWS FROM FINANCING ACTIVITIES:		
Proceeds from the exercises of stock options	576	1,885
Proceeds from the sale of future royalties	250,000	—
Net cash provided by financing activities	250,576	1,885
Net increase (decrease) in cash, cash equivalents and restricted cash	94,366	(92,808)
Effect of exchange rate on cash, cash equivalents and restricted cash	(122)	(39)
CASH, CASH EQUIVALENTS AND RESTRICTED CASH:		
BEGINNING OF PERIOD	108,005	184,434
END OF PERIOD	$ 202,249	$ 91,587
Supplementary disclosures:		
Interest paid	$ —	$ —
Income taxes (paid) refunded	$ —	$ —

The accompanying notes are an integral part of these unaudited consolidated financial statements.

NOTE 1. ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

General and Recent Developments

Arrowhead Pharmaceuticals, Inc. and its subsidiaries (referred to herein collectively as the "Company") are primarily engaged in developing medicines that treat intractable diseases by silencing the genes that cause them. Using a broad portfolio of RNA chemistries and efficient modes of delivery, the Company's 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. The Company's RNAi-based therapeutics may leverage this natural pathway of gene silencing to target and shut down specific disease-causing genes.

The following table presents the Company's current pipeline:

Therapeutic Area	Name	Stage	Product Rights
Cardiometabolic	ARO-APOC3	Two Phase 2b and one Phase 3	Arrowhead
	ARO-ANG3	Two Phase 2b	Arrowhead
	Olpasiran	Phase 3	Amgen
Pulmonary	ARO-ENAC2	Pre-Clinical	Arrowhead
	ARO-RAGE	Phase 1/2	Arrowhead
	ARO-MUC5AC	Phase 1/2a	Arrowhead
	ARO-MMP7	Phase 1/2a	Arrowhead
Liver	ARO-HSD	Phase 1/2	GSK
	Fazirsiran	Phase 2	Takeda and Arrowhead
	JNJ-3989	Phase 2	Janssen
	HZN-457 (formerly ARO-XDH)	Phase 1	Horizon
	ARO-C3	Phase 1/2	Arrowhead
	JNJ-75220795	Phase 1	Janssen
Muscle	ARO-DUX4	Pre-Clinical	Arrowhead

The Company operates lab facilities in San Diego, California and Madison, Wisconsin, where its research and development activities, including the development of RNAi therapeutics, take place. The Company's principal executive offices are located in Pasadena, California.

During the first quarter of fiscal 2023, the Company continued to develop and advance its pipeline and partnered candidates. Several key recent developments include:

- enrolled the first subject in a Phase 1 randomized, placebo-controlled trial to assess the safety tolerability, pharmacokinetics and pharmacodynamics of a development-stage medicine, HZN-457 (formerly ARO-XDH), which is out-licensed to Horizon, triggering a $15.0 million milestone payment to the Company which was paid in the second quarter of fiscal 2023;
- enrolled the first subject in Amgen's Phase 3 trial of Olpasiran, triggering a $25.0 million milestone payment to the Company which was paid in the second quarter of fiscal 2023;
- entered into a Royalty Purchase Agreement (the "Royalty Pharma Agreement") with Royalty Pharma Investments 2019 ICAV ("Royalty Pharma") on November 9, 2022, pursuant to which Royalty Pharma paid $250.0 million upfront (See Note 11 — Liability Related to the Sale of Future Royalties of Notes to Consolidated Financial Statements of Part I, "Item 1. Financial Statements.");
- announced Topline Results from SEQUOIA Phase 2 Study of Fazirsiran (formerly ARO-AAT) in Patients with Alpha-1 Antitrypsin Deficiency-Associated Liver Disease in which;
    - Fibrosis regression was observed in 50% of patients receiving Fazirsiran;
    - Median reductions of 94% of Z-AAT accumulation in the liver and mean reductions of 68% in histologic globule burden were observed;

- Treatment emergent adverse events were generally well balanced between Fazirsiran and placebo groups;
- Results were consistent with AROAAT-2002 open-label study previously published in The New England Journal of Medicine.

Consolidation and Basis of Presentation

The interim Consolidated Financial Statements include the accounts of Arrowhead Pharmaceuticals, Inc. and its subsidiaries (wholly-owned subsidiaries and a variable interest entity for which the Company is the primary beneficiary). Subsidiaries refer to Arrowhead Madison, Inc., Visirna Therapeutics, Inc. ("Visirna"), and Arrowhead Australia Pty Ltd. For subsidiaries in which the Company owns or is exposed to less than 100% of the economics, the Company records net loss attributable to noncontrolling interests in its consolidated statements of operations equal to the percentage of the economic or ownership interests retained in such entity by the respective noncontrolling party.

The interim Consolidated Financial Statements have been prepared in conformity with U.S. generally accepted accounting principles ("GAAP"). The financial data of the Company included herein are unaudited. In the opinion of management, all material adjustments of a normal recurring nature have been made to present fairly the Company's financial position at December 31, 2022 and the results of operations and cash flows for the periods presented. All intercompany transactions and balances have been eliminated. Certain prior period amounts have been reclassified to conform with the current period presentation.

Certain financial information that is normally included in annual financial statements prepared in accordance with GAAP, but that is not required for interim reporting purposes, has been omitted from the accompanying interim consolidated financial statements and related notes. Readers are urged to review the Company's Annual Report on Form 10-K for the year ended September 30, 2022 for more complete descriptions and discussions. Operating results and cash flows for the three months ended December 31, 2022 are not necessarily indicative of the results that may be expected for the fiscal year ending September 30, 2023.

Liquidity

The Company's primary sources of financing have been through the sale of its securities, revenue from its licensing and collaboration agreements and the sale of certain future royalties. Research and development activities have required significant capital investment since the Company's inception and are expected to continue to require significant cash expenditure in the future, particularly as the Company's pipeline of drug candidates and its headcount have both expanded significantly. Additionally, significant capital investment will be required as the Company's pipeline matures into later stage clinical trials and as the Company plans to increase its internal manufacturing capabilities.

At December 31, 2022, the Company had $202.2 million in cash and cash equivalents (including $7.3 million in restricted cash), $299.6 million in short-term investments and $115.8 million in long-term investments to fund operations. During the three months ended December 31, 2022, the Company's cash and cash equivalents and investments balance increased by $135.3 million which was primarily due to the $250.0 million upfront payment received from Royalty Pharma. See Note 11.

In total, the Company is eligible to receive up to $4.1 billion in developmental, regulatory and sales milestones, and may receive various royalties on net sales from its licensing and collaboration agreements, subject to the terms and conditions of those agreements. The revenue recognition for these collaboration agreements is discussed further in Note 2.

Summary of Significant Accounting Policies

There have been no changes to the significant accounting policies disclosed in the Company's most recent Annual Report on Form 10-K for the fiscal year ended September 30, 2022.

Recent Accounting Pronouncements

There have been no recent accounting pronouncements that have significantly impacted this Quarterly Report on Form 10-Q, beyond those disclosed in the Company's most recent Annual Report on Form 10-K for the fiscal year ended September 30, 2022.

NOTE 2. COLLABORATION AND LICENSE AGREEMENTS

Glaxosmithkline Intellectual Property (No. 3) Limited ("GSK")

On November 22, 2021, GSK and the Company entered into an Exclusive License Agreement (the "GSK License Agreement"). Under the GSK License Agreement, GSK has received an exclusive license for ARO-HSD. The exclusive license is worldwide with the exception of greater China, for which the Company retained rights to develop and commercialize ARO-HSD. The Company has completed its Phase 1/2 study of ARO-HSD, and GSK is now wholly responsible for all clinical development and commercialization of ARO-HSD in its territory. Under the terms of the agreement, the Company has received an upfront payment of $120.0 million and is eligible for additional payments of $30.0 million at the start of a Phase 2 trial and $100.0 million upon achieving (i) a successful Phase 2 trial readout and (ii) the first patient dosed in a Phase 3 trial. Furthermore, should the Phase 3 trial read out positively, and the potential new medicine receives regulatory approval in major markets, the deal provides for commercial milestone payments to the Company of up to $190.0 million at first commercial sale, and up to $590.0 million in sales-related milestone payments. The Company is further eligible to receive tiered royalties on net product sales in a range of mid-teens to twenty percent.

At the inception of the GSK License Agreement, the Company identified one distinct performance obligation. The Company determined that the key deliverables included the license and certain R&D services, including the Company's responsibility to complete the Phase 1/2 study (the "GSK R&D Services"). Due to the specialized and unique nature of the GSK R&D Services and their direct relationship with the license, the Company determined that these deliverables represented one distinct bundle and, thus, one performance obligation. Beyond the GSK R&D Services, which are the responsibility of the Company, GSK will be responsible for managing future clinical development and commercialization in its territory.

The Company determined the initial transaction price totaled $120.0 million, including the upfront payment, which was collected in January 2022. The Company has excluded any future estimated milestones or royalties from this transaction price to date. The Company has allocated the total $120.0 million initial transaction price to its one distinct performance obligation for the ARO-HSD license and the associated GSK R&D Services. As the Company has completed its performance obligation related to this agreement, the upfront payment of $120.0 million was fully recognized as of September 30, 2022. There were no revenue recorded associated with the GSK License Agreement for the three months ended December 31, 2022 and 2021. There were no contract assets and liabilities recorded as of December 31, 2022.

Horizon Therapeutics Ireland DAC ("Horizon")

On June 18, 2021, Horizon and the Company entered into a collaboration and license agreement (the "Horizon License Agreement"). Under the terms of the Horizon License Agreement, Horizon received a worldwide exclusive license for HZN-457, a clinical-stage medicine being developed by Horizon as a potential treatment for people with uncontrolled gout. The Company conducted all activities through the preclinical stages of development of, and Horizon is now wholly responsible for clinical development and commercialization of HZN-457. In July 2021, the Company received $40.0 million as an upfront payment and is eligible to receive up to $660.0 million in potential development, regulatory and sales milestones. The Company is also eligible to receive royalties in the low- to mid-teens range on net product sales.

At the inception of the Horizon License Agreement, the Company identified one distinct performance obligation. The Company determined that the key deliverables included the license and certain R&D services, including the Company's responsibilities to conduct all activities through the preclinical stages of development of HZN-457 (the "Horizon R&D Services"). Due to the specialized and unique nature of these Horizon R&D Services and their direct relationship with the license, the Company determined that these deliverables represented one distinct bundle and, thus, one performance obligation. Beyond the Horizon R&D Services, which are the responsibility of the Company, Horizon is responsible for managing future clinical development and commercialization of HZN-457.

The Company determined the initial transaction price totaled $40.0 million, including the upfront payment. The Company has excluded any future estimated milestones or royalties from this transaction price to date. The Company allocates the total $40.0 million initial transaction price to its one distinct performance obligation for the HZN-457 license and the associated Horizon R&D Services. Revenue is recognized on a straight-line basis over the estimated timeframe for completing the Horizon R&D Services. The Company determined that the straight-line basis was appropriate as its efforts will be expended evenly over the course of completing its performance obligation. Further, Horizon enrolled the first subject in December 2022 in a Phase 1 randomized, placebo-controlled trial to assess the safety, tolerability, pharmacokinetics and pharmacodynamics of HZN-457, triggering a $15.0 million milestone payment to the Company which was paid in the second quarter of fiscal 2023.

Revenue for the three months ended December 31, 2022 and 2021 were $21.7 million and $6.7 million, respectively. There were $15.0 million in contract assets recorded as accounts receivable and $0 in contract liabilities recorded as deferred revenue as of December 31, 2022.

Takeda Pharmaceutical Company Limited ("Takeda")

On October 7, 2020, Takeda and the Company entered into an Exclusive License and Co-Funding Agreement (the "Takeda License Agreement"). Under the Takeda License Agreement, Takeda and the Company will co-develop its Fazirsiran program, the Company's second-generation subcutaneously administered RNAi therapeutic candidate being developed as a treatment for liver disease associated with alpha-1 antitrypsin deficiency. Within the United States, Fazirsiran, if approved, will be co-commercialized under a 50/50 profit sharing structure. Outside the United States, Takeda will lead the global commercialization strategy and will receive an exclusive license to commercialize Fazirsiran, while the Company will be eligible to receive tiered royalties of 20% to 25% on net sales. In January 2021, the Company received $300.0 million as an upfront payment and is eligible to receive potential development, regulatory and commercial milestones of up to $595.0 million.

At the inception of the Takeda License Agreement, the Company identified one distinct performance obligation. The Company determined that the key deliverables included the license and certain R&D services including the Company's responsibilities to complete the initial portion of the SEQUOIA study, to complete the ongoing Phase 2 AROAAT2002 study and to ensure certain manufacturing of Fazirsiran drug product is completed and delivered to Takeda (the "Takeda R&D Services"). Due to the specialized and unique nature of these Takeda R&D Services and their direct relationship with the license, the Company determined that these deliverables represent one distinct bundle and, thus, one performance obligation. Beyond the Takeda R&D Services, which are the responsibility of the Company, Takeda will be responsible for managing future clinical development and commercialization outside the United States. Within the United States, the Company will also participate in co-development and co-commercialization efforts and will co-fund these efforts with Takeda as part of the 50/50 profit sharing structure within the United States. The Company considers the collaborative activities, including the co-development and co-commercialization, to be a separate unit of account within Topic 808, and as such, these co-funding amounts are recorded as research and development expenses or general and administrative expenses, as appropriate.

The Company determined the initial transaction price totaled $300.0 million, which includes the upfront payment. The Company has excluded any future milestones or royalties from this transaction price to date. The Company has allocated the total $300.0 million initial transaction price to its one distinct performance obligation for the Fazirsiran license and the associated Takeda R&D Services. Revenue is recognized using a proportional performance method (based on actual patient visits completed versus total estimated visits completed for the ongoing SEQUOIA and AROAAT2002 clinical studies). The Company recognized $16.3 million and $20.8 million in connection with these efforts for the three months ended December 31, 2022 and 2021, respectively. There were $0 of contract assets recorded as accounts receivable and $107.1 million of contract liabilities recorded as deferred revenue, of which $66.3 million was classified as current deferred revenue, as of December 31, 2022. The Company also recorded $9.8 million as accrued expenses as of December 31, 2022 that was primarily driven by co-development and co-commercialization activities.

Janssen Pharmaceuticals, Inc. ("Janssen")

On October 3, 2018, Janssen, part of the Janssen Pharmaceutical Companies of Johnson & Johnson, and the Company entered into a License Agreement (the "Janssen License Agreement") and a Research Collaboration and Option Agreement (the "Janssen Collaboration Agreement"). The Company also entered into a stock purchase agreement with JJDC, Inc. ("JJDC"), Johnson & Johnson's venture capital arm (the "JJDC Stock Purchase Agreement"). Under the Janssen License Agreement, Janssen has received a worldwide, exclusive license to the Company's JNJ-3989 (ARO-HBV) program, the Company's third-generation subcutaneously administered RNAi therapeutic candidate being developed as a potential therapy for patients with chronic hepatitis B virus infection. Beyond the Company's Phase 1/2 study of JNJ-3989 (ARO-HBV), which the Company was responsible for completing, Janssen is wholly responsible for clinical development and commercialization of JNJ-3989 (ARO-HBV). Under the Janssen Collaboration Agreement, Janssen was able to select three new targets against which the Company would develop clinical candidates. These candidates were subject to certain restrictions and did not include candidates that already were in the Company's pipeline. The Company was obligated to perform discovery, optimization and preclinical research and development, entirely funded by Janssen, which on its own or in combination with Janssen development work, would have been sufficient to allow the filing of a U.S. Investigational New Drug Application or equivalent, at which time Janssen would have the option to take an exclusive license. If the option was exercised, Janssen would have been wholly responsible for clinical development and commercialization of each optioned candidate. Under the terms of the agreements taken together, the Company has received $175.0 million as an upfront payment, $75.0 million in the form of an equity investment by JJDC in the Company's common stock under the JJDC Stock Purchase Agreement, and milestone and option payments totaling $73.0 million, and the Company may receive up to $0.8 billion in development and sales milestone payments for the Janssen License Agreement, and up to $0.6 billion in development and sales milestone payments for the remaining target covered under the Janssen Collaboration Agreement. The Company is further eligible to receive tiered royalties on product sales up to mid-teens under the Janssen License

Agreement and up to low teens under the Janssen Collaboration Agreement. During 2022, Janssen's option period expired unexercised for two of the three candidates (ARO-JNJ2 and ARO-JNJ3) under the Janssen Collaboration Agreement.

At the inception of the Janssen License Agreement and Janssen Collaboration Agreement, the Company identified one distinct performance obligation. Regarding the Janssen License Agreement, the Company determined that the key deliverables included the license and certain R&D services including the Company's responsibility to complete the Phase 1/2 study of JNJ-3989 (ARO-HBV) and the Company's responsibility to ensure certain manufacturing of JNJ-3989 (ARO-HBV) drug product is completed and delivered to Janssen (the "Janssen R&D Services"). Due to the specialized and unique nature of these Janssen R&D Services and their direct relationship with the license, the Company determined that these deliverables represent one distinct bundle and, thus, one performance obligation. The Company also determined that Janssen's option to require the Company to develop up to three new targets is not a material right and, thus, not a performance obligation at the onset of the agreement. The consideration for this option is accounted for separately.

The Company determined the transaction price totaled approximately $252.7 million, which includes the upfront payment, the premium paid by JJDC for its equity investment in the Company, two $25.0 million milestone payments related to JNJ-3989 (ARO-HBV), and estimated payments for reimbursable Janssen R&D Services to be performed. The Company has allocated the total $252.7 million initial transaction price to its one distinct performance obligation for the JNJ-3989 (ARO-HBV) license and the associated Janssen R&D Services. The Company recognized this transaction price in its entirety as of September 30, 2021, as its performance obligations were substantially completed. Future milestones and royalties achieved will be recognized in their entirety when earned. There were no contract assets and liabilities recorded as of December 31, 2022.

The Company has conducted its discovery, optimization and preclinical research and development of JNJ-75220795 (ARO-JNJ1), ARO-JNJ2, and ARO-JNJ3 under the Janssen Collaboration Agreement. All costs and labor hours spent by the Company have been entirely funded by Janssen. Janssen's option period expired unexercised for two of the three candidates (ARO-JNJ2 and ARO-JNJ3) under the Janssen Collaboration Agreement during 2022. In May 2021, Janssen exercised its option right for JNJ-75220795 (ARO-JNJ1), which resulted in a $10.0 million milestone payment to the Company. This $10.0 million milestone payment was recognized entirely as of September 30, 2021. There were no revenue recorded associated with the Company's agreement with Janssen for the three months ended December 31, 2022 and 2021. There were no contract assets and liabilities recorded as of December 31, 2022.

Amgen Inc. ("Amgen")

On September 28, 2016, Amgen and the Company entered into two collaboration and license agreements and a common stock purchase agreement. Under the Second Collaboration and License Agreement (the "Olpasiran Agreement"), Amgen received a worldwide, exclusive license to the Company's novel RNAi Olpasiran program. These RNAi molecules are designed to reduce elevated lipoprotein(a), which is a genetically validated, independent risk factor for atherosclerotic cardiovascular disease. Under the first collaboration and license agreement (the "First Collaboration and License Agreement" or the "ARO-AMG1 Agreement"), Amgen received an option to a worldwide, exclusive license to ARO-AMG1, an RNAi therapy for an undisclosed genetically validated cardiovascular target. Under both agreements, Amgen is wholly responsible for clinical development and commercialization.

Under the Olpasiran Agreement and the ARO-AMG1 Agreement, the Company has received $35.0 million in upfront payments, $21.5 million in the form of an equity investment by Amgen in the Company's common stock, and $30.0 million in milestone payments. The Company has substantially completed its performance obligations under the Olpasiran Agreement and the ARO-AMG1 Agreement. In July 2019, Amgen informed the Company that it would not be exercising its option for an exclusive license for ARO-AMG1, and as such, there will be no further milestone or royalty payments under the ARO-AMG1 Agreement. In July 2020, Amgen initiated a Phase 2 clinical study of Olpasiran, which resulted in a $20.0 million milestone payment to the Company. In December 2022, Amgen enrolled the first subject in its Phase 3 trial of Olpasiran, which triggered a $25.0 million milestone payment to the Company which was paid in the second quarter of fiscal 2023. Revenue for the three months ended December 31, 2022 and 2021 were $25.0 million and $0, respectively. There were $25.0 million in contract assets recorded as accounts receivable and $0 in contract liabilities recorded as deferred revenue as of December 31, 2022.

Further, in November 2022, Royalty Pharma and the Company entered into the Royalty Pharma Agreement. In consideration for the payments under the Royalty Pharma Agreement, Royalty Pharma is entitled to receive all royalties otherwise payable by Amgen to the Company under the Olpasiran Agreement. The Company remains eligible to receive up to an additional $375.0 million in remaining development, regulatory and sales milestone payments payable by Amgen under the Olpasiran Agreement. See Note 11.

Joint Venture and License Agreement with Visirna Therapeutics, Inc. ("Visirna")

On April 25, 2022, Visirna and the Company entered into a License Agreement (the "Visirna License Agreement"), pursuant to which Visirna received an exclusive license to develop, manufacture and commercialize four of the Company's RNAi-based investigational cardiometabolic medicines in Greater China (including the People's Republic of China, Hong Kong, Macau and Taiwan). Pursuant to a Share Purchase Agreement entered into simultaneously with the Visirna License Agreement (the "Visirna SPA"), the Company acquired a majority stake in Visirna (after accounting for shares reserved for Visirna's employee stock ownership plan) as partial consideration for the Visirna License Agreement. Under the Visirna SPA, entities affiliated with Vivo Capital also acquired a minority stake in Visirna in exchange for $60.0 million in upfront capital to support the operations of Visirna. As further consideration under the Visirna License Agreement, the Company is also eligible to receive potential royalties on commercial sales.

During the three months ended December 31, 2022, the Company performed manufacturing and development work pursuant to a Clinical Supply Agreement between the parties contemplated by the Visirna License Agreement. The Company received $0.7 million as consideration for this manufacturing and development work, and there were no contract assets and liabilities recorded as of December 31, 2022.

NOTE 3. PROPERTY AND EQUIPMENT

The following table summarizes the Company's major classes of property and equipment:

	December 31, 2022	September 30, 2022
	(in thousands)	
Computers, software, office equipment and furniture	$ 2,182	$ 2,182
Land	2,996	2,996
Research equipment	43,739	38,283
Leasehold improvements	42,017	42,017
Construction in progress	90,215	56,373
	181,149	141,851
Less: Accumulated depreciation and amortization	(33,835)	(31,554)
Property and equipment, net	$ 147,314	$ 110,297

Depreciation and amortization expense for property and equipment for the three months ended December 31, 2022 and 2021 was $2.3 million and $2.1 million, respectively.

The increase in the construction in progress during the three months ended December 31, 2022 was mainly due to the continuing developments of manufacturing, laboratory and office facilities in Verona, Wisconsin as well as a new laboratory and office facility in San Diego, California. See Note 7.

NOTE 4. INVESTMENTS

The Company's investments consisted of the following:

	As of December 31, 2022 (In thousands)			
	Adjusted Basis	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Short-term investments (due within one year)				
Held to maturity debt securities	$ 299,582	$ —	$ (2,644)	$ 296,938
Held to maturity certificate of deposit	—	—	—	—
Total short-term investments	$ 299,582	$ —	$ (2,644)	$ 296,938
Long-term investments (Due within one through three years)				
Held to maturity debt securities	$ 115,774	$ —	$ (4,440)	$ 111,334
Total long-term investments	$ 115,774	$ —	$ (4,440)	$ 111,334

	As of September 30, 2022 (In thousands)			
	Adjusted Basis	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Short-term investments (due within one year)				
Held to maturity debt securities	$ 218,391	$ —	$ (3,661)	$ 214,730
Held to maturity certificate of deposit	50,000	—	—	50,000
Total short-term investments	$ 268,391	$ —	$ (3,661)	$ 264,730
Long-term investments (Due within one through three years)				
Held to maturity debt securities	$ 105,872	$ —	$ (5,569)	$ 100,303
Total long-term investments	$ 105,872	$ —	$ (5,569)	$ 100,303

NOTE 5. INTANGIBLE ASSETS

Intangible assets subject to amortization include patents and a license agreement capitalized as part of the Novartis RNAi asset acquisition in March 2015. The following table presents the components of intangible assets:

	Gross Carrying Amount	Accumulated Amortization	Impairment	Net Carrying Amount	Useful Lives
	(amounts in thousands)				(in years)
As of December 31, 2022					
Patents	$ 21,728	$ 12,158	$ —	$ 9,570	14
License	3,129	1,162	—	1,967	21
Total intangible assets, net	$ 24,857	$ 13,320	$ —	$ 11,537	
As of September 30, 2022					
Patents	$ 21,728	$ 11,770	$ —	$ 9,958	14
License	3,129	1,125	—	2,004	21
Total intangible assets, net	$ 24,857	$ 12,895	$ —	$ 11,962	

Intangible assets are reviewed annually for impairment and more frequently if potential impairment indicators exist. No impairment indicators were identified during the three months ended December 31, 2022 and 2021.

Intangible assets with definite useful lives are amortized on a straight-line basis over their useful lives. Intangible assets amortization expense for each of the three months ended December 31, 2022 and 2021 was $0.4 million. None of the intangible assets with definite useful lives are anticipated to have a residual value.

The following table presents the estimated future amortization expense related to intangible assets as of December 31, 2022:

Year Ending September 30,	Amortization Expense (in thousands)
2023 (remainder)	$ 1,275
2024	1,700
2025	1,700
2026	1,700
2027	1,700
Thereafter	3,462
Total	$ 11,537

NOTE 6. STOCKHOLDERS' EQUITY

The following table summarizes the Company's shares of common stock and preferred stock:

	Par Value	Shares		
		Authorized	Issued	Outstanding
			(in thousands)	
As of December 31, 2022				
Common stock	$ 0.001	145,000	106,140	106,140
Preferred stock	$ 0.001	5,000	—	—
As of September 30, 2022				
Common stock	$ 0.001	145,000	105,960	105,960
Preferred stock	$ 0.001	5,000	—	—

13,769,984 and 14,000,392 shares of common stock as of December 31, 2022 and September 30, 2022, respectively, were reserved for issuance upon exercise of options and vesting of restricted stock units granted or available for grant under the Company's 2004 Equity Incentive Plan, 2013 Incentive Plan, and 2021 Incentive Plan, as well as for inducement grants made to new employees under Rule 5635(c)(4) of the Nasdaq Listing Rules.

On December 2, 2022, the Company entered into an open market sale agreement (the "Open Market Sale Agreement"), pursuant to which the Company may, from time to time, sell up to $250,000,000 in shares of the Company's common stock through Jefferies LLC, acting as the sales agent and/or principal, in an at-the-market offering ("ATM Offering"). The Company is not required to sell shares under the Open Market Sale Agreement. The Company will pay Jefferies LLC a commission of up to 3.0% of the aggregate gross proceeds received from all sales of the common stock under the Open Market Sale Agreement. Unless otherwise terminated, the ATM Offering shall 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. The Company and Jefferies may each terminate the Open Market Sale Agreement at any time upon prior notice. As of December 31, 2022, no shares have been issued under the Open Market Sale Agreement.

NOTE 7. COMMITMENTS AND CONTINGENCIES

Litigation

From time to time, the Company may be subject to various claims and legal proceedings in the ordinary course of business. If the potential loss from any claim, asserted or unasserted, or legal proceeding is considered probable and the amount is reasonably estimable, the Company will accrue a liability for the estimated loss. There were no contingent liabilities recorded as of December 31, 2022.

Commitments

On December 20, 2021, the Company completed a purchase of 13 acres of land in the Verona Technology Park in Verona, Wisconsin, which is being developed into an approximately 160,000 square foot drug manufacturing facility and an approximately 140,000 square foot laboratory and office facility which will support the Company's process development and analytical activities. The Company intends to invest between $200.0 million and $260.0 million into the build-out of the facilities. As part of this acquisition, the Company entered into a development agreement with the City of Verona to construct certain infrastructure improvements within the tax incremental district and will be reimbursed up to $16.0 million by the City of Verona by future tax increment revenue generated from the developed property. The total amount of funding that the City of Verona will pay under the Tax Incremental Financing program is not guaranteed and will depend on future tax revenues generated from the developed property. The Company will also receive up to $2.5 million of refundable Wisconsin state income tax credits from the Wisconsin Economic Development Corporation (WEDC) as incentives to invest in the local community and create new jobs.

Technology License Commitments

The Company has licensed from third parties the rights to use certain technologies for its research and development activities, as well as in any products it may develop using these licensed technologies. These agreements and other similar agreements often require milestone and royalty payments. Milestone payments, for example, may be required as the research and development process progresses through various stages of development, such as when clinical candidates enter or progress through clinical trials, upon NDA and/or certain sales level milestones. During the three months ended December 31, 2022 and 2021, the Company did not reach any milestones.

NOTE 8. LEASES

On November 19, 2021, the Company entered into a new 15-year lease for approximately 144,000 square feet of office and research and development laboratory space under construction in San Diego, California. This facility will replace the Company's current office and research facility sublease located in San Diego, California. The increased capacity of this new facility compared to the Company's current research facility in San Diego will accommodate increased personnel for its expanding pipeline of current and future drug candidates. The estimated rent commencement date for the new lease is in April 2023 after construction and leasehold improvements have been completed. The lease payments, which begin on the rent commencement date, will be approximately $119.0 million over the initial 15-year term. The Company also estimates payments for operating expenses to be approximately $3.0 million for the first year of the lease, and these payments will continue throughout the initial 15-year term. The Company expects to pay approximately $31.0 million for leasehold improvements, net of tenant improvement allowances. Pursuant to the lease, within twelve months of the expiration of the initial 15-year term, the Company has the option to extend the lease for up to one additional ten-year term, with certain annual increases in base rent.

Other Significant Leases

Pasadena, California: The Company leases office space located at 177 Colorado Blvd for its corporate headquarters from 177 Colorado Owner, LLC. The lease began on September 30, 2019 and expires on April 30, 2027. The lease contains an option to renew for one term of five years. On October 23, 2020, the Company entered into a lease expansion to add an additional approximately 24,000 square feet of office with a lease expiration date of April 30, 2027.

San Diego, California: The Company subleased space from Halozyme, Inc. for additional research and development facility in San Diego, California. The term of this sublease commenced on April 1, 2020 and ended on January 14, 2023. On December 23, 2022, the Company entered into a new six-month lease agreement with 11404 & 11408 Sorrento Valley Owner (DE) LLC, effective January 15, 2023. The lease will end on July 15, 2023.

Madison, Wisconsin: The Company leases space for office and laboratory facilities, which expires on September 30, 2031. The lease contains options to renew for two terms of five years. After accounting for additional rental square feet added pursuant to amendments to the lease agreement in 2019 and 2020, the Company currently leases a total of 111,000 square feet.

The components of lease assets and liabilities along with their classification on the Company's consolidated balance sheets were as follows:

Lease Assets and Liabilities	Classification	December 31, 2022	September 30, 2022
		(in thousands)	
Operating lease assets	Right-of-use assets	$ 41,655	$ 58,291
Current operating lease liabilities	Lease liabilities	2,664	2,776
Non-current operating lease liabilities	Lease liabilities, net of current portion	79,470	78,800

		Three Months Ended December 31,	
Lease Cost	Classification	2022	2021
		(in thousands)	
Operating lease cost	Research and development	$ 2,069	$ 878
	General and administrative expense	533	420
Variable lease cost	Research and development	210	158
	General and administrative expense	—	—
Total		$ 2,812	$ 1,456

Variable lease cost primarily related to operating expenses associated with the Company's operating leases. There was $0.1 million and $0 short-term lease cost during the three months ended December 31, 2022, and 2021, respectively.

The following table presents payments of operating lease liabilities on an undiscounted basis as of December 31,

2022:

Year	Amounts (in thousands)
2023 (remainder of fiscal year)	$ 4,470
2024	8,094
2025	11,800
2026	12,138
2027	11,297
2028 and thereafter	102,813
Total	$ 150,612
Less imputed interest	(68,478)
Total operating lease liabilities (includes current portion)	$ 82,134

Supplemental cash flow and other information related to leases was as follows:

	Three Months Ended December 31,	
	2022	2021
Cash paid for amounts included in the measurement of lease liabilities:		
Operating cash flows from operating leases (in thousands)	$ 1,331	$ 1,023
Weighted-average remaining lease term (in years)	6.9	7.8
Weighted-average discount rate	8.5 %	8.5 %

NOTE 9. STOCK-BASED COMPENSATION

The Company has three plans that provide for equity-based compensation. Under the 2004 Equity Incentive Plan (the "2004 Plan") and 2013 Incentive Plan (the "2013 Plan"), 175,083 and 3,991,304 shares, respectively, of the Company's common stock are reserved for the grant of stock options, stock appreciation rights, restricted stock awards and performance unit/share awards to employees, consultants and others as of December 31, 2022.

On March 18, 2021, the Company's Board of Directors approved the Arrowhead Pharmaceuticals, Inc. 2021 Incentive Plan (the "2021 Plan"), which authorizes 8,000,000 shares (subject to certain adjustments) to be awarded for grants of stock options, stock appreciation rights, restricted and unrestricted stock and stock units, performance awards, cash awards and other awards convertible into or otherwise based on shares of the Company's common stock. The maximum number of shares authorized under the 2021 Plan will be (i) reduced by any shares subject to awards made under the 2013 Plan after January 1, 2021, and (ii) increased by any shares subject to outstanding awards under the 2013 Plan as of January 1, 2021 that, after January 1, 2021, are canceled, expired, forfeited or otherwise not issued under such awards (other than as a result of being tendered or withheld to pay the exercise price or withholding taxes in connection with any such awards) or settled in cash. As of December 31, 2022, the total number of shares reserved for issuance under the 2021 Incentive Plan was 7,155,527 shares, which includes 136,972 shares that were forfeited under the 2013 Plan.

In addition, there were 762,150 shares reserved for options and 739,625 shares reserved for restricted stock units issued as inducement grants to new employees granted outside of the Company's equity-based compensation plans under Rule 5635(c)(4) of the Nasdaq Listing Rules.

The following table presents a summary of awards outstanding:

	As of December 31, 2022				
	2004 Plan	2013 Plan	2021 Plan	Inducement Awards	Total
Granted and outstanding awards:					
Options	175,083	1,685,543	3,000	762,150	2,625
Restricted stock units	—	2,305,761	918,795	739,625	3,964
Total	175,083	3,991,304	921,795	1,501,775	6,589

Stock Option Awards

The following table presents a summary of the stock option activity for the three months ended December 31, 2022:

	Shares	Weighted-Average Exercise Price Per Share	Weighted-Average Remaining Contractual Term (Years)	Aggregate Intrinsic Value
Outstanding at September 30, 2022	2,721,384	$ 20.73		
Granted	—	—		
Cancelled or expired	(13,875)	45.57		
Exercised	(81,733)	7.04		
Outstanding at December 31, 2022	2,625,776	$ 21.02	4.7	$ 61,867,396
Exercisable at December 31, 2022	2,346,710	$ 17.83	4.4	$ 60,525,256

The aggregate intrinsic values in the table above represent the total pre-tax intrinsic value (the difference between the Company's closing stock price and the stock option exercise price) that would have been received by the stock option holders had all stock options been exercised on December 31, 2022. The total intrinsic value of the options exercised during the three months ended December 31, 2022 and 2021 was $2.3 million and $12.5 million, respectively.

Stock-based compensation expense related to stock options oustanding for the three months ended December 31, 2022 and 2021, was $2.4 million and $3.0 million, respectively.

As of December 31, 2022, the pre-tax compensation expense for all outstanding unvested stock options in the amount of $9.5 million will be recognized in the Company's results of operations over a weighted average period of 1.3 years.

The fair value of each stock option award is estimated on the date of grant using the Black-Scholes option pricing model. The Black-Scholes option valuation model was developed for use in estimating the fair value of traded options, which do not

have vesting restrictions and are fully transferable. The determination of the fair value of each stock option is affected by the Company's stock price on the date of grant, as well as assumptions regarding a number of highly complex and subjective variables. Because the Company's employee stock options have characteristics significantly different from those of traded options, and because changes in the subjective input assumptions can materially affect the fair value estimate, the existing models do not necessarily provide a reliable single measure of the fair value of its employee stock options. No options were granted during the three months ended December 31, 2022 and 2021.

Restricted Stock Units

Restricted stock units ("RSUs"), including market-based, time-based and performance-based awards, have been granted under the Company's 2013 and 2021 Plans and as inducements grants granted outside of the Company's equity-based compensation plans. At vesting, each outstanding RSU will be exchanged for one share of the Company's common stock. RSU awards generally vest subject to the satisfaction of service requirements or the satisfaction of both service requirements and achievement of certain performance targets.

The following table summarizes the activity of the Company's RSUs:

	Number of RSUs	Weighted-Average Grant Date Fair Value Per Share
Outstanding at September 30, 2022	4,069,431	$ 62.96
Granted	18,875	31.77
Vested	(98,250)	51.70
Forfeited	(25,875)	44.70
Outstanding at December 31, 2022	3,964,181	$ 63.31

The fair value of RSUs was determined based on the closing price of the Company's common stock on the grant date, with consideration given to the probability of achieving service and/or performance conditions for awards.

For the three months ended December 31, 2022 and 2021, the Company recorded stock-based compensation expense of $17.0 million and $21.5 million, respectively, related to shares of RSUs. As of December 31, 2022, there was $128.3 million of total unrecognized compensation cost related to RSUs that is expected to be recognized over a weighted-average period of 2.2 years.

NOTE 10. FAIR VALUE MEASUREMENTS

The Company employs a fair value hierarchy that prioritizes the inputs to valuation techniques used to measure fair value. The fair value of a financial instrument is the amount that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date using the exit price. Accordingly, when market observable data are not readily available, the Company's own assumptions are used to reflect those that market participants would be presumed to use in pricing the asset or liability at the measurement date.

Assets and liabilities recorded at fair value on the consolidated balance sheets are categorized based on the level of judgment associated with inputs used to measure their fair values and the level of market price observability, as follows:

Level 1 Unadjusted quoted prices are available in active markets for identical assets or liabilities as of the reporting date.

Level 2 Pricing inputs are other than quoted prices in active markets, which are based on the following:

- Quoted prices for similar assets or liabilities in active markets;
- Quoted prices for identical or similar assets or liabilities in non-active markets; or
- Either directly or indirectly observable inputs as of the reporting date.

Level 3 Pricing inputs are unobservable and significant to the overall fair value measurement, and the determination of fair value requires significant management judgment or estimation.

In certain cases, inputs used to measure fair value may fall into different levels of the fair value hierarchy. In such cases, the level in the fair value hierarchy within which the fair value measurement in its entirety falls has been determined based on the lowest level input that is significant to the fair value measurement in its entirety. Thus, a Level 3 fair value measurement may include inputs that are observable (Level 1 or Level 2) and unobservable (Level 3). The Company's assessment of the significance of a particular input to the fair value measurement in its entirety requires judgment and consideration of factors specific to the asset or liability.

The Company uses prices and inputs that are current as of the measurement date, including during periods of market disruption. In periods of market disruption, the ability to observe prices and inputs may be reduced for many instruments. This condition could cause an instrument to be reclassified from Level 1 to Level 2, or from Level 2 to Level 3. The Company recognizes transfers between levels at either the actual date of the event or a change in circumstances that caused the transfer. At December 31, 2022 and September 30, 2022, the Company did not have any financial assets or financial liabilities based on Level 3 measurements

The following table presents information about the Company's assets and liabilities measured at fair value on a recurring basis, and indicates the fair value hierarchy of the valuation techniques utilized by the Company:

	December 31, 2022			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
U.S. government bonds	$ 27,423	$ —	$ —	$ 27,423
Commercial notes	—	104,311	—	104,311
Corporate debt securities	—	319,690	—	319,690
Certificate of deposits	—	—	—	—
Money market instruments	82,924	—	—	82,924

	September 30, 2022			
	Level 1	Level 2	Level 3	Total
	(in thousands)			
U.S. government bonds	$ 1,973	$ —	$ —	$ 1,973
Commercial notes	—	41,727	—	41,727
Corporate debt securities	—	271,333	—	271,333
Certificate of deposits	50,000	—	—	50,000
Money market instruments	39,262	—	—	39,262

NOTE 11. LIABILITY RELATED TO THE SALE OF FUTURE ROYALTIES

On November 9, 2022, the Company and Royalty Pharma entered into the Royalty Pharma Agreement, pursuant to which Royalty Pharma agreed to pay up to $410.0 million in cash to the Company in consideration for the Company's future royalty interest in Olpasiran, a small interfering RNA (siRNA) originally developed by the Company and licensed to Amgen in 2016 under the Olpasiran Agreement.

Pursuant to the Royalty Pharma Agreement, Royalty Pharma paid $250.0 million upfront and agreed to pay up to an additional $160.0 million in aggregate one-time milestone payments due if and when the following milestone events occur: (i) $50.0 million on completion of enrollment in the planned OCEAN Phase 3 clinical trial for Olpasiran, (ii) $50.0 million upon receipt of FDA approval of Olpasiran for an approved indication (reduction in the risk of myocardial infarction, urgent coronary revascularization, or coronary heart disease death in adults with established cardiovascular disease and elevated Lp(a)), and (iii) $60.0 million upon Royalty Pharma's receipt of at least $70.0 million of royalty payments under the Royalty Pharma Agreement in any single calendar year.

In consideration for the payment of the foregoing amounts under the Royalty Pharma Agreement, Royalty Pharma is entitled to receive all royalties otherwise payable by Amgen to the Company under the Olpasiran Agreement. The Company remains eligible to receive any milestone payments potentially payable by Amgen under the Olpasiran Agreement.

The Company has evaluated the terms of the Royalty Pharma Agreement and concluded in accordance with the relevant accounting guidance that the Company accounted for the transaction as debt and the funding of $250.0 million from Royalty Pharma was recorded as a liability related to the sale of future royalties on its consolidated balance sheets. The Company is not obligated to repay this upfront funding received under the Royalty Pharma Agreement. This liability is amortized over the expected repayment term using an effective interest rate method. The effective interest rate is calculated based on the rate that would enable the debt to be repaid in full over the anticipated life of the arrangement. The interest rate may vary during the term of the agreement depending on a number of factors, including the amount and timing of forecasted net revenues which affects the repayment timing and ultimate amount of repayment. The Company will evaluate the effective interest rate quarterly based on its current revenue forecasts utilizing the prospective method. For the three months ended December 31, 2022, the Company recognized non-cash interest expense of $2.8 million on the consolidated statements of operations and comprehensive loss.

ITEM 2. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

FORWARD-LOOKING STATEMENTS

This Quarterly Report on Form 10-Q contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended, and we intend that such forward-looking statements be subject to the safe harbors created thereby. For this purpose, any statements contained in this Quarterly Report on Form 10-Q 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," "plan," "project," "could," "estimate," "target," "forecast" or "continue" or the negative of these words 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 business, or other characterizations of future events or circumstances are forward-looking statements. These forward-looking statements include, but are not limited to, statements about the initiation, timing, progress and results of our preclinical studies and clinical trials, and our research and development programs; our expectations regarding the potential benefits of the partnership, licensing and/or collaboration arrangements and other strategic arrangements and transactions we have entered into or may enter into in the future; our beliefs and expectations regarding milestone, royalty or other payments that could be due to or from third parties under existing agreements; and our estimates regarding future revenues, research and development expenses, capital requirements and payments to third parties.

The forward-looking statements included herein are based on current expectations of the Company's 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 the Company's control. As such, our actual results and timing of certain events may differ materially from the results discussed, projected, anticipated or indicated in any forward-looking statements. Forward-looking statements are not guarantees of future performance and our actual results of operations, financial condition and cash flows may differ materially. 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 the Company's most recent Annual Report on Form 10-K. Readers should carefully review these risks, as well as the additional risks described in other documents the Company files from time to time with the Securities and Exchange Commission (the "SEC"), including this Quarterly Report on Form 10-Q for the quarter ended December 31, 2022. 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. Statements made herein are as of the date of the filing of this Quarterly Report on Form 10-Q with the SEC and should not be relied upon as of any subsequent date. 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.

OVERVIEW

The Company develops medicines that treat intractable diseases by silencing the genes that cause them. Using a broad portfolio of RNA chemistries and efficient modes of delivery, the Company's therapies trigger the RNAi mechanism to induce rapid, deep and durable knockdown of target genes. 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.

The Company has focused its resources on therapeutics that exclusively utilize its high levels of pharmacologic activity in multiple animal models spanning several therapeutic areas. The Company believes that TRiM™ enabled therapeutics offer several potential advantages over prior generation and competing technologies, including: simplified manufacturing and reduced costs; multiple routes of administration including subcutaneous injection and inhaled administration; the ability to target multiple tissue types including liver, lung, muscle and others; and the potential for improved safety and reduced risk of intracellular buildup, because there are fewer metabolites from smaller, simpler molecules.

The Company's pipeline includes:

- Hypertriglyceridemia - ARO-APOC3
- Dyslipidemia - ARO-ANG3
- Facioscapulohumeral muscular dystrophy - ARO-DUX4

- Complement mediated diseases - ARO-C3
- Muco-obstructive or inflammatory pulmonary conditions - ARO-RAGE and ARO-MUC5AC
- Idiopathic pulmonary fibrosis - ARO-MMP7
- Liver disease - ARO-HSD (out-licensed to GSK)
- Uncontrolled gout - HZN-457 (formerly ARO-XDH, out-licensed to Horizon)
- Non-alcoholic steatohepatitis (NASH) - NJ-75220795 (formerly ARO-JNJ1, out-licensed to Janssen)
- Liver disease associated with alpha-1 antitrypsin deficiency ("AATD") - Fazirsiran (formerly ARO-AAT, a collaboration with Takeda)
- Chronic hepatitis B virus - JNJ-3989 (formerly ARO-HBV, out-licensed to Janssen)
- Cardiovascular disease - Olpasiran (formerly AMG 890 or ARO-LPA, out-licensed to Amgen)

The Company operates lab facilities in San Diego, California and Madison, Wisconsin, where its research and development activities, including the development of RNAi therapeutics, take place. The Company's principal executive offices are located in Pasadena, California.

The Company continues to develop other clinical candidates for future clinical trials. Clinical candidates are tested internally and through GLP toxicology studies at outside laboratories. Drug materials for such studies and clinical trials are either manufactured internally or contracted to third-party manufacturers. The Company engages third-party contract research organizations ("CROs") to manage clinical trials and works cooperatively with such organizations on all aspects of clinical trial management, including plan design, patient recruiting, and follow up. These outside costs, relating to the preparation for and administration of clinical trials, are referred to as "candidate costs." As clinical candidates progress through clinical development, candidate costs will increase.

The First Quarter Business Highlights

Key recent developments during the first quarter of fiscal 2023 included the following:

- enrolled the first subject in a Phase 1 randomized, placebo-controlled trial to assess the safety tolerability, pharmacokinetics and pharmacodynamics of a development-stage medicine, HZN-457 (previously known as ARO-XDH), which is out-licensed to Horizon, triggering a $15.0 million milestone payment to the Company which was paid in the second quarter of fiscal 2023;
- enrolled the first subject in Amgen's Phase 3 trial of Olpasiran, which triggered a $25.0 million milestone payment to the Company, which was paid in the second quarter of fiscal 2023;
- entered into the Royalty Pharma Agreement on November 9, 2022, pursuant to which Royalty Pharma paid $250.0 million upfront (See Note 11 — Liability Related to the Sale of Future Royalties of Notes to Consolidated Financial Statements of Part I, "Item 1. Financial Statements.");
- announced top line results from SEQUOIA Phase 2 Study of Fazirsiran in Patients with Alpha-1 Antitrypsin Deficiency-Associated Liver Disease in which:
    - Fibrosis regression was observed in 50% of patients receiving Fazirsiran;
    - Median reductions of 94% of Z-AAT accumulation in the liver and mean reductions of 68% in histologic globule burden were observed;
    - Treatment emergent adverse events were generally well balanced between Fazirsiran and placebo groups;
    - Results were consistent with AROAAT-2002 open-label study previously published in The New England Journal of Medicine.

Net loss was $41.3 million for the three months ended December 31, 2022 as compared to net loss of $62.9 million for the three months ended December 31, 2021. Net loss per share – diluted was $0.39 for the three months ended December 31, 2022 as compared to net loss per share – diluted of $0.60 for the three months ended December 31, 2021. The decrease in net loss for the three months ended December 31, 2022 was due to an increase in revenue from the Company's license and collaboration agreements, primarily from the license agreements with Horizon, Takeda and Amgen, partially offset by increased research and development and general and administrative expenses, which have continued to increase as the Company's pipeline of candidates has expanded and progressed through clinical trial phases.

The Company had $202.2 million of cash, cash equivalents and restricted cash, $299.6 million in short-term investments, $115.8 million of long-term investments and $891.5 million of total assets as of December 31, 2022, as compared to $108.0 million of cash, cash equivalents and restricted cash, $268.4 million in short-term investments, $105.9 million of long-term investments and $691.9 million of total assets as of September 30, 2022. Based upon the Company's

current cash and investment resources and operating plan, the Company expects to have sufficient liquidity to fund operations for at least the next twelve months.

Critical Accounting Estimates

There have been no significant changes to the Company's critical accounting estimates disclosed in the most recent Annual Report on Form 10-K for the fiscal year ended September 30, 2022.

RESULTS OF OPERATIONS

The following data summarizes the Company's results of operations for the following periods indicated:

	Three Months Ended December 31,	
	2022	2021
	(in thousands, except per share amounts)	
Revenues	$ 62,546	$ 27,439
Operating loss	$ (42,134)	$ (63,321)
Net loss attributable to Arrowhead Pharmaceuticals, Inc.	$ (41,325)	$ (62,872)
Net loss per share-diluted	$ (0.39)	$ (0.60)

Revenue

Total revenue for the three months ended December 31, 2022 increased to $62.5 million, 127.9% from the same period of 2021. The increase was primarily driven by the revenue recognition associated with Horizon, Takeda and Amgen license agreements, as discussed below. The Company has evaluated each agreement in accordance with FASB Topic 808–*Collaborative Arrangements* and Topic 606-*Revenue for Contracts from Customers*.

Horizon

On June 18, 2021, Horizon and the Company entered into the Horizon License Agreement. At the inception of the Horizon License Agreement, the Company identified one distinct performance obligation. The Company determined that the key deliverables included the license and certain R&D services, including the Company's responsibilities to conduct all activities through the preclinical stages of development of HZN-457 (the "Horizon R&D Services"). Due to the specialized and unique nature of these Horizon R&D Services and their direct relationship with the license, the Company determined that these deliverables represented one distinct bundle and, thus, one performance obligation. Beyond the Horizon R&D Services, which are the responsibility of the Company, Horizon is responsible for managing future clinical development and commercialization of HZN-457.

The Company determined the initial transaction price totaled $40.0 million, including the upfront payment. The Company has excluded any future estimated milestones or royalties from this transaction price to date. The Company allocates the total $40.0 million initial transaction price to its one distinct performance obligation for the HZN-457 license and the associated Horizon R&D Services. Revenue is recognized on a straight-line basis over the estimated timeframe for completing the Horizon R&D Services. The Company determined that the straight-line basis was appropriate as its efforts will be expended evenly over the course of completing its performance obligation.

On December 8, 2022, Horizon announced that it enrolled the first subject in a Phase 1 randomized, placebo-controlled trial to assess the safety, tolerability, pharmacokinetics and pharmacodynamics of HZN-457, triggering a $15.0 million milestone payment to the Company which was paid in the second quarter of fiscal 2023.

Revenue for the three months ended December 31, 2022 and 2021 were $21.7 million and $6.7 million, respectively. There were $15.0 million in contract assets recorded as accounts receivable and $0 in contract liabilities recorded as deferred revenue as of December 31, 2022.

Takeda

On October 7, 2020, Takeda and the Company entered into the Takeda License Agreement. At the inception of the Takeda License Agreement, the Company identified one distinct performance obligation. The Company determined that the key deliverables included the license and certain R&D services including the Company's responsibilities to complete the initial portion of the SEQUOIA study, to complete the ongoing Phase 2 AROAAT2002 study and to ensure certain manufacturing of Fazirsiran drug product is completed and delivered to Takeda (the "Takeda R&D Services"). Due to the specialized and unique nature of these Takeda R&D Services and their direct relationship with the license, the Company

determined that these deliverables represent one distinct bundle and, thus, one performance obligation. Beyond the Takeda R&D Services, which are the responsibility of the Company, Takeda will be responsible for managing future clinical development and commercialization outside the United States. Within the United States, the Company will also participate in co-development and co-commercialization efforts and will co-fund these efforts with Takeda as part of the 50/50 profit sharing structure within the United States. The Company considers the collaborative activities, including the co-development and co-commercialization, to be a separate unit of account within Topic 808, and as such, these co-funding amounts are recorded as research and development expenses or general and administrative expenses, as appropriate.

The Company determined the initial transaction price totaled $300.0 million, which includes the upfront payment. The Company has excluded any future milestones or royalties from this transaction price to date. The Company has allocated the total $300.0 million initial transaction price to its one distinct performance obligation for the Fazirsiran license and the associated Takeda R&D Services. Revenue is recognized using a proportional performance method (based on actual patient visits completed versus total estimated visits completed for the ongoing SEQUOIA and AROAAT2002 clinical studies). The Company recognized $16.3 million and $20.8 million in connection with these efforts for the three months ended December 31, 2022 and 2021, respectively. There were $0 of contract assets recorded as accounts receivable and $107.1 million of contract liabilities recorded as deferred revenue, of which $66.3 million was classified as current deferred revenue, as of December 31, 2022. The Company also recorded $9.8 million as accrued expenses as of December 31, 2022 that was primarily driven by co-development and co-commercialization activities.

Amgen Inc. ("Amgen")

On September 28, 2016, Amgen and the Company entered into two collaboration and license agreements and a common stock purchase agreement. Under the Olpasiran Agreement, Amgen received a worldwide, exclusive license to the Company's novel RNAi Olpasiran program. Olpasiran is designed to reduce elevated lipoprotein(a), which is a genetically validated, independent risk factor for atherosclerotic cardiovascular disease. Amgen is wholly responsible for clinical development and commercialization. The Company has substantially completed its performance obligations under the Olpasiran Agreement.

Further, in November 2022, Royalty Pharma and the Company entered into the Royalty Pharma Agreement. In consideration for the payments under the Royalty Pharma Agreement, Royalty Pharma is entitled to receive all royalties otherwise payable by Amgen to the Company under the Olpasiran Agreement. The Company remains eligible to receive any milestone payments potentially payable by Amgen under the Olpasiran Agreement.

In December 2022, Amgen enrolled the first subject in its Phase 3 trial of Olpasiran, which triggered a $25.0 million milestone payment to the Company, which was paid in the second quarter of fiscal 2023. The Company is further eligible to receive up to an additional $535 million in aggregate development, regulatory, and sales milestone payments from Amgen and Royalty Pharma. Revenue for the three months ended December 31, 2022 and 2021 were $25.0 million and $0, respectively. There were $25.0 million in contract assets recorded as accounts receivable and $0 in contract liabilities recorded as deferred revenue as of December 31, 2022.

Operating Expenses

The analysis below details the operating expenses and discusses the expenditures of the Company within the major expense categories. For purposes of comparison, the amounts for the three months ended December 31, 2022 and 2021 are shown in the tables below.

Research and Development Expenses

R&D expenses are related to the Company's research and development discovery efforts and related candidate costs, which are comprised primarily of outsourced costs related to the manufacturing of clinical supplies, toxicity/efficacy studies and clinical trial expenses. Internal costs primarily relate to discovery operations at the Company's research facilities in San Diego, California and Madison, Wisconsin, including facility costs and laboratory-related expenses. The Company does not separately track R&D expenses by individual research and development projects, or by individual drug candidates. The Company operates in a cross-functional manner across projects and does not separately allocate facilities-related costs, candidate costs, discovery costs, compensation expenses, depreciation and amortization expenses, and other expenses related to research and development activities.

The following table provides details of research and development expenses for the three months ended December 31:

(in thousands)	2022	% of Expense Category	2021	% of Expense Category	Increase (Decrease) $	Increase (Decrease) %
Candidate costs	$ 42,284	51 %	$ 32,345	49 %	$ 9,939	31 %
R&D discovery costs	12,693	15 %	11,000	17 %	1,693	15 %
Salaries	14,689	17 %	10,994	17 %	3,695	34 %
Facilities related	3,341	4 %	2,038	3 %	1,303	64 %
Total research and development expense, excluding non-cash expense	$ 73,007	87 %	$ 56,377	86 %	$ 16,630	29 %
Stock compensation	8,402	10 %	7,218	11 %	1,184	16 %
Depreciation and amortization	2,286	3 %	2,170	3 %	116	5 %
Total research and development expense	$ 83,695	100 %	$ 65,765	100 %	$ 17,930	27 %

Candidate costs increased $9.9 million to $42.3 million for the three months ended December 31, 2022 compared to $32.3 million for the same period of 2021. This increase was primarily due to the progression of the Company's pipeline of candidates into and through clinical trials, which resulted in higher outsourced clinical trial, toxicity study and manufacturing costs. For example, the Company's cardiometabolic candidates, ARO-ANG3 and ARO-APOC3, have advanced into Phase 2 and Phase 3 clinical trials.

R&D discovery costs increased $1.7 million to $12.7 million for the three months ended December 31, 2022 compared to $11.0 million for the same period of 2021. This increase was due to the growth of the Company's discovery efforts and continued advancement into novel therapeutic areas and tissue types.

Salaries and stock compensation expense consist of salary, bonuses, payroll taxes, related benefits and stock compensation for the Company's R&D personnel. The increases in salaries and stock comp expenses were primarily due to an increase in R&D headcount that has occurred as the Company has expanded its pipeline of candidates, in addition to annual salary increases. Stock compensation expense was based upon the valuation of stock options and restricted stock units granted to employees, directors and certain consultants.

Facilities-related expense included lease costs for the Company's research and development facilities in San Diego, California and Madison, Wisconsin. Facilities-related costs increased $1.3 million to $3.3 million for the three months ended December 31, 2022, compared to $2.0 million for the same period of 2021. This increase was mainly due to the additional lease expense as the Company expands discovery efforts to identify new drug candidates.

The increase of depreciation and amortization expense, a non-cash expense, relates to depreciation on lab equipment and leasehold improvements at the facilities.

The Company anticipates these R&D expenses to continue to increase as its pipeline of candidates grows and progresses to later phase clinical trials, in addition to inflationary pressure on goods and services and the labor market.

General & Administrative Expenses

The following table provides details of the Company's general and administrative expenses for the three months ended

December 31:

	2022	% of Expense Category	2021	% of Expense Category	Increase (Decrease) $	Increase (Decrease) %
Salaries	$ 4,207	20 %	$ 3,430	13 %	$ 777	23 %
Professional, outside services, and others	4,383	21 %	3,195	13 %	1,188	37 %
Facilities related	1,005	5 %	680	3 %	325	48 %
Total general & administrative expense, excluding non-cash expense	$ 9,595	46 %	$ 7,305	29 %	$ 2,290	31 %
Stock compensation	10,987	52 %	17,287	69 %	(6,300)	(36)%
Depreciation and amortization	403	2 %	403	2 %	—	— %
Total general & administrative expense	$ 20,985	100 %	$ 24,995	100 %	$ (4,010)	(16)%

Salaries expense increased $0.8 million to $4.2 million for the three months ended December 31, 2022 compared to $3.4 million for the same period of 2021. The increase was driven by the combination of annual salary increases and increased headcount required to support the Company's growth.

Professional, outside services, and others expense includes legal, consulting, patent expenses, business insurance expenses, other outside services, travel, and communication and technology expenses. This expense increased $1.2 million to $4.4 million for the three months ended December 31, 2022 compared to $3.2 million for the same period of 2021. The increase was mainly due to consulting expenses related to software implementation and administrative expenses in support of additional headcount.

Facilities related expense primarily includes rental costs and other facilities-related costs for the Company's corporate headquarters in Pasadena, California. Depreciation and amortization expense, a noncash expense, was primarily related to amortization of leasehold improvements for the Company's corporate headquarters.

Stock compensation expense, a non-cash expense, decreased by $6.3 million to $11.0 million for the three months ended December 31, 2022 compared to $17.3 million for the same period of 2021. The decrease in the current period was mainly due to the reversal of recognized compensation costs related to a performance award where the minimum performance goal was not met. The fair value of market condition-based awards was expensed ratably over the service period and was not adjusted for actual achievement.

The Company anticipates these general and administrative expenses to continue to increase as its pipeline of candidates grows and progresses to later phase clinical trials, in addition to inflationary pressure on goods and services and the labor market.

Other Income

Other income is primarily related to interest income and realized and unrealized gain/loss on investments. Other income decreased $0.1 million to $0.3 million for the three months ended December 31, 2022 compared to $0.4 million for the same period of 2021. The decrease was due to the interest expense on the liability related to the sale of future royalties, offset by higher yields on investments due to increased interest rates as well as credits the Company received during the first quarter of fiscal 2023.

LIQUIDITY AND CAPITAL RESOURCES

The Company has historically financed its operations through the sale of its common stock, revenue from its licensing and collaboration agreements and the sale of certain future royalties. Research and development activities have required significant capital investment since the Company's inception and are expected to continue to require significant cash expenditure as the Company's pipeline continues to expand and matures into later stage clinical trials. Additionally, the Company plans to expand its facilities with its purchase of land in Verona, Wisconsin, and its entry into a new lease in San Diego, California. Each of these expansions is designed to increase the Company's internal manufacturing and discovery capabilities, and each will require significant capital investment.

The Company's cash, cash equivalents and restricted cash increased to $202.2 million at December 31, 2022 compared to $108.0 million at September 30, 2022. Cash invested in short-term fixed income securities was $299.6 million at December 31, 2022 compared to $268.4 million at September 30, 2022. Cash invested in long-term fixed income securities was $115.8 million at December 31, 2022, compared to $105.9 million at September 30, 2022. On December 2, 2022, the Company entered into the Open Market Sale Agreement, pursuant to which the Company may, from time to time, sell up to $250.0 million in shares of the Company's common stock through Jefferies LLC, acting as the sales agent and/or principal, in an at-the-market offering. As of December 31, 2022, no shares have been issued under the Open Market Sale Agreement. The Company believes its current financial resources are sufficient to fund its operations through at least the next twelve months.

The following table presents a summary of cash flows:

	Three Months Ended December 31,	
	2022	2021
	(in thousands)	
Cash Flow from:		
Operating activities	$ (75,516)	$ (61,308)
Investing activities	(80,694)	(33,385)
Financing activities	250,576	1,885
Net increase (decrease) in cash, cash equivalents and restricted cash	$ 94,366	$ (92,808)
Cash, cash equivalents and restricted cash at end of period	$ 202,249	$ 91,587

During the three months ended December 31, 2022, cash flows used by operating activities was $75.5 million, which was primarily due to the ongoing expenses related to the Company's research and development programs and general and administrative expenses, partially offset by the receipt of $6.0 million from GSK (see Note 2 — Collaboration and License Agreements to Consolidated Financial Statements of Part I, "Item 1. Financial Statements") and Horizon. Cash used in investing activities was $80.7 million, which was primarily related to capital expenditures, primarily construction in progress, of $38.9 million and investments of $111.2 million, offset by net sales and maturities of investments of $69.4 million. Cash provided by financing activities of $250.6 million was primarily related to the $250.0 million payment from Royalty Pharma as well as cash received from stock option exercises. See Note 11 — Liability Related to the Sale of Future Royalties of Notes to Consolidated Financial Statements of Part I, "Item 1. Financial Statements."

During the three months ended December 31, 2021, cash flows used by operating activities was $61.3 million, which was primarily related to ongoing expenses related to the Company's research and development programs and general and administrative expenses. Cash used in investing activities was $33.4 million, which was primarily related to the purchase of property and equipment of $5.8 million and net purchases of investments of $27.6 million. Cash provided by financing activities of $1.9 million was related to cash received from stock option exercises.

On December 20, 2021, the Company completed a purchase of 13 acres of land in the Verona Technology Park in Verona, Wisconsin, which is being developed into an approximately 160,000 square foot drug manufacturing facility and an approximately 140,000 square foot laboratory and office facility which will support the Company's process development and analytical activities. The Company intends to invest between $200.0 million and $260.0 million into the build out of the facilities with cash on hand. As part of this acquisition, the Company entered into a development agreement with the City of Verona to construct certain infrastructure improvements within the tax incremental district and expects to be reimbursed up to $16.0 million by the City of Verona by future tax increment revenue generated from the developed property. The total amount of funding that City of Verona is expected to pay under the Tax Incremental Financing program is not guaranteed and will depend on future tax revenues generated from the developed property. The Company also expects receive up to $2.5 million of refundable Wisconsin state income tax credits from the Wisconsin Economic Development Corporation (WEDC) as incentives to invest in the local community and create new jobs.

ITEM 3. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

There has been no material change in the Company's exposure to market risk from that described in Item 7A of its Annual Report on Form 10-K for the year ended September 30, 2022.

ITEM 4. CONTROLS AND PROCEDURES

Evaluation of Disclosure Controls and Procedures

The Company maintains disclosure controls and procedures designed to ensure that information required to be disclosed in its reports filed under the Exchange Act is recorded, processed, summarized, and reported within the time periods specified in the SEC rules and forms, and that such information is accumulated and communicated to its management, including its Chief Executive Officer and Chief Financial Officer, as appropriate, to allow for timely decisions regarding required disclosure. In designing and evaluating the disclosure controls and procedures, management recognizes that any controls and procedures, no matter how well designed and operated, can provide only reasonable assurance of achieving the desired control objectives.

As required by Rule 13a-15(b) of the Exchange Act, the Company carried out an evaluation, under the supervision and with the participation of its management, including its Chief Executive Officer and Chief Financial Officer, of the effectiveness of the design and operation of the Company's disclosure controls and procedures as of the end of the quarter covered by this Quarterly Report on Form 10-Q. Based on the foregoing, the Company's Chief Executive Officer and Chief Financial Officer concluded that the Company's disclosure controls and procedures were effective at the reasonable assurance level.

Changes in Internal Control Over Financial Reporting

There has been no change in the Company's internal control over financial reporting during the Company's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the Company's internal control over financial reporting. The Company's process for evaluating controls and procedures is continuous and encompasses constant improvement of the design and effectiveness of established controls and procedures and the remediation of any deficiencies which may be identified during this process.

PART II—OTHER INFORMATION

ITEM 1. LEGAL PROCEEDINGS

From time to time, the Company may be involved in routine legal proceedings, as well as demands, claims and threatened litigation, which arise in the normal course of its business. Litigation can be expensive and disruptive to normal business operations. Moreover, the results of legal proceedings, particularly complex legal proceedings, cannot be predicted with any certainty. There have been no material developments in the legal proceedings that the Company disclosed in Part I, Item 3 of its Annual Report on Form 10-K for the year ended September 30, 2022.

ITEM 1A. Risk Factors

The Company's business, results of operations and financial conditions are subject to various risks. These risks are described elsewhere in this Quarterly Report on Form 10-Q and in the Company's other filings with the SEC, including the Company's Annual report on Form 10-K for the year ended September 30, 2022. There have been no material changes from the risk factors identified in the Company's Annual Report on Form 10-K for the year ended September 30, 2022.

ITEM 2. UNREGISTERED SALES OF EQUITY SECURITIES AND USE OF PROCEEDS

None.

ITEM 3. DEFAULTS UPON SENIOR SECURITIES

None.

ITEM 4. MINE SAFETY DISCLOSURES

Not Applicable.

ITEM 5. OTHER INFORMATION

None.

ITEM 6. EXHIBITS

Exhibit Number	Document Description
3.1	Amended and Restated Certificate of Incorporation (incorporated by reference from Exhibit 3.1 of the Company's Form 8-K filed on April 6, 2016)
3.2	Second Amended and Restated Bylaws (incorporated by reference from Exhibit 3.1 of the Company's Form 8-K filed on January 30, 2023)
10.1*	Royalty Purchase Agreement, dated as of November 9, 2022, by and between Arrowhead Pharmaceuticals, Inc. and Royalty Pharma Investments 2019 ICAV.
31.1*	Certification of Chief Executive Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
31.2*	Certification of Chief Financial Officer pursuant to Rule 13a-14(a) of the Securities Exchange Act of 1934, as Adopted Pursuant to Section 302 of the Sarbanes-Oxley Act of 2002
32.1**	Certification of Chief Executive Officer pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
32.2**	Certification of Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as Adopted Pursuant to Section 906 of the Sarbanes-Oxley Act of 2002
101.INS*	Inline XBRL Instance Document
101.SCH*	Inline XBRL Taxonomy Extension Schema Document
101.CAL*	Inline XBRL Taxonomy Extension Calculation Linkbase Document
101.LAB*	Inline XBRL Taxonomy Extension Label Linkbase Document
101.PRE*	Inline XBRL Taxonomy Extension Presentation Linkbase Document
101.DEF*	Inline XBRL Taxonomy Extension Definition Linkbase Document
104*	The cover page from this Quarterly Report on Form 10-Q, formatted in Inline XBRL (included as Exhibit 101)

* Filed herewith.
** Furnished herewith.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this Quarterly Report on Form 10-Q to be signed on its behalf by the undersigned, thereunto duly authorized.

Dated: February 6, 2023

ARROWHEAD PHARMACEUTICALS, INC.

By: /s/ Kenneth A. Myszkowski

Kenneth A. Myszkowski
Chief Financial Officer
(Principal Financial Officer and Duly Authorized Officer)

AMENDED AND RESTATED
CERTIFICATE OF INCORPORATION

OF

ARROWHEAD RESEARCH CORPORATION
(a Delaware corporation)

Arrowhead Research Corporation, a corporation organized and existing under the laws of the State of Delaware (the "Corporation"), does hereby certify as follows:

(a) The name of the Corporation is Arrowhead Research Corporation. The Corporation's original Certificate of Incorporation was filed with the Secretary of State of the State of Delaware on February 13, 2001 under the Corporation's former name, InterActive Group, Inc.

(b) This Amended and Restated Certificate of Incorporation has been duly authorized and adopted by the Board of Directors of the Corporation in accordance with the provisions of Sections 242 and 245 of the General Corporation Law of the State of Delaware.

(c) Effective as of 4:01 p.m. (Eastern Time) on April 6, 2016, the Corporation's Certificate of Incorporation shall be amended and restated in its entirety to read as follows:

FIRST: The name of the corporation is Arrowhead Pharmaceuticals, Inc. (the "Corporation").

SECOND: The address of the Corporation's registered office in the State of Delaware is 2140 South Dupont Hwy, Camden, Kent County, Delaware 19934. The name of its registered agent at such address is Paracorp Incorporated.

THIRD: The purpose of the Corporation is to engage in any lawful act or activity for which corporations may be organized under the General Corporation Law of the State of Delaware (the "DGCL").

FOURTH: The total number of shares which the Corporation shall have authority to issue is 150,000,000, of which 145,000,000 shares shall be common stock, $.001 par value ("Common Stock"), and 5,000,000 shares shall be preferred stock, $.001 par value ("Preferred Stock"). The Board of Directors (the "Board") is authorized, subject to the limitations prescribed by law and the provisions of this Article FOURTH, to provide for the issuance of the Preferred Stock in series, and by filing a certificate pursuant to the applicable laws of the State of Delaware, to establish from time to time the number of shares to be included in each such series, and to fix the designation, powers, preferences and rights of the shares of each such series and the qualifications, limitations or restrictions thereof. The authority of the Board with respect to each such series shall include, but not be limited to, the determination of the following: (a) The number of shares constituting that series and the distinctive designation of that series; (b) The dividend rate, if any, on the shares of that series, whether dividends shall be cumulative, and, if so, from which date or dates, and the relative priority, if any, of payment of dividends on shares of that series; (c) Whether that series shall have voting rights, in addition to the voting rights expressly required by law, and, if so, the terms of such voting rights; (d) Whether that series shall have conversion privileges, and, if so, the terms and conditions of such conversion, including provisions for adjustment of the conversion rate in such events as the Board shall determine; (e) Whether or not the shares of that series shall be redeemable, and, if so, the terms and conditions of such redemption, including the date or dates upon or after which they shall be redeemable, and the amount per share payable in the case of redemption, which amount may vary under different conditions and at different redemption dates; (f) Whether that series shall have a sinking fund for the redemption or purchase of shares of that series, and, if so, the terms and amount of such sinking fund; (g) The rights of the shares of that series in the event of a voluntary or involuntary liquidation, dissolution or winding up of the Corporation, and the relative rights of priority, if any, of payment of shares of that series; and (h) Any other relative rights, preferences and limitations of that series.

Series C Convertible Preferred Stock. Pursuant to the authority conferred by this Article FOURTH upon the Board, the Board created a series of 46,000 shares of Preferred Stock designated as Series C Convertible Preferred Stock by filing a certificate of designations with the Secretary of State of the State of Delaware on October 10, 2013. The voting powers, designations, preferences and relative, participating, optional or other special rights, and the qualifications, limitations and restrictions thereof, of the Series C Convertible Preferred Stock of the Corporation are as set forth in Annex A hereto and are incorporated herein by reference.

FIFTH: The Board is expressly authorized to make, alter or repeal the Bylaws of the Corporation, but the stockholders may make additional Bylaws and may alter or repeal any bylaw whether adopted by them or otherwise.

SIXTH: Elections of directors need not be by written ballot except to the extent provided in the Bylaws of the Corporation.

SEVENTH: A director of the Corporation shall not be liable to the Corporation or any of its stockholders for monetary damages for breach of fiduciary duty as a director, except to the extent such exemption from liability or limitation thereof is not permitted under the DGCL as the same exists or may hereafter be amended. Any repeal or modification of the foregoing paragraph by the stockholders of the Corporation shall not adversely affect any right or protection of a director of the Corporation in respect of any act or omission occurring prior to the time of such repeal or modification.

EIGHTH: The Corporation reserves the right at any time and from time to time to amend, alter, change or repeal any provision contained in this Certificate of Incorporation in the manner now or hereafter prescribed by law, and all rights, preferences and privileges of whatsoever nature conferred upon stockholders, directors or any other persons whomsoever by and pursuant to this Certificate of Incorporation in its present form or as hereafter amended are granted subject to the right reserved in this Article EIGHTH.

[*Remainder of Page Intentionally Left Blank*]

IN WITNESS WHEREOF, Arrowhead Research Corporation has caused this Amended and Restated Certificate of Incorporation to be signed by the undersigned duly authorized officer on this 5th day of April, 2016.

ARROWHEAD RESEARCH CORPORATION

By: /s/ Christopher Anzalone
Christopher Anzalone
President and Chief Executive Officer

[*Signature Page to Amended & Restated Certificate of Incorporation*]

ANNEX A

ARROWHEAD RESEARCH CORPORATION

**CERTIFICATE OF DESIGNATION OF PREFERENCES,
RIGHTS AND LIMITATIONS
OF
SERIES C CONVERTIBLE PREFERRED STOCK**

PURSUANT TO SECTION 151 OF THE
DELAWARE GENERAL CORPORATION LAW

Section 1. Definitions. For the purposes of this Annex A, the following terms shall have the following meanings:

"Affiliate" means any Person that, directly or indirectly through one or more intermediaries, controls or is controlled by or is under common control with a Person, as such terms are used in and construed under Rule 405 of the Securities Act.

"Beneficial Ownership Limitation" shall have the meaning set forth in Section 6(d).

"Business Day" means any day except any Saturday, any Sunday, any day which is a federal legal holiday in the United States or any day on which banking institutions in the State of New York are authorized or required by law or other governmental action to close.

"Buy-In" shall have the meaning set forth in Section 6(c)(iv).

"Commission" means the United States Securities and Exchange Commission.

"Common Stock" means the Corporation's common stock, par value $0.001 per share, and stock of any other class of securities into which such securities may be reclassified or changed after October 10, 2013.

"Common Stock Equivalents" means any securities of the Corporation or the Subsidiaries which would entitle the holder thereof to acquire at any time Common Stock, including, without limitation, any debt, preferred stock, rights, options, warrants or other instrument that is at any time convertible into or exercisable or exchangeable for, or otherwise entitles the holder thereof to receive, Common Stock.

"Conversion Amount" means the sum of the Stated Value at issue.

"Conversion Date" shall have the meaning set forth in Section 6(a).

"Conversion Price" shall have the meaning set forth in Section 6(b).

"Conversion Shares" means, collectively, the shares of Common Stock issuable upon conversion of the shares of Series C Preferred Stock in accordance with the terms hereof.

"Distribution" shall have the meaning set forth in Section 7(c).

"Effective Date" means the date that the Resale Registration Statement filed by the Corporation pursuant to the Purchase Agreement first becomes effective under the Securities Act.

"Exchange Act" means the Securities Exchange Act of 1934, as amended, and the rules and regulations promulgated thereunder.

"Fundamental Transaction" shall have the meaning set forth in Section 7(d).

"Holder" shall have the meaning given such term in Section 2.

"Junior Securities" means the Common Stock and all other Common Stock Equivalents of the Corporation other than those securities which are explicitly senior or pari passu to the Series C Preferred Stock in dividend rights or liquidation preference.

"Liquidation" shall have the meaning set forth in Section 5.

"New York Courts" shall have the meaning set forth in Section 8(d).

"Notice of Conversion" shall have the meaning set forth in Section 6(a).

"Original Issue Date" means the date of the first issuance of any shares of the Series C Preferred Stock regardless of the number of transfers of any particular shares of Series C Preferred Stock and regardless of the number of certificates which may be issued to evidence such Series C Preferred Stock.

"Person" means an individual or corporation, partnership, trust, incorporated or unincorporated association, joint venture, limited liability company, joint stock company, government (or an agency or subdivision thereof) or other entity of any kind.

"Purchase Agreement" means the Securities Purchase Agreement, dated October 8, 2013, among the Corporation and the original Holders, as amended, modified or supplemented from time to time in accordance with its terms.

"Reference Property" shall have the meaning set forth in Section 7(d).

"Reference Property Units" shall have the meaning set forth in Section 7(d).

"Resale Registration Statement" means a registration statement that registers the resale of the Conversion Shares of the Holders, who shall be named as "selling stockholders" therein and meets the requirements of the Purchase Agreement.

"Securities Act" means the Securities Act of 1933, as amended, and the rules and regulations promulgated thereunder.

"Series C Preferred Stock" shall have the meaning set forth in Section 2.

"Share Delivery Date" shall have the meaning set forth in Section 6(c)(i).

"Stated Value" shall have the meaning set forth in Section 2.

"Subsidiary" means any Subsidiary of the Corporation as defined in the Purchase Agreement and shall, where applicable, also include any direct or indirect subsidiary of the Corporation formed or acquired after the date of the Purchase Agreement.

"Successor Entity" shall have the meaning set forth in Section 7(d).

"Trading Day" means a day on which the principal Trading Market is open for business.

"Trading Market" means any of the following markets or exchanges on which the Common Stock is listed or quoted for trading on the date in question: the NYSE MKT, the Nasdaq Capital Market, the Nasdaq Global Market, the Nasdaq Global Select Market, the New York Stock Exchange or the OTC Bulletin Board (or any successors to any of the foregoing).

"Transaction Documents" means the Purchase Agreement, this Certificate of Designation and all exhibits and schedules thereto and hereto and any other documents or agreements executed in connection with the transactions contemplated hereunder.

"Transfer Agent" means Computershare Trust Company, N.A., the current transfer agent for the Common Stock, and any successor transfer agent of the Corporation.

Section 2. Designation, Amount and Par Value. The series of preferred stock shall be designated as the Corporation's Series C Convertible Preferred Stock (the "Series C Preferred Stock") and the number of shares so designated shall be 46,000 (which shall not be subject to increase without the written consent of a majority of the holders of the Series C Preferred Stock (each, a "Holder" and collectively, the "Holders")). Each share of Series C Preferred Stock shall have a par value of $0.001 per share and a stated value equal to $1,000 (the "Stated Value").

Section 3. Dividends; Restrictions on Repurchases and Redemptions of Junior Securities: No Redemption.

a) Dividends. Holders shall be entitled to receive, and the Corporation shall pay, dividends on shares of Series C Preferred Stock equal (on an as-if-converted-to-Common-Stock basis, without regard to any limitation in Section 6(d) on the conversion of the Series C Preferred Stock) to and in the same form, and in the same manner, as dividends (other than dividends in the form of Common Stock) actually paid on shares of the Common Stock when, as and if such dividends (other than dividends in the form of Common Stock) are paid on shares of the Common Stock. Other than as set forth in the previous sentence, no other dividends shall be paid on shares of Series C Preferred Stock; and the Corporation shall pay no dividends (other than dividends in the form of Common Stock) on shares of the Common Stock unless it simultaneously complies with the previous sentence.

b) Repurchases and Redemptions of Junior Securities. So long as any Series C Preferred Stock shall remain outstanding, the Corporation shall not redeem, purchase or otherwise acquire directly or indirectly more than a de minimis amount of any Junior Securities other than as to repurchases of Common Stock or Common Stock Equivalents from departing, officers, directors or employees of the Company or any Subsidiary, and provided that, while any of the Series C Preferred Stock remains outstanding, such repurchases shall not exceed an aggregate of $100,000 in any fiscal year.

c) No Redemption. The Series C Preferred Stock shall not be redeemable at the election of the Corporation.

Section 4. Voting Rights. In addition to the voting rights provided by applicable law, the Series C Preferred Stock shall have the right to vote on any matter on which the Common Stock is eligible to vote on an as-if-converted-to-Common-Stock basis; provided that each Holder shall only have the right to vote such shares of Series C Preferred Stock as are eligible for conversion without exceeding the Beneficial Ownership Limitation.

Section 5. Liquidation. Upon any liquidation, dissolution or winding-up of the Corporation, whether voluntary or involuntary (a "Liquidation"), after the satisfaction in full of the debts of the Corporation and the payment of any liquidation preference owed to the holders of shares of capital stock of the Corporation ranking prior to the Series C Preferred Stock upon liquidation, the Holders of the Series C Preferred Stock shall participate pari passu with the holders of the Common Stock (on an as-if-converted-to-Common-Stock basis without regard to any limitation in Section 6(d) on the conversion of the Series C Preferred Stock) in the net assets of the Corporation. The Corporation shall mail written notice of any such Liquidation, not less than 45 days prior to the payment date stated therein, to each Holder.

Section 6. Conversion.

a) Conversions at Option of Holder. Each share of Series C Preferred Stock shall be convertible, at any time and from time to time from and after the Original Issue Date at the option of the Holder thereof, into that number of shares of Common Stock (subject to the limitations set forth in Section 6(d)) determined by dividing the Stated Value of such share of Series C Preferred Stock by the Conversion Price in effect on the Conversion Date for such conversion, subject to Section 6(c)(vi). Holders shall effect conversions by providing the Corporation with the form of conversion notice attached hereto as Exhibit A (a "Notice of Conversion"). Each Notice of Conversion shall specify the number of shares of Series C Preferred Stock to be converted, the number of shares of Series C Preferred Stock owned prior to the conversion at issue, the number of shares of Series C Preferred Stock owned subsequent to the conversion at issue and the date on which such conversion is to be effected, which date may not be prior to the date the applicable Holder delivers (as provided in Section 8(a)) such Notice of Conversion to the Corporation (such date, the "Conversion Date"). If no Conversion Date is specified in a Notice of Conversion, the Conversion Date shall be the date that such Notice of Conversion to the Corporation is deemed delivered hereunder. The calculations and entries set forth in the Notice of Conversion shall control in the absence of manifest or mathematical error. No ink-original Notice of Conversion shall be required, nor shall any medallion guarantee (or other type of guarantee or notarization) of any Notice of Conversion form be required. To effect conversions of shares of Series C Preferred Stock, a Holder shall not be required to surrender the certificate(s) representing the shares of Series C Preferred Stock to the Corporation unless all of the shares of Series C Preferred Stock represented thereby are so converted, in which case such Holder shall deliver the certificate representing such shares of Series C Preferred Stock promptly following the Conversion Date at issue. Shares of Series C Preferred Stock converted into Common Stock in accordance with the terms hereof or repurchased by the Corporation shall be canceled and shall not be reissued.

b) Conversion Price. The conversion price for the Series C Preferred Stock shall initially equal $5.86, subject to adjustment as provided herein (the "Conversion Price").

c) Mechanics of Conversion

i. Delivery of Certificate Upon Conversion. Not later than three (3) Trading Days after each Conversion Date (the "Share Delivery Date"), the Corporation shall deliver, or cause to be delivered, to the converting Holder a certificate or certificates representing the applicable Conversion Shares which, on or after the earlier of (i) the one-year anniversary of the Original Issue Date or (ii) the Effective Date, shall be free of restrictive legends and trading restrictions (other than those which may then be required by the Purchase Agreement) representing the number of Conversion Shares being acquired upon the conversion of the Series C Preferred Stock. Subject to clauses (ii) and (iv)(B) below, on the Conversion Date with respect to any Conversion Shares, the Person to which such Conversion Shares are to be issued shall be deemed to be the holder of record of such Conversion Shares; provided, however, that, subject to clauses (ii) and (iv)(B) below, if such Conversion Date occurs after a record date for the payment of dividends on the Series C Preferred Stock pursuant to Section 3(a) and prior to the related dividend payment date, then such Person shall be deemed to have been the holder of record of such Conversion Shares on such record date (and, for the avoidance of doubt, will be entitled to receive such dividends in respect of such Conversion Shares on such dividend payment date). On or after the earlier of (i) the one-year anniversary of the Original Issue Date or (ii) the Effective Date, the Corporation shall use its best efforts to deliver any certificate or certificates required to be delivered by the Corporation under this Section 6 electronically through the Depository Trust Company or another established clearing corporation performing similar functions.

ii. Failure to Deliver Certificates. If, in the case of any Notice of Conversion, such certificate or certificates are not delivered to or as directed by the applicable Holder by the Share Delivery Date, the Holder shall be entitled to elect by written notice to the Corporation at any time on or before its receipt of such certificate or certificates, to rescind such Conversion, in which event the Corporation shall promptly return to the Holder any original Series C Preferred Stock certificate delivered to the Corporation.

iii. Obligation Absolute. The Corporation's obligation to issue and deliver the Conversion Shares upon conversion of Series C Preferred Stock in accordance with the terms hereof are absolute and unconditional, irrespective of any action or inaction by a Holder to enforce the same, any waiver or consent with respect to any provision hereof, the recovery of any judgment against any Person or any action to enforce the same, or any setoff, counterclaim, recoupment, limitation or termination, or any breach or alleged breach by such Holder or any other Person of any obligation to the Corporation or any violation or alleged violation of law by such Holder or any other person, and irrespective of any other circumstance which might otherwise limit such obligation of the Corporation to such Holder in connection with the issuance of such Conversion Shares; provided, however, that such delivery shall not operate as a waiver by the Corporation of any such action that the Corporation may have against such Holder. In the event a Holder shall elect to convert any or all of the Stated Value of its Series C Preferred Stock, the Corporation may not refuse conversion based on any claim that such Holder or anyone associated or affiliated with such Holder has been engaged in any violation of law or agreement or for any other reason, unless an injunction from a court, on notice to Holder, restraining and/or enjoining conversion of all or part of the Series C Preferred Stock of such Holder shall have been sought and obtained, and the Corporation posts a surety bond for the benefit of such Holder in the amount of 150% of the Stated Value of Series C Preferred Stock which is subject to the injunction, which bond shall remain in effect until the completion of arbitration/litigation of the underlying dispute and the proceeds of which shall be payable to such Holder to the extent it obtains judgment. In the absence of such injunction, the Corporation shall issue Conversion Shares and, if applicable, cash, upon a properly noticed conversion. Nothing herein shall limit a Holder's right to pursue all remedies available to it hereunder, at law or in equity, including, without limitation, a decree of specific performance and/or injunctive relief. The exercise of any such rights shall not prohibit a Holder from seeking to enforce damages pursuant to any other Section hereof or under applicable law.

iv. Compensation for Buy-In on Failure to Timely Deliver Certificates Upon Conversion. In addition to any other rights available to the Holder, if the Corporation fails for any reason to deliver to a Holder the applicable certificate or certificates by the Share Delivery Date pursuant to Section 6(c)(i), and if on or after such Share Delivery Date such Holder is required by its brokerage firm to purchase (in an open market transaction or otherwise), or the Holder's brokerage firm otherwise purchases, shares of Common Stock to deliver in satisfaction of a sale by such Holder of the Conversion Shares which such Holder was entitled to receive upon the conversion relating to such Share Delivery Date (a "Buy-In"), then the Corporation shall (A) pay in cash to such Holder (in addition to any other remedies available to or elected by such Holder) the amount, if any, by which (x) such Holder's total purchase price (or, in the case of a purchase by such brokerage firm, the cost charged by such brokerage firm to such Holder with respect thereto) (including any brokerage commissions) for the Common Stock so purchased exceeds (y) the product of (1) the aggregate number of shares of Common Stock that such Holder was entitled to receive from the conversion at issue and which was the subject of such sale multiplied by (2) the actual sale price at which the sell order giving rise to such purchase obligation was executed (including any brokerage commissions) and (B) at the option of such Holder, either reissue (if surrendered) the shares of Series C Preferred Stock equal to the number of shares of Series C Preferred Stock submitted for conversion (in which case, such conversion shall be deemed rescinded) or deliver to such Holder the number of shares of Common Stock that would have been issued if the Corporation had timely complied with its delivery requirements under Section 6(c)(i). For example, if a Holder purchases shares of Common Stock having a total purchase price of $11,000 to cover a Buy-In with respect to an attempted conversion of shares of Series C Preferred Stock with respect to which the actual sale price of the Conversion Shares (including any brokerage commissions) giving rise to such purchase obligation was a total of $10,000 under clause (A) of the immediately preceding sentence, the Corporation shall be required to pay such Holder $1,000. The Holder shall provide the Corporation written notice indicating the amounts payable to such Holder in respect of the Buy-In and, upon request of the Corporation, evidence of the amount of such loss. Nothing herein shall limit a Holder's right to pursue any other remedies available to it hereunder, at law or in equity including, without limitation, a decree of specific performance and/or injunctive relief with respect to the Corporation's failure to timely deliver certificates representing shares of Common Stock upon conversion of the shares of Series C Preferred Stock as required pursuant to the terms hereof.

v. Reservation of Shares Issuable Upon Conversion. The Corporation covenants that it will at all times reserve and keep available out of its authorized and unissued shares of Common Stock for the sole purpose of issuance upon conversion of the Series C Preferred Stock, as herein provided, free from preemptive rights or any other actual contingent purchase rights of Persons other than the Holder (and the other Holders of the Series C Preferred Stock), not less than such aggregate number of shares of the Common Stock as shall (subject to the terms and conditions set forth herein) be issuable (taking into account the adjustments and restrictions of Section 7) upon the conversion of the then-outstanding shares of Series C Preferred Stock. The Corporation covenants that all shares of Common Stock that shall be so issuable shall, upon issue, be duly authorized, validly issued, fully paid and nonassessable and, if the Resale Registration Statement is then effective under the Securities Act, shall be registered for public resale in accordance with such Resale Registration Statement (subject to such Holder's compliance with its related obligations under the Purchase Agreement).

vi. Fractional Shares. No fractional shares or scrip representing fractional shares of Common Stock shall be issued upon the conversion of the Series C Preferred Stock. As to any fraction of a share which the Holder would otherwise be entitled to purchase upon such conversion, the Corporation shall at its election, either pay a cash adjustment in respect of such final fraction in an amount equal to such fraction multiplied by the Conversion Price in effect on the relevant Conversion Date or round up to the next whole share.

vii. Transfer Taxes and Expenses. The issuance of certificates for shares of the Common Stock upon conversion of the Series C Preferred Stock shall be made without charge to any Holder for any documentary stamp or similar taxes that may be payable in respect of the issue or delivery of such certificates, provided that the Corporation shall not be required to pay any tax that may be payable in respect of any transfer involved in the issuance and delivery of any such certificate upon conversion in a name other than that of the Holders of such Series C Preferred Stock and the Corporation shall not be required to issue or deliver such certificates unless or until the Person or Persons requesting the issuance thereof shall have paid to the Corporation the amount of such tax or shall have established to the satisfaction of the Corporation that such tax has been paid. The Company shall pay all Transfer Agent fees required for same-day processing of any Notice of Conversion.

d) Beneficial Ownership Limitation. Notwithstanding anything herein to the contrary, the Corporation shall not effect any conversion of the Series C Preferred Stock, and a Holder shall not have the right to convert any portion of the Series C Preferred Stock, in each case to the extent that, after giving effect to such conversion, such Holder would beneficially own in excess of the Beneficial Ownership Limitation (as defined below). For purposes of this Section 6(d), beneficial ownership of a Holder shall be calculated in accordance with Section 16(a) and (b) of the Exchange Act and the rules and regulations promulgated thereunder for purposes of determining whether such Holder is subject to the reporting and liability provisions of Section 16(a) and 16(b) of the Exchange Act. For purposes of complying with this Section 6(d), the Corporation shall be entitled to conclusively rely on the information set forth in any Holder's Notice of Conversion, and each Holder delivering a Notice of Conversion shall be deemed to represent to the Corporation that such Notice of Conversion does not violate the restrictions set forth in this paragraph, and the Corporation shall have no obligation to verify or confirm the accuracy of such representation. Upon the written or oral request of a Holder, the Corporation shall, within two Trading Days, confirm orally and in writing to such Holder the number of shares of Common Stock then outstanding. The "Beneficial Ownership Limitation" shall be 9.99% of the number of shares of the Common Stock outstanding immediately after giving effect to the issuance of shares of Common Stock issuable upon conversion of Series C Preferred Stock held by the applicable Holder. By written notice to the Company, a Purchaser may from time to time increase or decrease the Beneficial Ownership Limitation applicable solely to such Purchaser to any other percentage not in excess of 19.99% specified in such notice; provided that any such increase will not be effective until the sixty-fifth (65th) day after such notice is delivered to the Company. The express purpose of this Section 6(d) is to preclude any Holder's ownership of any shares of Series C Preferred Stock from causing such Holder to become subject to the reporting and liability provisions of Section 16(a) and 16(b) of the Exchange Act, including pursuant to Rule 16a-2 promulgated by the Commission, and this Section 6(d) shall be interpreted according to such express purpose. Solely for purposes of this Section 6(d) and for purposes of the provisos to Section 7(b) and (c) hereof, the term "Holder" shall include all

persons whose beneficial ownership of the Common Stock is aggregated pursuant to Section 13(d)(3) of the Exchange Act or Rule 13d-5 thereunder.

Section 7. Certain Adjustments: Rights of Holders Upon Certain Dividends, Distributions or Fundamental Transactions.

a) Stock Dividends and Stock Splits. If the Corporation, at any time while any Series C Preferred Stock is outstanding: (i) pays a stock dividend or otherwise makes a distribution or distributions payable in shares of Common Stock on shares of Common Stock, (ii) subdivides outstanding shares of Common Stock into a larger number of shares or (iii) combines (including by way of a reverse stock split) outstanding shares of Common Stock into a smaller number of shares, then the Conversion Price shall be adjusted to equal adjustment multiplied by a fraction of which the numerator shall be the number of shares of Common an amount equal to such Conversion Price immediately before such Stock outstanding immediately before giving effect to such event, and of which the denominator shall be the number of shares of Common Stock outstanding immediately after giving effect to such event. Any adjustment made pursuant to this Section 7(a) shall become effective immediately after the record date for the determination of stockholders entitled to receive such dividend or distribution and shall become effective immediately after the effective date in the case of a subdivision or combination, as applicable.

b) Subsequent Rights Offerings. In addition to any adjustments pursuant to Section 7(a) above, if at any time the Corporation grants, issues or sells any Common Stock Equivalents or rights to purchase stock, warrants, securities or other property pro rata to the record holders of any class of shares of Common Stock (the "Purchase Rights"), then, without duplication of any dividends to be due on Series C Preferred Stock pursuant to Section 3(a), each Holder will be entitled to acquire, upon the terms applicable to such Purchase Rights, the aggregate Purchase Rights which the Holder could have acquired if such Holder had held the number of shares of Common Stock acquirable upon conversion of such Holder's Series C Preferred Stock (without regard to any limitations on exercise hereof, including without limitation, the Beneficial Ownership Limitation) on the date on which a record is taken for the grant, issuance or sale of such Purchase Rights, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the grant, issue or sale of such Purchase Rights; provided, however, that, to the extent that any Holder's right to participate in any such Purchase Right would result in the Holder exceeding the Beneficial Ownership Limitation, then the Purchase Rights to which such Holder is entitled pursuant hereto shall be limited to the same extent provided in Section 6(d) hereof.

c) Pro Rata Distributions. During such time as the Series C Preferred Stock is outstanding, if the Corporation declares or makes any dividend or other distribution of its assets (or rights to acquire its assets) to holders of shares of Common Stock, by way of return of capital or otherwise (including, without limitation, any distribution of cash, stock or other securities, property or options by way of a dividend, spin off, reclassification, corporate rearrangement, scheme of arrangement or other similar transaction) (a "Distribution"), at any time after the issuance of the Series C Preferred Stock, then, in each such case, without duplication of any dividends to be due on Series C Preferred Stock pursuant to Section 3(a), each Holder shall be entitled to participate in such Distribution to the same extent that such Holder would have participated therein if such Holder had held the number of shares of Common Stock acquirable upon complete Conversion of the Series C Preferred Stock (without regard to any limitations on Conversion hereof, including without limitation, the Beneficial Ownership Limitation) on the date of which a record is taken for such Distribution, or, if no such record is taken, the date as of which the record holders of shares of Common Stock are to be determined for the participation in such Distribution; provided, however, that, to the extent that any Holder's right to participate in any such Distribution would result in the Holder exceeding the Beneficial Ownership Limitation, then the rights appurtenant to such securities, property or options to which such Holder is entitled pursuant hereto shall be limited to the same extent provided in Section 6(d) hereof.

d) Fundamental Transaction. If, at any time while the Series C Preferred Stock is outstanding, (i) the Corporation, directly or indirectly, in one or more related transactions is a party to any merger or consolidation of the Corporation, (ii) the Corporation, directly or indirectly, effects any sale, lease, license, assignment, transfer, conveyance or other disposition of all or substantially all of its assets in one or a series of related transactions, (iii) any, direct or indirect, purchase offer, tender offer or exchange offer (whether by the Corporation or another Person) is completed, (iv) the Corporation, directly or indirectly, in one or more related transactions effects any reclassification, reorganization or recapitalization of the Common Stock or any compulsory share exchange, in each

case pursuant to which the Common Stock is converted into, exchanged for or represents solely the right to receive, other securities, cash or property, or any combination thereof (such other securities, cash or property, or combination thereof, the "Reference Property," and the amount and kind of Reference Property that a holder of one share of Common Stock would be entitled to receive on account of such transaction, a "Reference Property Unit") (each such transaction, a "Fundamental Transaction"), then, notwithstanding anything to the contrary herein, (I) at the effective time of such Fundamental Transaction, the Conversion Shares due upon conversion of any Series C Preferred Stock shall be determined in the same manner as if each reference to any number of shares of Common Stock in this Certificate of Designation were instead a reference to the same number of Reference Property Units and (II) if such Reference Property Unit consists of any security of a Person other than the Corporation, then such Person (and, as a condition to the Corporation effecting such Fundamental Transaction, the Corporation shall ensure that such Person) shall execute such instruments as shall be necessary to give effect to this Section 7(d). If holders of Common Stock arc given any choice as to the securities, cash or property to be received in such Fundamental Transaction, then each Holder shall be given the same choice as to the Reference Property Unit it receives upon any conversion of the Series C Preferred Stock following such Fundamental Transaction. To the extent necessary to effectuate the foregoing provisions, any successor to the Corporation or surviving entity in such Fundamental Transaction shall file a new Certificate of Designation with the same terms and conditions and issue to the Holders new preferred stock consistent with the foregoing provisions and evidencing the Holders' right to convert such preferred stock into Reference Property Units. The Corporation shall cause any successor entity in a Fundamental Transaction in which the Corporation is not the survivor (the "Successor Entity") to assume in writing all of the obligations of the Corporation under this Certificate of Designation and the other Transaction Documents in accordance with the provisions of this Section 7(d) pursuant to written agreements in form and substance reasonably satisfactory to the Holders and approved by the Holders (without unreasonable delay) prior to such Fundamental Transaction and shall, at the option of the Holders, deliver to the Holder in exchange for the Series C Preferred Stock a security of the Successor Entity evidenced by a written instrument substantially similar in form and substance to the Series C Preferred Stock which is convertible in accordance with this Section 7(d), and which is reasonably satisfactory in form and substance to the Holders. Upon the occurrence of any such Fundamental Transaction, the Successor Entity shall succeed to, and, except in the case of a lease, be substituted for (so that from and after the date of such Fundamental Transaction, the provisions of this Certificate of Designation and the other Transaction Documents referring to the "Corporation" shall refer instead to the Successor Entity), and may exercise every right and power of the Corporation and shall assume all of the obligations of the Corporation under this Certificate of Designation and the other Transaction Documents with the same effect as if such Successor Entity had been named as the Corporation herein.

e) Calculations. All calculations under this Section 7 shall be made to the nearest cent or the nearest 1/100th of a share, as the case may be. For purposes of this Section 7, the number of shares of Common Stock deemed to be issued and outstanding as of a given date shall be the sum of the number of shares of Common Stock (excluding any treasury shares of the Corporation) issued and outstanding.

f) Notice to the Holders.

i. Adjustment to Conversion Price. Whenever the Conversion Price is adjusted pursuant to any provision of this Section 7, the Corporation shall promptly deliver to each Holder a notice setting forth the Conversion Price after such adjustment and setting forth a brief statement of the facts requiring such adjustment.

ii. Notice to Allow Conversion by Holder. If (A) the Corporation shall declare a dividend (or any other distribution in whatever form) on the Common Stock, (B) the Corporation shall declare a special nonrecurring cash dividend on or a redemption of the Common Stock, (C) the Corporation shall authorize the granting to all holders of the Common Stock of rights or warrants to subscribe for or purchase any shares of capital stock of any class or of any rights, (D) the approval of any stockholders of the Corporation shall be required in connection with any reclassification of the Common Stock, any consolidation or merger to which the Corporation is a party, any sale or transfer of all or substantially all of the assets of the Corporation, or any compulsory share exchange whereby the Common Stock is converted into other securities, cash or property or (E) the Corporation shall authorize the voluntary or involuntary dissolution, liquidation or winding up of the affairs of the Corporation, then, in each case, the Corporation shall cause to be filed at each office or agency maintained for the purpose of conversion of the Series C

Preferred Stock, and shall cause to be delivered to each Holder at its last address as it shall appear upon the stock books of the Corporation, at least twenty (20) calendar days prior to the applicable record or effective date hereinafter specified, a notice stating (x) the date on which a record is to be taken for the purpose of such dividend, distribution, redemption, rights or warrants, or if a record is not to be taken, the date as of which the holders of the Common Stock of record to be entitled to such dividend, distributions, redemption, rights or warrants are to be determined or (y) the date on which such reclassification, consolidation, merger, sale, transfer, share exchange, dissolution, liquidation or winding up is expected to become effective or close, and the date as of which it is expected that holders of the Common Stock of record shall be entitled to exchange their shares of the Common Stock for securities, cash or other property deliverable upon such reclassification, consolidation, merger, sale, transfer, share exchange, dissolution, liquidation or winding up, provided that the failure to deliver such notice or any defect therein or in the delivery thereof shall not affect the validity of the corporate action required to be specified in such notice. To the extent that any notice provided hereunder constitutes, or contains, material non-public information regarding the Corporation or any of the Subsidiaries, the Corporation shall simultaneously file such notice with the Commission pursuant to a Current Report on Form 8-K. For the avoidance of doubt, notwithstanding such notice or corporate event, each Holder shall remain entitled to convert the Conversion Amount of its Series C Preferred Stock (or any part hereof) as provided herein.

Section 8. Miscellaneous.

a) Notices. Any and all notices or other communications or deliveries to be provided by the Holders hereunder, including, without limitation, any Notice of Conversion, shall be in writing and delivered personally, by facsimile or other electronic delivery, or sent by a nationally recognized overnight courier service, addressed to the Corporation, at the address set forth above Attention: Corporate Secretary, facsimile number (626) 304-3401, or such other facsimile number or address as the Corporation may specify for such purposes by notice to the Holders delivered in accordance with this Section 8(a). Any and all notices or other communications or deliveries to be provided by the Corporation hereunder shall be in writing and delivered personally, by facsimile or other electronic delivery, or sent by a nationally recognized overnight courier service addressed to each Holder at the facsimile number or address of such Holder appearing on the books of the Corporation, or if no such facsimile number or address appears on the books of the Corporation, at the principal place of business of such Holder, as set forth in the Purchase Agreement. Any notice or other communication or deliveries hereunder shall be deemed given and effective on the earliest of (i) the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number set forth in this Section prior to 5:30 p.m. (New York City time) on any date, (ii) the next Trading Day after the date of transmission, if such notice or communication is delivered via facsimile at the facsimile number set forth in this Section on a day that is not a Trading Day or later than 5:30 p.m. (New York City time) on any Trading Day, (iii) the second Trading Day following the date of mailing, if sent by U.S. nationally recognized overnight courier service, or (iv) upon actual receipt by the party to whom such notice is required to be given.

b) Absolute Obligation. Except as expressly provided herein, no provision of this Certificate of Designation shall alter or impair the obligation of the Corporation, which is absolute and unconditional, to pay liquidated damages, accrued dividends and accrued interest, as applicable, on the shares of Series C Preferred Stock at the time, place, and rate, and in the coin or currency, herein or in the Purchase Agreement prescribed.

c) Lost or Mutilated Series C Preferred Stock Certificate. If a Holder's Series C Preferred Stock certificate shall be mutilated, lost, stolen or destroyed, the Corporation shall execute and deliver, in exchange and substitution for and upon cancellation of a mutilated certificate, or in lieu of or in substitution for a lost, stolen or destroyed certificate, a new certificate for the shares of Series C Preferred Stock so mutilated, lost, stolen or destroyed, but only upon receipt of evidence of such loss, theft or destruction of such certificate, and of the ownership thereof, reasonably satisfactory to the Corporation.

d) Governing Law. All questions concerning the construction, validity, enforcement and interpretation of this Certificate of Designation shall be governed by and construed and enforced in accordance with the internal laws of the State of Delaware, without regard to the principles of conflict of laws thereof. Each party agrees that all legal proceedings concerning the interpretation, enforcement and defense of the transactions contemplated by any of the Transaction Documents

(whether brought against a party hereto or its respective Affiliates, directors, officers, shareholders, employees or agents) shall be commenced in the state and federal courts sitting in the City of New York, Borough of Manhattan (the "New York Courts"). Each party hereto hereby irrevocably submits to the exclusive jurisdiction of the New York Courts for the adjudication of any dispute hereunder or in connection herewith or with any transaction contemplated hereby or discussed herein (including with respect to the enforcement of any of the Transaction Documents), and hereby irrevocably waives, and agrees not to assert in any suit, action or proceeding, any claim that it is not personally subject to the jurisdiction of such New York Courts, or such New York Courts are improper or inconvenient venue for such proceeding. Each party hereby irrevocably waives personal service of process and consents to process being served in any such suit, action or proceeding by mailing a copy thereof via registered or certified mail or overnight delivery (with evidence of delivery) to such party at the address in effect for notices to it under this Certificate of Designation and agrees that such service shall constitute good and sufficient service of process and notice thereof. Nothing contained herein shall be deemed to limit in any way any right to serve process in any other manner permitted by applicable law. Each party hereto 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 Certificate of Designation or the transactions contemplated hereby. If any party shall commence an action or proceeding to enforce any provisions of this Certificate of Designation, then the prevailing party in such action or proceeding shall be reimbursed by the other party for its attorneys' fees and other costs and expenses incurred in the investigation, preparation and prosecution of such action or proceeding.

e) Waiver. Any waiver by the Corporation or a Holder of a breach of any provision of this Certificate of Designation shall not operate as or be construed to be a waiver of any other breach of such provision or of any breach of any other provision of this Certificate of Designation or a waiver by any other Holders. The failure of the Corporation or a Holder to insist upon strict adherence to any term of this Certificate of Designation on one or more occasions shall not be considered a waiver or deprive that party (or any other Holder) of the right thereafter to insist upon strict adherence to that term or any other term of this Certificate of Designation on any other occasion. Any waiver by the Corporation or a Holder must be in writing.

f) Severability. If any provision of this Certificate of Designation is invalid, illegal or unenforceable, the balance of this Certificate of Designation shall remain in effect, and if any provision is inapplicable to any Person or circumstance, it shall nevertheless remain applicable to all other Persons and circumstances. If it shall be found that any interest or other amount deemed interest due hereunder violates the applicable law governing usury, the applicable rate of interest due hereunder shall automatically be lowered to equal the maximum rate of interest permitted under applicable law.

g) Next Business Day. Whenever any payment or other obligation hereunder shall be due on a day other than a Business Day, such payment shall be made on the next succeeding Business Day.

h) Headings. The headings contained herein are for convenience only, do not constitute a part of this Certificate of Designation and shall not be deemed to limit or affect any of the provisions hereof.

i) Status of Converted or Reacquired Series C Preferred Stock. Shares of Series C Preferred Stock may only be issued pursuant to the Purchase Agreement. If any shares of Series C Preferred Stock shall be converted or reacquired by the Corporation, such shares shall resume the status of authorized but unissued shares of preferred stock and shall no longer be designated as Series C Convertible Preferred Stock.

EXHIBIT A

NOTICE OF CONVERSION

(TO BE EXECUTED BY THE REGISTERED HOLDER IN ORDER TO CONVERT SHARES OF SERIES C PREFERRED STOCK)

The undersigned hereby elects to convert the number of shares of Series C Convertible Preferred Stock indicated below into shares of common stock, par value $0.001 per share (the "Common Stock"), of Arrowhead Research Corporation, a Delaware corporation (the "Corporation"), according to the conditions hereof, as of the date written below. If shares of Common Stock are to be issued in the name of a Person other than the undersigned, the undersigned will pay all transfer taxes payable with respect thereto and is delivering herewith such certificates and opinions as may be required by the Corporation in accordance with the Purchase Agreement. No fee will be charged to the Holders for any conversion, except for any such transfer taxes.

Conversion calculations:

Date to Effect Conversion: __

Number of shares of Series C Preferred Stock owned prior to Conversion: __

Number of shares of Series C Preferred Stock to be Converted: __

Stated Value of shares of Series C Preferred Stock to be Converted: __

Number of shares of Common Stock to be Issued: __

Applicable Conversion Price: __

Number of shares of Series C Preferred Stock subsequent to Conversion: __

Address for Delivery: __
or
DWAC Instructions:
Broker no: __
Account no: __

[HOLDER]

By: __
Name:
Title:

SECOND AMENDED AND RESTATED
BYLAWS OF
ARROWHEAD PHARMACEUTICALS, INC.

ARTICLE I
STOCKHOLDERS

Section 1.1 Annual Meeting.

(a) General. The annual meeting of stockholders shall be held at the hour, date and place, if any, within or without the State of Delaware which is fixed by the Board of Directors, which time, date and place may subsequently be changed at any time by vote of the Board of Directors. If no annual meeting has been held for a period of thirteen (13) months after the corporation's last annual meeting, a special meeting in lieu thereof may be held, and such special meeting shall have, for the purposes of these bylaws or otherwise, all the force and effect of an annual meeting. Any and all references hereafter in these bylaws to an annual meeting or annual meetings also shall be deemed to refer to any special meeting(s) in lieu thereof.

(b) Notice of Stockholder Business and Nominations.

(1) Nominations of persons for election to the Board of Directors and the proposal of other business to be considered by the stockholders may be brought before an annual meeting: (i) by or at the direction of the Board of Directors, (ii) by any stockholder of the corporation who was a stockholder of record at the time of giving of notice provided for in this bylaw, who is entitled to vote at the meeting, who is present (in person or by proxy) at the meeting and who complies with the notice procedures set forth in this bylaw as to such nomination or other business, or (iii) by an Eligible Stockholder (as defined in Section 1.11 below) pursuant to and in accordance with Section 1.11 of these bylaws. For the avoidance of doubt, the foregoing clauses (ii) and (iii) shall be the exclusive means for a stockholder to bring nominations and the foregoing clause (ii) shall be the exclusive means for a stockholder to bring other business properly before an annual meeting (other than matters properly brought under Rule 14a-8 (or any successor rule) under the Securities Exchange Act of 1934, as amended (the "Exchange Act")), and such stockholder must comply with the notice and other procedures set forth in Article I, Section 1.1(b) or Article I, Section 1.11, as applicable, of this bylaw to bring such nominations or other business properly before an annual meeting. In addition to the other requirements set forth in this bylaw, for any proposal of business to be considered at an annual meeting, it must be a proper subject for action by stockholders of the corporation under applicable law.

(2) For nominations or other business to be properly brought before an annual meeting by a stockholder pursuant to clause (iii) of Article I, Section 1.1(b)(1) of this bylaw, the stockholder must (i) have given Timely Notice (as defined below) thereof in writing to the Secretary of the corporation, (ii) have provided any updates or supplements to such notice at the times and in the forms required by this bylaw and (iii) together with the beneficial owner(s), if any, on whose behalf the nomination or other business proposal is made, have acted in accordance with the representations set forth in the Solicitation Statement (as defined below) required by this bylaw. To be timely, a stockholder's written notice shall be received by the Secretary at the principal executive offices of the corporation not later than the close of business on the 90th day nor earlier than the close of business on the 120th day prior to the one-year anniversary of the preceding year's annual meeting; provided, however, that in the event the annual meeting is first convened more than 30 days before or more than 60 days after such anniversary date, or if no annual meeting was held in the preceding year, notice by the stockholder to be timely must be received by the Secretary of the corporation not later than the close of business on the later of the 90th day prior to the scheduled date of such annual meeting or the 10th day following the day on which public announcement of the date of such meeting is first made (such notice within such time periods shall be referred to as "Timely Notice"). In no event shall an adjournment or recess of an annual meeting, or a postponement of an annual meeting for which notice of the meeting has already been given to stockholders or a public announcement of the meeting date has already been made, commence a new time period (or extend any time period) for the giving of a stockholder's notice as described above. Such stockholder's Timely Notice shall set forth:

(A) as to each person whom the stockholder proposes to nominate for election or reelection as a director, (i) all information relating to such person that is required to be disclosed in solicitations of proxies for election of directors in an election contest, or is otherwise required, in each case pursuant to Regulation 14A under the Exchange Act, (ii) the information required under Article I, Section 1.12 with respect to any nominee for election as a director, and (iii) a written statement, not to exceed 500 words, in support of such person;

(B) as to any other business that the stockholder proposes to bring before the meeting, a brief description of the business desired to be brought before the meeting, the text of the proposal or business (including the text of any resolutions proposed for consideration and in the event that such business includes a proposal to amend these bylaws, the language of the proposed amendment), the reasons for conducting such business at the meeting, and any substantial interest (within the meaning of Item 5 of Schedule 14A under the Exchange Act) in such business of each Proposing Person (as defined below);

(C) (i) the name and address of the stockholder giving the notice, as they appear on the corporation's books, and the names and addresses of the other Proposing Persons (if any) and (ii) as to each Proposing Person, the following information: (a) the class or series and number of all shares of capital stock of the corporation which are, directly or indirectly, owned beneficially or of record by such Proposing Person, including any shares of any class or series of capital stock of the corporation as to which such Proposing Person has a right to acquire beneficial ownership at any time in the future, (b) all Synthetic Equity Interests (as defined below) in which such Proposing Person, directly or indirectly, holds an interest including a description of the material terms of each such Synthetic Equity Interest, including without limitation, identification of the counterparty to each such Synthetic Equity Interest and disclosure, for each such Synthetic Equity Interest, as to (x) whether or not such Synthetic Equity Interest conveys any voting rights, directly or indirectly, in such shares to such Proposing Person, (y) whether or not such Synthetic Equity Interest is required to be, or is capable of being, settled through delivery of such shares and (z) whether or not such Proposing Person and/or, to the extent known, the counterparty to such Synthetic Equity Interest has entered into other transactions that hedge or mitigate the economic effect of such Synthetic Equity Interest, (c) any proxy (other than a revocable proxy given in response to a public proxy solicitation made pursuant to, and in accordance with, the Exchange Act), agreement, arrangement, understanding or relationship pursuant to which such Proposing Person has or shares a right to, directly or indirectly, vote any shares of any class or series of capital stock of the corporation, (d) any rights to dividends or other distributions on the shares of any class or series of capital stock of the corporation, directly or indirectly, owned beneficially by such Proposing Person that are separated or separable from the underlying shares of the corporation, (e) any performance-related fees (other than an asset based fee) that such Proposing Person, directly or indirectly, is entitled to based on any increase or decrease in the value of shares of any class or series of capital stock of the corporation or any Synthetic Equity Interests, and (f) any equity interests or Synthetic Equity Interest in the securities of any principal competitor (for purposes of this Section 1.1(b), as defined for purposes of Section 8 of the Clayton Antitrust Act of 1914) of the corporation held by or on behalf of such Proposing Person (the disclosures to be made pursuant to the foregoing clauses (a) through (f) are referred to, collectively, as "Material Ownership Interests") and (iii) a description of the material terms of all agreements, arrangements or understandings (whether or not in writing) entered into by any Proposing Person with any other person for the purpose of acquiring, holding, disposing or voting of any shares of any class or series of capital stock of the corporation;

(D) (i) any plans or proposals which such Proposing Person may have with respect to securities of the corporation that would be required to be disclosed pursuant to Item 4 of Exchange Act Schedule 13D, (ii) a description of all agreements, arrangements or understandings by and among any of the Proposing Persons, or by and among any Proposing Persons and any other person (including with any proposed nominee(s)), pertaining to the nomination(s) or other business proposed to be brought before the meeting of stockholders, including, without limitation any agreements that would be required to be disclosed pursuant to Item 5 or Item 6 of Exchange Act Schedule 13D, (which description shall identify the name of each other person who is party to such an agreement, arrangement or understanding), and (iii) identification of the names and addresses of other stockholders (including beneficial owners) known by any of the Proposing Persons to support such nominations or other business proposal(s), and to the extent known the class and number of all shares of the corporation's capital stock owned beneficially or of record by such other stockholder(s) or other beneficial owner(s);

(E) a representation that the stockholder (or a qualified representative of the stockholder) intends to appear at the meeting to make such nomination or propose such other business;

(F) a representation as to whether the stockholder giving the notice, any other Proposing Person, or any other participant (as defined in Item 4 of Schedule 14A under the Exchange Act) will engage in a solicitation with respect to such nomination or proposal of other business and, if so, a statement of whether such solicitation will be conducted as an exempt

solicitation under Rule 14a-2(b) of the Exchange Act, the name of each participant in such solicitation and the amount of the cost of solicitation that has been and will be borne, directly or indirectly, by each participant in such solicitation and (i) in the case of a proposal of business other than nominations, whether such person or group intends to deliver, through means satisfying each of the conditions that would be applicable to the corporation under either Exchange Act Rule 14a-16(a) or Exchange Act Rule 14a-16(n), a proxy statement and form of proxy to holders (including any beneficial owners pursuant to Rule 14b-1 and Rule 14b-2 of the Exchange Act) of at least the percentage of the corporation's voting shares required under applicable law to carry the proposal or (ii) in the case of any solicitation that is subject to Rule 14a-19 of the Exchange Act, confirming that such person or group will deliver, through means satisfying each of the conditions that would be applicable to the corporation under either Exchange Act Rule 14a-16(a) or Exchange Act Rule 14a-16(n), a proxy statement and form of proxy to holders (including any beneficial owners pursuant to Rule 14b-1 and Rule 14b-2 of the Exchange Act) of at least 67% of the voting power of the corporation's stock entitled to vote generally in the election of directors;

(G) a representation that promptly after soliciting proxies from the percentage of stockholders referred to in the representation required under the immediately preceding clause (F), such stockholder or any Proposing Person will provide the corporation with documents, which may take the form of a certified statement and documentation from a proxy solicitor, specifically demonstrating that the necessary steps have been taken to deliver a proxy statement and form of proxy to holders of such percentage of the corporation's stock (such representation, together with the representations required under the immediately preceding clause (F) above, the "Solicitation Statement").

(3) A stockholder providing Timely Notice of nominations or other business proposed to be brought before an annual meeting shall further update and supplement such notice, if necessary, so that the information (including, without limitation, the Material Ownership Interests information) provided or required to be provided in such notice pursuant to this bylaw shall be true and correct as of the record date for the meeting and as of the date that is ten business days prior to such annual meeting, and such update and supplement shall be received by the Secretary at the principal executive offices of the corporation not later than the close of business on the fifth business day after the record date for the annual meeting (in the case of the update and supplement required to be made as of the record date), and not later than the close of business on the eighth business day prior to the date of the annual meeting (in the case of the update and supplement required to be made as of ten business days prior to the meeting).

(4) Notwithstanding anything in the second sentence of Article I, Section 1.1(b)(2) of this bylaw to the contrary, in the event that the number of directors to be elected to the Board of Directors of the corporation is increased and there is no public announcement naming all of the nominees for director or specifying the size of the increased Board of Directors made by the corporation at least ten (10) days before the last day a stockholder may deliver a notice of nomination in accordance with the second sentence of Article I, Section 1.1(b)(2), a stockholder's notice required by this bylaw shall also be considered timely, but only with respect to nominees for any new positions created by such increase, if it shall be received by the Secretary of the corporation not later than the close of business on the tenth (10^{th}) day following the day on which such public announcement is first made by the corporation.

(c) Other.

(1) Only such persons who are nominated in accordance with the provisions of this Section 1.1 or Article I, Section 1.11 shall be eligible for election and to serve as directors and only such business shall be conducted at an annual meeting of stockholders as shall have been brought before the meeting in accordance with the provisions of this Article I, Section 1.1. The Chairman of the Board, the chairman of the meeting or any other person designated by the Board of Directors shall have the power to determine whether a nomination or any business proposed to be brought before the meeting was made in accordance with the provisions of these bylaws (including whether a stockholder or any other Proposing Person provided all information and complied with all requirements and representations required under this Article I, Section 1.1). If the Chairman of the Board, the chairman of the meeting or any other person designated by the Board of Directors determines that such nomination or other business was not made in accordance with the provisions of these bylaws, such nomination shall be disregarded and such other business shall not be transacted, notwithstanding that votes and proxies in respect of any such nomination or other business may have been received by the corporation.

(2) Except as otherwise required by law, nothing in this Article I, Section 1.1 shall obligate the corporation or the Board of Directors to include in any proxy statement or other stockholder

communication distributed on behalf of the corporation or the Board of Directors information with respect to any nominee for director or any other matter of business submitted by a stockholder.

(3) In furtherance and not by way of limitation of the foregoing provisions of this Article I, Section 1.1, if the proposing stockholder (or a qualified representative of the stockholder) does not appear at the annual meeting to present a nomination or other business, such nomination shall be disregarded and such other business shall not be transacted, notwithstanding that votes and proxies in respect of any such nomination or other business may have been received by the corporation. For purposes of this Article I, Section 1.1, to be considered a qualified representative of the proposing stockholder, a person must be authorized by a written instrument executed by such stockholder or an electronic transmission delivered by such stockholder to act for such stockholder as proxy at the meeting of stockholders and such person must produce such written instrument or electronic transmission, or a reliable reproduction of the written instrument or electronic transmission, to the corporation prior to the making of such nomination or proposal of other business at the meeting of the stockholders (and in any event not fewer than five business days before such meeting).

(4) Notwithstanding the foregoing provisions of this bylaw, a stockholder (and any other Proposing Person) shall also comply with all applicable requirements of the Exchange Act and the rules and regulations thereunder with respect to the matters set forth in this bylaw. Nothing in this bylaw shall be deemed to affect any rights of (i) stockholders to have proposals included in the corporation's proxy statement pursuant to Rule 14a-8 (or any successor rule) under the Exchange Act and, to the extent required by such rule, have such proposals considered and voted on at an annual meeting or (ii) the holders of any series of Preferred Stock to elect directors under specified circumstances.

(5) Any stockholder directly or indirectly soliciting proxies from other stockholders must use a proxy card color other than white, which shall be reserved for the exclusive use for solicitation by the Board of Directors.

(d) Definitions. For purposes of this bylaw, the "close of business" shall mean 6:00 p.m. local time at the principal executive offices of the corporation on any calendar day, whether or not the day is a business day and "public announcement" shall mean disclosure in a press release reported by the Dow Jones News Service, Associated Press or comparable national news service or in a document publicly filed by the corporation with the Securities and Exchange Commission pursuant to Section 13, 14 or 15(d) of the Exchange Act. For purposes of this Article I of these bylaws, the term "Proposing Person" shall mean the following persons: (i) the stockholder of record providing the notice of nominations or other business proposed to be brought before a stockholders' meeting, and (ii) the beneficial owner(s), if different, on whose behalf the nominations or other business proposed to be brought before a stockholders' meeting is made, and if such stockholder or beneficial owner is an entity, each individual who is a director, executive officer, general partner or managing member of such entity or of any other entity that has or shares control of such entity. For purposes of this Section 1.1 of Article I of these bylaws, the term "Synthetic Equity Interest" shall mean (a) any transaction, agreement or arrangement (or series of transactions, agreements or arrangements), including, without limitation, any option, warrant, forward contract, contract of sale or other derivative, swap, hedge, pledge, repurchase, voting rights, or so-called "stock borrowing" agreement or arrangement, whether the instrument or agreement is to be settled with shares or with cash based on the notional amount or value of outstanding shares of stock of the corporation, the purpose or effect of which is to, directly or indirectly: (1) give a person or entity economic benefit and/or risk similar to ownership of shares of any class or series of capital stock of the corporation, in whole or in part, including due to the fact that such transaction, agreement or arrangement provides, directly or indirectly, the opportunity to profit or avoid a loss from any increase or decrease in the value of any shares of any class or series of capital stock of the corporation, (2) mitigate loss to, reduce the economic risk of or manage the risk of share price changes for, any person or entity with respect to any shares of any class or series of capital stock of the corporation, (3) otherwise provide in any manner the opportunity to profit or avoid a loss from any decrease in the value of any shares of any class or series of capital stock of the corporation, or (4) increase or decrease the voting power of any person or entity with respect to any shares of any class or series of capital stock of the corporation, and (b) any interest in the foregoing clause (a) with respect to any class or series of capital stock of any principal competitor of the corporation.

Section 1.2 Special Meetings. Except as otherwise required by statute and subject to the rights, if any, of the holders of any series of Preferred Stock, special meetings of the stockholders of the corporation may be called only by the Board of Directors. The Board of Directors may postpone, reschedule or cancel any previously scheduled special meeting of stockholders. Only those matters set forth in the notice of the special meeting may be considered or acted upon at a special meeting of stockholders of the corporation. Nominations of persons for election to the Board of Directors of the corporation and stockholder proposals of other business shall not be brought before a special meeting of stockholders to be considered by the stockholders unless such special meeting is held in lieu of an annual meeting of stockholders in accordance with Article I, Section 1.1(a) of these bylaws, in which case

such special meeting in lieu thereof shall be deemed an annual meeting for purposes of these bylaws and the provisions of Article I, Section 1.1(b) of these bylaws shall govern such special meeting.

Section 1.3 Notice of Meetings. Whenever stockholders are required or permitted to take any action at a meeting, a written notice of the meeting shall be given which shall state the place, if any, date and hour of the meeting, the record date for determining the stockholders entitled to vote at the meeting (if such date is different from the record date for determining the stockholders entitled to notice of the meeting) and the means of remote communications, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such meeting, and, in the case of a special meeting, the purpose or purposes for which the meeting is called. Unless otherwise provided by law, the written notice of any meeting shall be given not less than ten nor more than sixty days before the date of the meeting to each stockholder entitled to vote at such meeting. If mailed, such notice shall be deemed to be given when deposited in the mail, postage prepaid, directed to the stockholder at his/her address as it appears on the records of the corporation.

Section 1.4 Adjournments. Any meeting of stockholders, annual or special, may adjourn from time to time to reconvene at the same or some other place (including an adjournment taken to address a technical failure to convene or continue a meeting using remote communication), and notice need not be given of any such adjourned meeting if the place, if any, date and hour thereof, and the means of remote communication, if any, by which stockholders and proxyholders may be deemed to be present in person and vote at such adjourned meeting are (i) announced at the meeting at which the adjournment is taken, (ii) displayed, during the time scheduled for the meeting, on the same electronic network used to enable stockholders and proxyholders to participate in the meeting by means of remote communication, or (iii) set forth in the notice of meeting given in accordance with Section 1.3 of these bylaws). At the adjourned meeting the corporation may transact any business which might have been transacted at the original meeting. If the adjournment is for more than thirty days, or if after the adjournment a new record date is fixed for the adjourned meeting, a notice of the adjourned meeting shall be given to each stockholder of record entitled to vote at the meeting.

Section 1.5 Quorum. At each meeting of stockholders, except where otherwise provided by law or the corporation's Amended and Restated Certificate of Incorporation, as it may be amended from time to time (the "Certificate of Incorporation") or these bylaws, the holders of shares representing a majority of the votes entitled to be cast by the holders of the outstanding shares of stock entitled to vote at the meeting, present in person or by proxy, shall constitute a quorum. In the absence of a quorum, the stockholders so present may, by majority vote, adjourn the meeting from time to time in the manner provided in Section 1.4 of these bylaws until a quorum shall attend. Shares of its own stock belonging to the corporation or to another corporation, if a majority of the shares entitled to vote in the election of directors of such other corporation is held, directly or indirectly, by the corporation, shall neither be entitled to vote nor be counted for quorum purposes; provided, however, that the foregoing shall not limit the right of the corporation to vote stock, including but not limited to its own stock, held by it in a fiduciary capacity.

Section 1.6 Organization. Meetings of stockholders shall be presided over by the Chairman of the Board, if any, or in his/her absence by the Vice Chairman of the Board, if any, or in his/her absence by the President, or in his/her absence by a Vice President, or in the absence of the foregoing persons by a chairman designated by the Board of Directors, or in the absence of such designation by a chairman chosen at the meeting. The Secretary shall act as secretary of the meeting, but in his/her absence the chairman of the meeting may appoint any person to act as secretary of the meeting. The Board of Directors may adopt such rules and regulations for the conduct of any meeting of stockholders as it shall deem appropriate. Except to the extent inconsistent with such rules and regulations as adopted by the Board of Directors, the chairman of the meeting shall have the authority to adopt and enforce such rules and regulations for the conduct of any meeting of stockholders and the safety of those in attendance as, in the judgment of the chairman, are necessary, appropriate or convenient for the conduct of the meeting. Rules and regulations for the conduct of meetings of stockholders, whether adopted by the Board of Directors or by the chairman of the meeting, may include, without limitation, establishing: (i) an agenda or order of business for the meeting; (ii) rules and procedures for maintaining order at the meeting and the safety of those present; (iii) limitations on attendance at or participation in the meeting to stockholders entitled to vote at the meeting, their duly authorized and constituted proxies and such other persons as the chairman of the meeting shall permit; (iv) restrictions on entry to the meeting after the time fixed for the commencement thereof; (v) limitations on the time allotted for consideration of each agenda item and for questions and comments by participants; (vi) regulations for the opening and closing of the polls for balloting and matters which are to be voted on by ballot (if any); and (vii) procedures (if any) requiring attendees to provide the corporation advance notice of their intent to attend the meeting. Subject to any rules and regulations adopted by the Board of Directors, the chairman of the meeting may convene and, for any or no reason, from time to time, adjourn and/or recess any meeting of stockholders pursuant to Section 1.4.

Section 1.7 Voting; Proxies. Except as otherwise provided in the Certificate of Incorporation or any amendment thereto, each stockholder entitled to vote at any meeting of stockholders shall be entitled to one vote for each share of stock held by him which has voting power upon the matter in question. Each stockholder entitled to vote at a meeting of stockholders may authorize another person or persons to act for him by proxy, but no such proxy shall be voted or acted upon after three years from its date, unless the proxy provides for a longer period. A duly executed proxy shall be irrevocable if it states that it is irrevocable and if, and only as long as, it is coupled with an interest sufficient in law to support an irrevocable power. A stockholder may revoke any proxy which is not irrevocable by attending the meeting and voting in person or by filing an instrument in writing revoking the proxy or another duly executed proxy bearing a later date with the Secretary of the corporation. Voting at meetings of stockholders need not be by written ballot and need not be conducted by inspectors unless the holders of shares representing a majority of the votes entitled to be cast by the holders of the outstanding shares of all classes of stock entitled to vote thereon present in person or by proxy at such meeting shall so determine. At all meetings of stockholders for the election of directors a plurality of the votes cast shall be sufficient to elect. All other elections and questions shall, unless otherwise provided by law or by the Certificate of Incorporation or these bylaws, be decided by the vote of shares representing a majority of the votes entitled to be cast by the holders of the outstanding shares of stock entitled to vote thereon present in person or by proxy at the meeting.

Section 1.8 Fixing Date for Determination of Stockholders of Record. In order that the corporation may determine the stockholders entitled to notice of or to vote at any meeting of stockholders or any adjournment thereof, or to express consent to corporate action in writing without a meeting, or entitled to receive payment of any dividend or other distribution or allotment of any rights, or entitled to exercise any rights in respect of any change, conversion or exchange of stock or for the purpose of any other lawful action, the Board of Directors may fix, in advance, a record date, which shall not be more than sixty nor less than ten days prior to any other action. If no record date is fixed: (1) the record date for determining stockholders entitled to notice of or to vote at a meeting of stockholders shall be at the close of business on the day next preceding the day on which notice is given, or, if notice is waived, at the close of business on the day next preceding the day on which the meeting is held; and (2) the record date for determining stockholders for any other purpose shall be at the close of business on the day on which the Board of Directors adopts the resolution relating thereto. A determination of stockholders of record entitled to notice of or to vote at a meeting of stockholders shall apply to any adjournment of the meeting; provided, however, that the Board of Directors may fix a new record date for the adjourned meeting.

Section 1.9 List of Stockholders Entitled to Vote. The Secretary shall prepare and make, no later than the tenth (10^{th}) day before each meeting of stockholders, a complete list of the stockholders entitled to vote at the meeting, arranged in alphabetical order, and showing the address of each stockholder and the number of shares registered in the name of each stockholder; provided, however, that if the record date for determining the stockholders entitled to vote is less than ten (10) days before the date of the meeting, the list shall reflect the stockholders entitled to vote as of the tenth (10^{th}) day before the meeting date. Such list shall be open to the examination of any stockholder, for any purpose germane to the meeting, during ordinary business hours, for ten (10) days ending on the day before the meeting date: (a) on a reasonably accessible electronic network, provided that the information required to gain access to such list is provided with the notice of meeting; or (b) during ordinary business hours at the principal place of business of the corporation. The stock ledger shall be the only evidence as to who are the stockholders entitled to examine the stock ledger, the list of stockholders or the books of the corporation, or to vote in person or by proxy at any meeting of stockholders.

Section 1.10 Action by Consent of Stockholders. Unless otherwise restricted by the Certificate of Incorporation, any action required or permitted to be taken at any annual or special meeting of the stockholders may be taken without a meeting, without prior notice and without a vote, if a consent in writing, setting forth the action so taken, shall be signed by the holders of outstanding stock having not less than the minimum number of votes that would be necessary to authorize or take such action at a meeting at which all shares entitled to vote thereon were present and voted. Prompt notice of the taking of the corporate action without a meeting by less than unanimous written consent shall be given to those stockholders who have not consented in writing.

Section 1.11 Proxy Access for Director Nominations.

(a) Eligibility. Subject to the terms and conditions of these bylaws, in connection with an annual meeting of stockholders at which directors are to be elected, the corporation: (1) shall include in its proxy statement and on its form of proxy the names of, and (2) shall include in its proxy statement the "Additional Information" (as defined below) relating to, a number of nominees specified pursuant to Article I, Section 1.11(b)(1) (the "Authorized Number") for election to the Board of Directors submitted pursuant to this Section 1.11 (each, a "Stockholder Nominee"), if:

(i) the Stockholder Nominee satisfies the eligibility requirements in this Section 1.11;

(ii) the Stockholder Nominee is identified in a timely notice (the "Stockholder Notice") that satisfies this Section 1.11 and is delivered by a stockholder that qualifies as, or is acting on behalf of, an Eligible Stockholder (as defined below);

(iii) the Eligible Stockholder satisfies the requirements in this Section 1.11 and expressly elects at the time of the delivery of the Stockholder Notice to have the Stockholder Nominee included in the corporation's proxy materials; and

(iv) the additional requirements of these bylaws are met.

(b) Definitions.

(1) The maximum number of Stockholder Nominees appearing in the corporation's proxy materials with respect to an annual meeting of stockholders (the "Authorized Number") shall not exceed the greater of two or 20% of the number of directors in office as of the last day on which a Stockholder Notice may be delivered pursuant to this Section 1.11 with respect to the annual meeting, or if such amount is not a whole number, the closest whole number (rounding down) below 20%; provided that the Authorized Number shall be reduced: (i) by any Stockholder Nominee whose name was submitted for inclusion in the corporation's proxy materials pursuant to this Section 1.11 but either is subsequently withdrawn or that the Board of Directors decides to nominate as a Board nominee; (ii) by any directors in office or director nominees that in either case shall be included in the corporation's proxy materials with respect to the annual meeting as an unopposed (by the corporation) nominee pursuant to an agreement, arrangement or other understanding between the corporation and a stockholder or group of stockholders (other than any such agreement, arrangement or understanding entered into in connection with an acquisition of capital stock, by the stockholder or group of stockholders, from the corporation); (iii) by any directors serving on the Board of Directors who were previously elected to the Board of Directors as Stockholder Nominees at any of the preceding two annual meetings and who are nominated for election at the annual meeting by the Board of Directors as a Board nominee; and (iv) by any Stockholder Nominee who is not included in the corporation's proxy materials or is not submitted for director election for any reason, in accordance with the last sentence of Article I, Section 1.11(d)(2). In the event that one or more vacancies for any reason occurs after the date of the Stockholder Notice but before the annual meeting and the Board of Directors resolves to reduce the size of the Board of Directors in connection therewith, the Authorized Number shall be calculated based on the number of directors in office as so reduced.

(2) To qualify as an "Eligible Stockholder," a stockholder or a group as described in this Section 1.11 must: (i) Own and have Owned (as defined below), continuously for at least three years as of the date of the Stockholder Notice, a number of shares (as adjusted to account for any stock dividend, stock split, subdivision, combination, reclassification or recapitalization of shares of stock of the corporation that are entitled to vote generally in the election of directors) that represents at least 3% of the outstanding shares of stock of the corporation that are entitled to vote generally in the election of directors as of the date of the Stockholder Notice (the "Required Shares"), and (ii) thereafter continue to Own the Required Shares through such annual meeting of stockholders.

For purposes of satisfying the ownership requirements of this Section 1.11(b)(2), a group of not more than 20 stockholders and/or beneficial owners may aggregate the number of shares of stock of the corporation that are entitled to vote generally in the election of directors that each group member has individually Owned continuously for at least three years as of the date of the Stockholder Notice if all other requirements and obligations for an Eligible Stockholder set forth in this Section 1.11 are satisfied by and as to each stockholder or beneficial owner comprising the group whose shares are aggregated. No shares may be attributed to more than one Eligible Stockholder, and no stockholder or beneficial owner, alone or together with any of its affiliates, may individually or as a member of a group qualify as or constitute more than one Eligible Stockholder under this Section 1.11. A group of any two or more funds shall be treated as only one stockholder or beneficial owner for this purpose if they are (a) under common management and investment control, (b) under common management and funded primarily by a single employer or (c) part of a "group of investment companies," as such term is defined in Section 12(d)(1)(G)(ii) of the Investment Company Act of 1940. For purposes of this Section 1.11, the term "affiliate" or "affiliates" shall have the meanings ascribed thereto under the rules and regulations promulgated under the Exchange Act.

(3) For purposes of this Section 1.11:

(i) A stockholder or beneficial owner is deemed to "Own" only those outstanding shares of stock of the corporation that are entitled to vote generally in the election of directors as to which the person possesses both: (A) the full voting and investment rights pertaining to the shares; and (B) the full economic interest in (including the opportunity for profit and risk of loss

on) such shares, except that the number of shares calculated in accordance with clauses (A) and (B) shall not include any shares: (i) sold by such person in any transaction that has not been settled or closed; (ii) borrowed by the person for any purposes or purchased by the person pursuant to an agreement to resell; or (iii) subject to any option, warrant, forward contract, swap, contract of sale, or other derivative or similar agreement entered into by the person, whether the instrument or agreement is to be settled with shares or with cash based on the notional amount or value of outstanding shares of stock of the corporation that are entitled to vote generally in the election of directors, if the instrument or agreement has, or is intended to have, or if exercised would have, the purpose or effect of: (x) reducing in any manner, to any extent or at any time in the future, the person's full right to vote or direct the voting of the shares; and/or (y) hedging, offsetting or altering to any degree any gain or loss arising from the full economic ownership of the shares by the person. The terms "Owned," "Owning" and other variations of the word "Own," when used with respect to a stockholder or beneficial owner, have correlative meanings. For purposes of clauses (i) through (iii), the term "person" includes its affiliates (as such term is defined in Rule 12b-2 promulgated under the Exchange Act).

(ii) A stockholder or beneficial owner "Owns" shares held in the name of a nominee or other intermediary so long as the person retains both: (A) the full voting and investment rights pertaining to the shares; and (B) the full economic interest in the shares. The person's Ownership of shares is deemed to continue during any period in which the person has delegated any voting power by means of a proxy, power of attorney, or other instrument or arrangement that is revocable at any time by the stockholder.

(iii) A stockholder or beneficial owner's Ownership of shares shall be deemed to continue during any period in which the person has loaned the shares if the person has the power to recall the loaned shares on not more than five business days' notice and (A) the person recalls the loaned shares within five business days of being notified that its Stockholder Nominee shall be included in the Corporation's proxy materials for the relevant annual meeting; and (B) the person holds the recalled shares through the annual meeting.

(4) For purposes of this Section 1.11, the "Additional Information" referred to in Article I, Section 1.11(a)(2) that the corporation will include in its proxy statement is:

(i) the information set forth in the Schedule 14N provided with the Stockholder Notice concerning each Stockholder Nominee and the Eligible Stockholder that is required to be disclosed in the corporation's proxy statement by the applicable requirements of the Exchange Act and the rules and regulations thereunder; and

(ii) if the Eligible Stockholder so elects, a written statement of the Eligible Stockholder (or, in the case of a group, a written statement of the group), not to exceed 500 words, in support of its Stockholder Nominee(s), which must be provided at the same time as the Stockholder Notice for inclusion in the corporation's proxy statement for the annual meeting (the "Statement").

Notwithstanding anything to the contrary contained in this Section 1.11, the corporation may omit from its proxy materials any information or Statement that it, in good faith, believes is untrue in any material respect (or omits a material fact necessary in order to make the statements made, in light of the circumstances under which they are made, not misleading) or would violate any applicable law, rule, regulation or listing standard. Nothing in this Section 1.11 shall limit the corporation's ability to solicit against and include in its proxy materials its own statements relating to any Eligible Stockholder or Stockholder Nominee.

(c) Stockholder Notice and Other Informational Requirements.

(1) The Stockholder Notice shall set forth:

(i) all information required under Article I, Section 1.1(b)(2)(C) and (D) of these bylaws (and for such purposes, references in Article I, Section 1.1(b)(2) of these bylaws to the "Proposing Person" shall be deemed to refer to the "Eligible Stockholder" on whose behalf the Stockholder Notice is delivered);

(ii) a copy of the Schedule 14N that has been or concurrently is filed with the SEC under the Exchange Act;

(iii) a written statement of the Eligible Stockholder (and in the case of a group, the written statement of each stockholder or beneficial owner whose shares are aggregated for purposes of constituting an Eligible Stockholder), which statement(s) shall also be included in the Schedule 14N filed with the SEC: (A) setting forth and certifying to the number of shares of stock of the corporation that are entitled to vote generally in the election of directors the Eligible Stockholder Owns and has Owned (as defined in Article I, Section 1.11(b)(3) above) continuously for at least three years as of the date of the Stockholder Notice; (B) agreeing to continue to Own such shares through the annual meeting; and (C) regarding whether or not it intends to maintain Ownership of the Required Shares for at least one year following the annual meeting;

(iv) the written agreement of the Eligible Stockholder (and in the case of a group, the written agreement of each stockholder or beneficial owner whose shares are aggregated for purposes of constituting an Eligible Stockholder) addressed to the corporation, setting forth the following additional agreements, representations, and warranties:

(A) it shall provide: (i) within five business days after the date of the Stockholder Notice, one or more written statements from the record holder(s) of the Required Shares and from each intermediary through which the Required Shares are or have been held, in each case during the requisite three-year holding period, specifying the number of shares that the Eligible Stockholder Owns, and has Owned continuously in compliance with this Section 1.11; (ii) within the time period specified in Article I, Section 1.1(b)(3) of these bylaws, an updated or supplemental notice so that the information provided or required to be provided pursuant to clause (c)(1) of this Section 1.11 shall be true and correct as of the dates specified in Article I, Section 1.1(b)(3); and (iii) immediate notice to the corporation if the Eligible Stockholder ceases to own any of the Required Shares prior to the annual meeting;

(B) it: (i) acquired the Required Shares in the ordinary course of business and not with the intent to change or influence control at the corporation, and does not presently have this intent; (ii) has not nominated and shall not nominate for election to the Board of Directors at the annual meeting any person other than the Stockholder Nominee(s) being nominated pursuant to this Section 1.11; (iii) has not engaged and shall not engage in, and has not been and shall not be a participant (as defined in Item 4 of Exchange Act Schedule 14A) in a solicitation within the meaning of Exchange Act Rule 14a-1(l), in support of the election of any individual as a director at the annual meeting other than its Stockholder Nominee(s) or any nominee(s) of the Board of Directors; and (iv) shall not distribute to any stockholder any form of proxy for the annual meeting other than the form distributed by the corporation; and

(C) it will: (i) assume all liability stemming from any legal or regulatory violation arising out of the Eligible Stockholder's communications with the stockholders of the corporation or out of the information that the Eligible Stockholder provided to the corporation; (ii) indemnify and hold harmless the corporation and each of its directors, officers and employees individually against any liability, loss or damages in connection with any threatened or pending action, suit or proceeding, whether legal, administrative or investigative, against the corporation or any of its directors, officers or employees arising out of the nomination or solicitation process pursuant to this Section 1.11; (iii) comply with all laws, rules, regulations and listing standards applicable to its nomination or any solicitation in connection with the annual meeting; (iv) file with the SEC any solicitation or other communication by or on behalf of the Eligible Stockholder relating to the corporation's annual meeting of stockholders, one or more of the corporation's directors or director nominees or any Stockholder Nominee, regardless of whether the filing is required under Exchange Act Regulation 14A, or whether any exemption from filing is available for the materials under Exchange Act Regulation 14A; and (v) at the request of the corporation, promptly, but in any event within five business days after such request (or by the day prior to the day of the annual meeting, if earlier), provide to the corporation such additional information as reasonably requested by the corporation; and

(v) in the case of a nomination by a group, the designation by all group members of one group member that is authorized to act on behalf of all members of the group with respect to the nomination and matters related thereto, including withdrawal of the nomination, and the written agreement, representation, and warranty of the Eligible Stockholder that it shall provide, within five business days after the date of the Stockholder Notice, documentation reasonably

satisfactory to the corporation demonstrating that the number of stockholders and/or beneficial owners within such group does not exceed 20, including whether a group of funds qualifies as one stockholder or beneficial owner within the meaning of Section 1.11(b)(2) of these bylaws.

(2) Within the time period for delivery of the Stockholder Notice, the Eligible Stockholder shall deliver to the Secretary at the principal executive offices of the Corporation the information as to each Stockholder Nominee required to be submitted by nominees under Article I, Section 1.12 of these bylaws with respect to any nominee for election as a director, which information shall be deemed part of the Stockholder Notice. The corporation may request such additional information as necessary to permit the Board of Directors to determine if each Stockholder Nominee satisfies the requirements of this Section 1.11.

(3) To be timely under this Section 1.11, the Stockholder Notice must be delivered by a stockholder to the Secretary of the corporation at the principal executive offices of the corporation not later than the close of business on the 120th day nor earlier than the close of business on the 150th day prior to the first anniversary of the date (as stated in the corporation's proxy materials) the definitive proxy statement was first released to stockholders in connection with the preceding year's annual meeting of stockholders; provided, however, that in the event that the date of the annual meeting is more than 30 days before or after the anniversary of the previous year's annual meeting, or if no annual meeting was held in the preceding year, to be timely, the Stockholder Notice must be so delivered not earlier than the close of business on the 150th day prior to such annual meeting and not later than the close of business on the later of the 120th day prior to such annual meeting or the 10th day following the day on which public announcement (as defined in Article I, Section 1.1(c)(3)) of the date of such meeting is first made by the corporation. In no event shall an adjournment or recess of an annual meeting, or a postponement of an annual meeting for which notice of the meeting has already been given to stockholders or a public announcement of the meeting date has already been made, commence a new time period (or extend any time period) for the giving of the Stockholder Notice as described above.

(4) In the event that any information or communications provided by the Eligible Stockholder or any Stockholder Nominees to the corporation or its stockholders is not, when provided, or thereafter ceases to be, true, correct and complete in all material respects (including omitting a material fact necessary to make the statements made, in light of the circumstances under which they were made, not misleading), such Eligible Stockholder or Stockholder Nominee, as the case may be, shall promptly notify the Secretary and provide the information that is required to make such information or communication true, correct, complete and not misleading; it being understood that providing any such notification shall not be deemed to cure any defect or limit the corporation's right to omit a Stockholder Nominee from its proxy materials as provided in this Section 1.11.

All information provided pursuant to this Section 1.11(c) shall be deemed part of the Stockholder Notice for purposes of this Section 1.11(c).

(d) Proxy Access Procedures.

(1) Notwithstanding anything to the contrary contained in this Article I, Section 1.11, the corporation may omit from its proxy materials any Stockholder Nominee, and such nomination and any proxies or votes in respect of any such nomination shall be disregarded and no vote on such Stockholder Nominee shall occur, notwithstanding that proxies or votes in respect of any such nomination may have been received by the corporation, if:

(i) the Eligible Stockholder or Stockholder Nominee breaches any of its agreements, representations or warranties set forth in the Stockholder Notice or otherwise submitted pursuant to this Section 1.11, any of the information in the Stockholder Notice or otherwise submitted pursuant to this Section 1.11 was not, when provided, true, correct and complete, or the Eligible Stockholder or applicable Stockholder Nominee otherwise fails to comply with its obligations pursuant to these bylaws, including, but not limited to, its obligations under this Section 1.11;

(ii) the Stockholder Nominee: (A) is not independent under any applicable listing standards, any applicable rules of the SEC and any publicly disclosed standards used by the Board of Directors in determining and disclosing the independence of the corporation's directors; (B) is or has been, within the past three years, an officer or director of a competitor, as defined for the purposes of Section 8 of the Clayton Antitrust Act of 1914; (C) is a named subject of a pending criminal proceeding (excluding traffic violations and other minor offenses) or has been convicted

in a criminal proceeding (excluding traffic violations and other minor offenses) within the past ten years; or (D) is subject to any order of the type specified in Rule 506(d) of Regulation D promulgated under the Securities Act of 1933;

(iii) the corporation receives a notice (whether or not subsequently withdrawn) that a stockholder intends to nominate any candidate for election to the Board of Directors pursuant to the advance notice requirements for stockholder nominees for director in Article I, Section 1.1(b); or

(iv) the election of the Stockholder Nominee to the Board of Directors would cause the corporation to violate the Certificate of Incorporation, these bylaws, or any applicable law, rule, regulation or listing standard.

(2) An Eligible Stockholder submitting more than one Stockholder Nominee for inclusion in the corporation's proxy materials pursuant to Section 1.11 shall rank such Stockholder Nominees based on the order that the Eligible Stockholder desires such Stockholder Nominees to be selected for inclusion in the corporation's proxy materials and include such assigned rank in its Stockholder Notice submitted to the corporation. In the event that the number of Stockholder Nominees submitted by Eligible Stockholders pursuant to this Section 1.11 exceeds the Authorized Number, the Stockholder Nominees to be included in the corporation's proxy materials shall be determined in accordance with the following provisions: one Stockholder Nominee who satisfies the eligibility requirements in this Section 1.11 shall be selected from each Eligible Stockholder for inclusion in the corporation's proxy materials until the Authorized Number is reached, going in order of the amount (largest to smallest) of shares of the corporation each Eligible Stockholder disclosed as Owned in its Stockholder Notice submitted to the corporation and going in the order of the rank (highest to lowest) assigned to each Stockholder Nominee by such Eligible Stockholder. If the Authorized Number is not reached after one Stockholder Nominee who satisfies the eligibility requirements in this Section 1.11 has been selected from each Eligible Stockholder, this selection process shall continue as many times as necessary, following the same order each time, until the Authorized Number is reached. Following such determination, if any Stockholder Nominee who satisfies the eligibility requirements in this Section 1.11 thereafter is nominated by the Board of Directors, thereafter is not included in the corporation's proxy materials or thereafter is not submitted for director election for any reason (including the Eligible Stockholder's or Stockholder Nominee's failure to comply with this Section 1.11), no other nominee or nominees shall be included in the corporation's proxy materials or otherwise submitted for election as a director at the applicable annual meeting in substitution for such Stockholder Nominee.

(3) Any Stockholder Nominee who is included in the corporation's proxy materials for a particular annual meeting of stockholders but either: (i) withdraws from or becomes ineligible or unavailable for election at the annual meeting for any reason, including for the failure to comply with any provision of these bylaws (provided that in no event shall any such withdrawal, ineligibility or unavailability commence a new time period (or extend any time period) for the giving of a Stockholder Notice); or (ii) does not receive a number of votes cast in favor of his or her election that is at least equal to 25% of the shares present in person or represented by proxy and entitled to vote in the election of directors, shall be ineligible to be a Stockholder Nominee pursuant to this Section 1.11 for the next two annual meetings.

(4) Notwithstanding the foregoing provisions of this Section 1.11, unless otherwise required by law or otherwise determined by the chairman of the meeting or the Board of Directors, if the stockholder delivering the Stockholder Notice (or a qualified representative of the stockholder, as defined in Article I, Section 1.1(c)(2) of these bylaws) does not appear at the annual meeting of stockholders of the corporation to present its Stockholder Nominee or Stockholder Nominees, such nomination or nominations shall be disregarded, notwithstanding that proxies in respect of the election of the Stockholder Nominee or Stockholder Nominees may have been received by the corporation. Without limiting the Board of Directors' power and authority to interpret any other provisions of these bylaws, the Board of Directors (and any other person or body authorized by the Board of Directors) shall have the power and authority to interpret this Section 1.11 and to make any and all determinations necessary or advisable to apply this Section 1.11 to any persons, facts or circumstances, in each case acting in good faith. Except for a nomination made in accordance with Article I, Section 1.1(b) of these bylaws, this Section 1.11 shall be the exclusive method for stockholders to include nominees for director election in the corporation's proxy materials.

Section 1.12 Information Regarding Director Nominees.

(a) As to each person whom the stockholder proposes to nominate for election or reelection as a director of the corporation pursuant to Section 1.1(b) or Section 1.11 of these bylaws, the stockholder must deliver to the Secretary at the principal executive offices of the corporation the following information:

(1) a written representation and agreement, which shall be signed by the person proposed to be nominated and pursuant to which such person shall represent and agree that such person: (i) consents to being named as a nominee in a proxy statement and form of proxy relating to the meeting at which directors are to be elected and to serving as a director if elected, and currently intends to serve as a director for the full term for which such person is standing for election; (ii) is not and will not become a party to any agreement, arrangement or understanding with, and has not given any commitment or assurance to, any person or entity: (A) as to how the person, if elected as a director, will act or vote on any issue or question, except as disclosed in such representation and agreement or (B) that could limit or interfere with the person's ability to comply, if elected as a director, with such person's fiduciary duties under applicable law; (iii) is not and will not become a party to any agreement, arrangement or understanding with any person or entity other than the corporation with respect to any direct or indirect compensation, reimbursement or indemnification in connection with service or action as a director or nominee except as disclosed in such representation and agreement; and (iv) if elected as a director, will comply with all of the corporation's corporate governance policies and guidelines related to conflict of interest, confidentiality, stock ownership and trading policies and guidelines, and any other policies and guidelines applicable to directors (which will be promptly provided following a request therefor);

(2) a fully completed and signed questionnaire in the same form required of the corporation's director nominees (which form will be promptly provided following a request therefor); and

(3) a representation that such person will provide to the corporation such other information as the corporation may reasonably request, including such information reasonably necessary for the corporation to determine whether a nominee will satisfy any qualifications or requirements imposed by the Certificate of Incorporation or these bylaws, any law, rule, regulation or listing standard that may be applicable to the corporation, or relevant to a determination whether such person can be considered an independent director, which information shall be promptly provided following a request therefor.

(b) The written and signed representations and agreements and fully completed and signed questionnaires described in Article I, Section 1.12(a)(2) above shall be provided to the corporation at the time specified pursuant to Article I, Section 1.1(b) or Article I, Section 1.11 of these bylaws, and the additional information described in Article I, Section 1.12(a)(3) above shall be provided to the corporation promptly upon request by the corporation, but in any event within five business days after such request. All information provided pursuant to this Section 1.12 shall be deemed part of the stockholder's notice submitted pursuant to Article I, Section 1.1(b) of these bylaws or a Stockholder Notice submitted pursuant to Article I, Section 1.11 of these bylaws as applicable.

(c) Notwithstanding the foregoing, if any information or communication submitted pursuant to this Section 1.12 is inaccurate or incomplete in any material respect (as determined by the Board of Directors (or any designated committee thereof)) such information shall be deemed not to have been provided in accordance with this Section 1.12. Any stockholder providing information pursuant to this Section 1.12 shall promptly notify the Secretary of the corporation in writing at the principal executive office of the corporation of any inaccuracy or change in any previously provided information within two business days after becoming aware of such inaccuracy or change. Upon written request of the Secretary, such stockholder shall provide, within seven business days after delivery of such request (or such longer period as may be specified in such request), (i) written verification, reasonably satisfactory to the corporation, to demonstrate the accuracy of any information submitted and (ii) a written affirmation of any information submitted as of an earlier date. If the stockholder giving notice of an intent to nominate a candidate for election fails to provide such written verification or affirmation within such period, the information as to which written verification or affirmation was requested may be deemed not to have been provided in accordance with this Section 1.12.

ARTICLE II
BOARD OF DIRECTORS

Section 1.1 Number; Qualifications. The Board of Directors shall consist of one or more members, the number thereof to be determined from time to time by resolution of the Board of Directors. Directors need not be stockholders.

Section 1.2 Election; Resignation; Removal; Vacancies. The Board of Directors shall initially consist of the persons named as Directors by the Incorporator, and each Director so elected shall hold office until the first

annual meeting of stockholders or until his/her successor is elected and qualified. At the first annual meeting of stockholders and at each annual meeting thereafter, the stockholders shall elect Directors each of whom shall hold office for a term of one year or until his/her successor is elected and qualified. Any Director may resign at any time upon written notice to the corporation. Any vacancy occurring in the Board of Directors for any cause may be filled by a majority of the remaining members of the Board of Directors, although such majority is less than a quorum, or by a plurality of the votes cast at a meeting of stockholders, and each Director so elected shall hold office until the expiration of the term of office of the Director whom he has replaced or until his/her successor is elected and qualified.

Section 1.3 Regular Meetings. Regular meetings of the Board of Directors may be held at such places within or without the State of Delaware and at such times as the Board of Directors may from time to time determine, and if so determined notices thereof need not be given.

Section 1.4 Special Meetings. Special meetings of the Board of Directors may be held at any time or place within or without the State of Delaware whenever called by the President, any Vice President, the Secretary, or by any member of the Board of Directors. Reasonable notice thereof shall be given by the person or persons calling the meeting, not later than the second day before the date of the special meeting.

Section 1.5 Telephonic Meetings Permitted. Members of the Board of Directors, or any committee designated by the Board, may participate in a meeting of such Board or committee by means of conference telephone or similar communications equipment by means of which all persons participating in the meeting can hear each other, and participation in a meeting pursuant to this bylaw shall constitute presence in person at such meeting.

Section 1.6 Quorum; Vote Required for Action. At all meetings of the Board of Directors a majority of the directors then in office shall constitute a quorum for the transaction of business. Except in cases in which the Certificate of Incorporation or these bylaws otherwise provide, the vote of a majority of the directors present at a meeting at which a quorum is present shall be the act of the Board of Directors.

Section 1.7 Organization. Meetings of the Board of Directors shall be presided over by the Chairman of the Board, if any, or in his/her absence by the Vice Chairman of the Board, if any, or in his/her absence by the President, or in their absence by a chairman chosen at the meeting. The Secretary shall act as secretary of the meeting, but in his/her absence the chairman of the meeting may appoint any person to act as secretary of the meeting.

Section 1.8 Informal Action by Directors. Unless otherwise restricted by the Certificate of Incorporation or these bylaws, any action required or permitted to be taken at any meeting of the Board of Directors, or of any committee thereof, may be taken without a meeting if all members of the Board or such committee, as the case may be, consent thereto in writing, and the writing or writings are filed with the minutes of proceedings of the Board or committee.

ARTICLE III
COMMITTEES

Section 1.1 Committees. The Board of Directors may designate one or more committees, each committee to consist of one or more of the directors of the corporation. The Board may designate one or more directors as alternate members of any committee, who may replace any absent or disqualified member at any meeting of the committee. In the absence or disqualification of a member of the committee, the member or members thereof present at any meeting and not disqualified from voting, whether or not he or they constitute a quorum, may unanimously appoint another member of the Board of Directors to act at the meeting in place of any such absent or disqualified member. Any such committee, to the extent provided in the resolution of the Board of Directors, shall have and may exercise all the powers and authority of the Board of Directors in the management of the business and affairs of the corporation, and may authorize the seal of the corporation to be affixed to all papers which may require it, but no such committee shall have the power or authority in reference to amending the Certificate of Incorporation (except that any such committee may, to the extent authorized in the resolution or resolutions providing for the issuance of shares of Preferred Stock adopted by the Board of Directors pursuant to Article Fourth of the Certificate of Incorporation, fix any of the preferences or rights of such shares relating to dividends, redemption, dissolution, any distribution of the assets of the corporation or the conversion into, or the exchange of such shares for, shares of any other class or classes or any other series of the same or any other class or classes of stock of the corporation), adopting an agreement of merger or consolidation under Sections 251 or 252 of the General Corporation Law of the State of Delaware (the "DGCL"), recommending to the stockholders the sale, lease or exchange of all or substantially all of the corporation's property and assets, recommending to the stockholders a dissolution of the corporation or a revocation of a dissolution, or amending these bylaws; and unless the resolution or the Certificate of Incorporation expressly so provides, no such committee shall have the power or authority to declare a dividend, to

authorize the issuance of stock, or to adopt a certificate of ownership and merger pursuant to Section 253 of the DGCL.

Section 1.2 Committee Rules. Unless the Board of Directors otherwise provides, each committee designated by the Board may make, alter and repeal rules for the conduct of its business. In the absence of such rules each committee shall conduct its business in the same manner as the Board of Directors conducts its business pursuant to Article II of these bylaws.

ARTICLE IV
OFFICERS

Section 1.1 Executive Officers; Election; Qualifications; Term of Office; Resignation; Removal; Vacancies. The Board of Directors shall choose a President and Secretary, and it may, if it so determines, choose a Chairman of the Board and a Vice Chairman of the Board from among its members. The Board of Directors may also choose one or more Vice Presidents, one or more Assistant Secretaries, a Treasurer and one or more Assistant Treasurers. Each such officer shall hold office until the first meeting of the Board of Directors after the annual meeting of stockholders next succeeding this election, and until his/her successor is elected and qualified or until his/her earlier resignation or removal. Any officer may resign at any time upon written notice to the corporation. The Board of Directors may remove any officer with or without cause at any time, but such removal shall be without prejudice to the contractual rights of such officer, if any, with the corporation. Any number of offices may be held by the same person. Any vacancy occurring in any office of the corporation by death, resignation, removal or otherwise may be filled for the unexpired portion of the term by the Board of Directors at any regular or special meeting.

Section 1.2 Powers and Duties of Executive Officers. The officers of the corporation shall have such powers and duties in the management of the corporation as may be prescribed by the Board of Directors and, to the extent not so provided, as generally pertain to their respective offices, subject to the control of the Board of Directors. The Board of Directors may require any officer, agent or employee to give security for the faithful performance of his/her duties.

ARTICLE V
STOCK

Section 1.1 Certificates. The Board may provide by resolution or resolutions that some or all of any or all classes or series of the stock of the Company shall be uncertificated shares. Certificates, if any, representing shares of stock of the Company will be in such form as is determined by the Board, subject to applicable legal requirements. Each such certificate shall be numbered and shall be signed by or in the name of the corporation by the Chairman or Vice Chairman of the Board of Directors, if any, or the President or a Vice President, and by the Treasurer or an Assistant Treasurer, or the Secretary or an Assistant Secretary, of the corporation, certifying the number of shares owned by him in the corporation. Any of or all the signatures on the certificate may be a facsimile. In case any officer, transfer agent, or registrar who has signed or whose facsimile signature has been placed upon a certificate shall have ceased to be such officer, transfer agent, or registrar before such certificate is issued, it may be issued by the corporation with the same effect as if he were such officer, transfer agent, or registrar at the date of issue. Records shall be kept of the amount of stock of the corporation issued and outstanding, the manner in which and the time when such stock was paid for, the respective names, alphabetically arranged, and the addresses, of the persons, firms or corporations owning of record the stock represented by certificates for stock of the corporation, the number, class and series of shares represented by such certificates, respectively, the time when each became an owner of record thereof, and the respective dates of such certificates, and in case of cancellation, the respective dates of cancellation.

Section 1.2 Lost, Stolen or Destroyed Stock Certificates; Issuance of New Certificates. The corporation may issue a new certificate of stock in the place of any certificate theretofore issued by it, alleged to have been lost, stolen or destroyed, and the corporation may require the owner of the lost, stolen or destroyed certificate, or his/her legal representative, to give the corporation a bond sufficient to indemnify it against any claim that may be made against it on account of the alleged loss, theft or destruction of any such certificate or the issuance of such new certificate.

Section 1.3 Transfers of Stock. Transfers of shares shall be made upon the books of the Company (i) only by the holder of record thereof, or by a duly authorized agent, transferee or legal representative and (ii) in the case of certificated shares, upon the surrender to the Company of the certificate or certificates for such shares. No transfer shall be made that is inconsistent with the provisions of applicable law. The person in whose name shares of stock stand on the books of the corporation shall be deemed the owner thereof for all purposes as regards the corporation. Whenever any transfer of shares shall be made for collateral security and not absolutely, such fact shall

be so expressed in the entry of transfer if, when the certificate of certificates shall be presented to the corporation for transfer, both the transferor and the transferee request the corporation to do so.

Section 1.4 Regulations Concerning Transfer of Stock. The Board of Directors may make such rules and regulations as it may deem expedient, not inconsistent with these bylaws, concerning the issue, transfer and registration of certificates for stock of the corporation. The Board of Directors may appoint, or authorize any officer or officers to appoint, one or more transfer agents and one or more registrars, and may require all certificates for stock to bear the signature or signatures of any of them.

ARTICLE VI
INDEMNIFICATION OF DIRECTORS, OFFICERS, EMPLOYEES AND AGENTS

Section 1.1 Right to Indemnification. The corporation shall indemnify and hold harmless, to the fullest extent permitted by applicable law as it presently exists or may hereafter be amended, any person who was or is made or is threatened to be made a party or is otherwise involved in any action, suit, or proceeding, whether brought by or in the right of the corporation or otherwise, including civil, criminal, administrative, or investigative (a "proceeding") by reason of the fact that he, or a person for whom he is the legal representative, 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 or of a partnership, joint venture, trust, enterprise or non-profit entity, including service with respect to employee benefit plans, against all liability and loss suffered and expenses reasonably incurred by such person. The corporation shall indemnify a person in connection with a proceeding initiated by such person only if the proceeding was authorized by the Board of Directors of the corporation.

Section 1.2 Prepayment of Expenses. The corporation shall pay the expenses incurred in defending any proceeding in advance of its final disposition, provided, however, that the payment of expenses incurred by a director or officer in his/her capacity as a director or officer (except with regard to service to an employee benefit plan or non-profit organization) in advance of the final disposition of the proceeding shall be made only upon receipt of an undertaking by the director or officer to repay all amounts advanced if it should be determined that the director or officer is not entitled to be indemnified under this Article VI or otherwise.

Section 1.3 Claims. If a claim for indemnification or payment of expenses under this Article VI is not paid in full within 90 days after a written claim therefor has been received by the corporation, the claimant may file suit to recover the unpaid amount of such claims and, if successful in whole or in part, shall be entitled to be paid the expense of prosecuting such claim. In any such action the corporation shall have the burden of proving that the claimant was not entitled to the requested indemnification or payment of expenses under applicable law.

Section 1.4 Non-Exclusivity of Rights. The rights conferred on any person by this Article VI shall not be exclusive of any other rights which such person may have or hereafter acquire under any statute, provision of the Certificate of Incorporation, these Bylaws, agreement, vote of stockholders or disinterested directors or otherwise.

Section 1.5 Amendment or Repeal. Any repeal or modification of the foregoing provisions of this Article VI shall not adversely affect any right or protection of a director, officer or employee of the corporation in respect of any act or omission occurring prior to the time of such repeal or modification.

ARTICLE VII
MISCELLANEOUS

Section 1.1 Fiscal Year. The fiscal year of the corporation shall be determined by resolution of the Board of Directors.

Section 1.2 Seal. The Board of Directors may, but need not, adopt a corporate seal. If adopted, the corporate seal shall have the name of the corporation inscribed thereon and shall be in such form as may be approved from time to time by the Board of Directors.

Section 1.3 Waiver of Notice of Meetings of Stockholders, Directors and Committees. Any written waiver of notice, signed by the person entitled to notice, whether before or after the time stated therein, shall be deemed equivalent to notice. Attendance of a person at a meeting shall constitute a waiver of notice of such meeting, except when the person attends a meeting for the express purpose of objecting, at the beginning of the meeting, to the transaction of any business because the meeting is not lawfully called or convened. Neither the

business to be transacted at, nor the purpose of any regular or special meeting of the stockholders, directors, or members of a committee of directors need be specified in any written waiver of notice.

Section 1.4 Interested Directors; Quorum. No contract or transaction between the corporation and one or more of its directors or officers, or between the corporation and any other corporation, partnership, association, or other organization in which one or more of its directors or officers are directors or officers, or have a financial interest, shall be void or voidable solely for this reason, or solely because the director or officer is present at or participates in the meeting of the Board or committee thereof which authorizes the contract or transaction, or solely because his/her or their votes are counted for such purpose, if: (a) the material facts as to his/her relationship or interest and as to the contract or transaction are disclosed or are known to the Board of Directors or the committee, and the Board or committee in good faith authorizes the contract or transaction by the affirmative votes of a majority of the disinterested directors, even though the disinterested directors be less than a quorum; (b) the material facts as to his/her relationship or interest and as to the contract or transaction are disclosed or are known to the stockholders entitled to vote thereon, and the contract or transaction is specifically approved in good faith by vote of the stockholders; or (c) the contract or transaction is fair as to the corporation as of the time it is authorized, approved or ratified, by the Board of Directors, a committee thereof, or the stockholders. Common or interested directors may be counted in determining the presence of a quorum at a meeting of the Board of Directors or of a committee, which authorizes the contract or transaction.

Section 1.5 Form of Records. Any records maintained by the corporation in the regular course of its business, including its stock ledger, books of account, and minute books, may be kept on, or be in the form of, punch cards, magnetic tape, photographs, microphotographs, or any other information storage device, provided that the records so kept can be converted into clearly legible form within a reasonable time. The corporation shall so convert any records so kept upon the request of any person entitled to inspect the same.

Section 1.6 Amendment of Bylaws. These Bylaws may be altered or repealed, and new bylaws made, by the Board of Directors, but the stockholders may make additional bylaws and may alter and repeal any bylaws whether adopted by them or otherwise.

***

Royalty Purchase Agreement

By and Between

Arrowhead Pharmaceuticals, Inc.

and

Royalty Pharma Investments 2019 ICAV

Dated as of November 9, 2022

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ROYALTY PURCHASE AGREEMENT

This ROYALTY PURCHASE AGREEMENT, dated as of November 9, 2022 (this "Agreement"), is made and entered into by and between Arrowhead Pharmaceuticals, Inc., a Delaware corporation (the "Seller"), on the one hand, and Royalty Pharma Investments 2019 ICAV, an Irish collective asset-management vehicle (the "Buyer"), on the other hand. Unless otherwise defined in this Agreement, capitalized terms have the meanings ascribed to them in Section 1 below.

W I T N E S S E T H:

WHEREAS, pursuant to the License Agreement, the Seller granted to Licensee a license under the Arrowhead Licensed Technology with respect to the Licensed Compounds and Licensed Products and the Seller's rights under the Joint IPR (as such term is defined in the License Agreement), and Licensee, in partial consideration thereof, agreed to pay specified royalties to the Seller with respect to Net Sales of the Licensed Products; and

WHEREAS, the Buyer desires to purchase the Royalty from the Seller, and the Seller desires to sell the Royalty to the Buyer.

NOW THEREFORE, in consideration of the representations, warranties, covenants and agreements set forth herein and for good and valuable consideration, the receipt and adequacy of which are hereby acknowledged, the Seller and the Buyer hereby agree as follows:

Article 1

DEFINED TERMS AND RULES OF CONSTRUCTION

Section 1.1 Definitions. As used in this Agreement, the following terms shall have the following meanings:

"Additional Purchase Price Payment" is defined in Section 2.1(b).

"Affiliate" means, with respect to any particular Person, any other Person directly or indirectly, and whether by contract or otherwise, controlling, controlled by or under common control with such Person. For purposes of this definition, the word "control" (including, with correlative meaning, the terms "controlled by" or "under common control with") means the actual power, either directly or indirectly through one or more intermediaries, to direct or cause the direction of the management and policies of such entity, whether by the ownership of at least fifty percent (50%) of the voting stock of such entity, or by contract or otherwise. Notwithstanding the foregoing, with respect to the Seller, the term "Affiliate" shall not include Visirna or its respective Subsidiaries.

"Agreement" is defined in the preamble. References to this Agreement include the Bill of Sale and the Licensee Instruction Letter.

"Amgen Product Patents" means all patents, other than the Licensed Patents, owned or in-licensed by Amgen Inc. or its Affiliates that claim the Licensed Product.

"Arrowhead In-License" means an In-License to which the Seller is a party pursuant to which the Seller has in-licensed any Arrowhead Licensed Technology from a Third Party.

"Arrowhead Licensed Technology" shall have the meaning ascribed to the term Arrowhead Licensed Technology in Section 1.12 of the License Agreement.

"Arrowhead Platform Patents" means the Patents listed as "Arrowhead Platform Patents" on Exhibit G.

"Arrowhead Product Patents" means the Patents listed as "Arrowhead Product Patents" on Exhibit G.

"ASCVD" is defined in Section 2.1(b).

"Bankruptcy Laws" means, collectively, bankruptcy, insolvency, reorganization, moratorium, fraudulent conveyance, fraudulent transfer or other similar laws affecting the enforcement of creditors' rights generally.

"Bilateral Common Interest Agreement" means a Common Interest Agreement between the Seller and the Buyer, substantially in the form attached hereto as Exhibit A-1.

"Bill of Sale" is defined in Section 3.3.

"Business Day" means any day other than (a) a Saturday or Sunday or (b) a day on which banking institutions located in New York are permitted or required by applicable law or regulation to remain closed.

"Buyer" is defined in the preamble.

"Buyer Indemnified Parties" is defined in Section 7.1(a).

"Closing" is defined in Section 3.1.

"Closing Date" means the date on which the Closing occurs.

"Collaboration Target" shall have the meaning ascribed to such term in Section 1.28 of the License Agreement.

"Credit Event" means any insolvency, bankruptcy, receivership, assignment for the benefit of creditors, similar proceeding, or financial distress of Licensee, as a result of which Licensee fails to pay, or is delayed in paying, all or a portion of the Royalty .

"Data Room" is defined in Section 3.7.

"FDA" means the U.S. Food and Drug Administration, or a successor federal agency thereto in the United States.

"FDA Approval" means the FDA's approval of an NDA for Olpasiran, including all licenses, registrations, and pricing or reimbursement approvals, that are necessary for the sale and marketing of Olpasiran in the United States.

"Governmental Entity" means any: (a) nation, principality, republic, state, commonwealth, province, territory, county, municipality, district or other jurisdiction of any nature; (b) federal, state, local, municipal, foreign or other government; (c) governmental or quasi-governmental authority of any nature (including any governmental division, subdivision, department, agency, bureau, branch, office, commission, council, board, instrumentality, officer, official, representative, organization, unit, body or other entity and any court, arbitrator or other

tribunal); (d) multi-national organization or body; or (e) individual, body or other entity exercising, or entitled to exercise, any executive, legislative, judicial, administrative, regulatory, police, military or taxing authority or power of any nature.

"In-License" means an agreement with a Third Party pursuant to which such Third Party grants a license to the counterparty under such Third Party's intellectual property rights.

"Indemnified Party" is defined in Section 7.2.

"Indemnifying Party" is defined in Section 7.2.

"Information" shall have the meaning ascribed to such term in Section 1.60 of the License Agreement.

"Initial Purchase Price" means $250,000,000.

"Joint Patents" shall have the meaning ascribed to the term Joint Patent in Section 9.2(a) of the License Agreement.

"Judgment" means any judgment, order, writ, injunction, citation, award or decree of any nature.

"Knowledge of the Seller" means the actual knowledge of the Seller's executive officers or personnel identified on Exhibit F, exercising reasonably diligent inquiry.

"License Agreement" means (a) that certain Second Collaboration and License Agreement by and between the Seller and Licensee dated September 28, 2016, as may be amended and/or restated from time to time, and (b) if applicable, solely from and after the date of execution of a New License Agreement entered into by the Seller in accordance with Section 5.12, any such New License Agreement.

"License Agreement Correspondence" means (a) all reports provided to the Seller by Licensee since January 1, 2020 pursuant to Section 6.3 of the License Agreement; (b) all minutes from, and meeting agendas and materials of, the Joint Research Committee (as such term is defined in Section 4.1 of the License Agreement) and all committees thereof since January 1, 2020 related to the Royalty or any Licensed Product; (c) any written updates Seller has received from Licensee's Alliance Manager (as such term is defined in the License Agreement and as designated in accordance with Section 4.1(f) of the License Agreement) since January 1, 2020 related to the Royalty or any Licensed Product, including manufacturing updates under Section 7.4 of the License Agreement; (d) the Arrowhead In-Licenses listed in Exhibit E of the License Agreement; (e) any agreements between Seller and Licensee (or their Affiliates) relating to the License Agreement, including any manufacturing or services agreements contemplated in Section 7.1 of the License Agreement (but excluding any work orders to such agreements which such work orders are unrelated to the Royalty and which do not amend or waive any provisions under the License Agreement) and any pharmacovigilance agreement contemplated in Section 5.3(b) of the License Agreement; (f) any audit records provided by Licensee to the Seller under Section 8.9 of the License Agreement; (g) any safety database information provided by Licensee to the Seller under Section 5.3(a) of the License Agreement; (h) notifications received by Seller from Licensee of inventions developed by Licensee under Section 9.2(b) of the License Agreement; (i) any patent infringement notices provided by Licensee to the Seller under Section 9.4(a) of the License Agreement; (j) any patent enforcement and defense updates provided by Licensee to the Seller under Section 9.4(b); (k) any updates regarding Third Party infringement claims provided by Licensee to the Seller under Section 9.6 of the License Agreement; and (l) all other material written communications between the Seller and Licensee under the License

Agreement since January 1, 2020 relating to the Royalty, the Licensed Patents, or the Licensed Products.

"Licensed Compound" shall have the meaning ascribed to the term Licensed Compound in Section 1.71 of the License Agreement

"Licensed Patents" is defined in Section 4.1(k)(i).

"Licensed Product" shall have the meaning ascribed to (a) the term Licensed Product in Section 1.72 of the License Agreement, and (b) if applicable, solely from and after the date of execution of a New License Agreement entered into by the Seller in accordance with Section 5.12, the analogous term for "licensed product" or any comparable concept as defined in such New License Agreement.

"Licensed Product Patents" means all Licensed Patents, other than any Arrowhead Platform Patents.

"Licensee" means (a) Amgen Inc., a Delaware corporation and (b) if applicable, solely from and after the date of execution of a New License Agreement entered into by the Seller in accordance with Section 5.12, the licensee party to such New License Agreement.

"Licensee Instruction Letter" is defined in Section 3.3.

"Lien" means any mortgage, lien, pledge, license, charge, adverse claim, security interest, encumbrance or restriction of any kind, including any restriction on use, transfer or exercise of any other attribute of ownership of any kind.

"Loss" means any and all Judgments, damages, losses, claims, costs, liabilities and expenses, including reasonable fees and out-of-pocket expenses of counsel.

"Lp(a)" is defined in Section 2.1(b).

"Material Adverse Effect" means (i) a material adverse effect on the legality, validity or enforceability of any provision of this Agreement, (ii) a material adverse effect on the ability of the Seller to perform any of its obligations hereunder, (iii) a material adverse effect on the rights or remedies of the Buyer hereunder, (iv) a material adverse effect on the rights of the Seller under the License Agreement related to the Royalty, or (v) an adverse effect in any material respect on the timing, amount or duration of the payments to be made to the Buyer in respect of any portion of the Royalty or the right of the Buyer to receive such payments.

"Mutually Agreed" means

(a) for matters (i) related solely to the Royalty, (ii) that would reasonably be expected (with or without the giving of notice or passage of time, or both) to result in a Material Adverse Effect, (iii) that relate to patent filing, maintenance, prosecution, defense, enforcement, or seeking to extend the term of a patent or exclusivity period for a Licensed Product (including any patent term extension, pediatric exclusivity period, supplementary protection certificate or the like), in each case with respect to any of the Licensed Product Patents, or (iv) that relate to patent enforcement or seeking to extend the term of a patent or exclusivity period for a Licensed Product (including any patent term extension, pediatric exclusivity period, supplementary protection certificate or the like), in each case with respect to any of the Arrowhead Platform Patents that cover or claim Olpasiran, the Seller shall take, or refrain from taking, such reasonable actions (in each case, unless

prohibited under the License Agreement) in respect of each such matter as are reasonably instructed by the Buyer;

(b) for matters related (i) solely to any amounts owed to the Seller under Section 8.2 of the License Agreement, or (ii) except as set forth in clause (a), to patent filing, maintenance, prosecution defense, enforcement , or seeking to extend the term of a patent or exclusivity period for a Licensed Product (including any patent term extension, pediatric exclusivity period, supplementary protection certificate or the like), in each case, with respect to any of the Arrowhead Platform Patents, the Seller shall have the right to take, or refrain from taking, such actions (in each case, unless prohibited under the License Agreement) in respect of each such matter as the Seller, acting reasonably, deems appropriate; and

(c) for (i) matters related solely to any amounts owed to the Seller under Section 8.3 of the License Agreement, or (ii) all other matters under the License Agreement that do not meet the criteria set forth in clauses (a) or (b) above, the Seller shall take, or refrain from taking, actions (in each case, unless prohibited under the License Agreement) in respect of each such matter as the Seller and the Buyer, each acting reasonably, mutually agree.

"Net Sales" shall have the meaning ascribed to the term Net Sales in Section 1.74 of the License Agreement.

"New Arrangement" is defined in Section 5.12(a)(ii).

"New License Agreement" is defined in Section 5.12(b).

"Olpasiran" means an N-acetyl-galactosamine (GalNAc)-conjugated siRNA that lowers lipoprotein(a) by directly inhibiting the expression of apolipoprotein(a) that is referred to by Licensee as of the date hereof as olpasiran and formerly as AMG 890.

"Olpasiran In-License" means an Arrowhead In-License in respect of which the Patents or Information licensed thereunder to the Seller or any of its Affiliates are necessary or reasonably useful to make, have made, use, sell, offer for sale, import or otherwise exploit Olpasiran.

"Patents" shall have the meaning ascribed to the term Patents in Section 1.77 of the License Agreement

"Payment Triggering Event" is defined in Section 2.1(b).

"Permitted Liens" means any (a) mechanic's, materialmen's, and similar liens for amounts not yet due and payable, (b) statutory liens for taxes, assessments or governmental charges or levies not yet due and payable or that the taxpayer is contesting in good faith, (c) any liens created, permitted or required by this Agreement in favor of the Buyer or its Affiliates, (d) pledges or deposits in the ordinary course of business in connection with workers' compensation, unemployment insurance and other social security legislation, (e) deposits to secure the performance of bids, trade contracts and leases (other than indebtedness), statutory obligations, surety and appeal bonds, indemnity and performance bonds and other obligations of a like nature incurred in the ordinary course of business, (f) normal and customary banker's liens and rights of setoff upon deposits of cash in favor of banks or other depository institutions with respect to the deposit accounts for which such cash is maintained with such banks or other depository institutions, (g) any licenses granted to Licensee pursuant to the License Agreement, (h) non-exclusive sub-licenses granted by Licensee to Third Party contractors pursuant to the License

Agreement, for the sole purpose of performing any activity on such Licensee's behalf in connection with Licensee's exercise of any of its rights granted under Section 3.1 of the License Agreement, where such activity is to be performed at the direction and control and for the sole benefit of Licensee, its Affiliates and/or Sublicensees, and (i) a license or other right granted to any Person that is not an Affiliate of the Seller under the Arrowhead Platform Patents, other than with respect to the Licensed Compounds, Licensed Products, or the Collaboration Target (including any products directed thereto).

"Permitted Reduction" means a Royalty Reduction pursuant to Section 8.4(c) or 8.5 of, but subject to Section 8.4(d) of, the License Agreement.

"Person" means any individual, firm, corporation, company, partnership, limited liability company, trust, joint venture, association, estate, trust, Governmental Entity or other entity, enterprise, association or organization.

"Prime Rate" means the prime rate published by the Wall Street Journal, from time to time, as the prime rate.

"Proceeds" means any amounts actually recovered by the Seller as a result of any settlement or resolution of any actions, suits, proceedings, claims or disputes related to the License Agreement or any Licensed Product or related to or involving the Royalty.

"Purchase Price" means, collectively, the Initial Purchase Price and any Additional Purchase Price Payments.

"Related Agreements" means the Licensee Instruction Letter and that certain (a) Master Services Agreement by and between the Seller and Licensee dated January 23, 2017 and (b) Confidentiality Disclosure Agreement by and between the Seller and Licensee dated April 21, 2014, each as may be amended and/or restated from time to time.

"Representative" means, with respect to any Person, (i) any direct or indirect stockholder, member or partner of such Person and (ii) any manager, director, officer, employee, agent, advisor or other representative (including attorneys, accountants, consultants, bankers, financial advisors and actual and potential lenders and investors) of such Person.

"Royalty" means (i) any and all amounts owed to the Seller under Section 8.4(a) of the License Agreement, (ii) any and all amounts owed to the Seller under the License Agreement in lieu of such payments of the foregoing clause (i), (iii) any and all payments or amounts owed to the Seller under Sections 8.9 (solely with respect to amounts owed to the Seller under Section 8.4(a) of the License Agreement) or 9.4(d) of the License Agreement, (iv) any and all amounts owed to the Seller under Section 11.2 of the License Agreement (solely with respect to amounts owed to the Seller under Section 8.4(a) of the License Agreement), and (v) any and all interest payments to the Seller under Section 8.8 of the License Agreement assessed on any payments described in the foregoing clauses (i), (ii) (iii) and (iv). Except for purposes of Section 4.1(i)(xii), "Royalty" shall be net of any Permitted Reductions applicable to amounts owed to the Seller under Section 8.4(a) of the License Agreement.

"Royalty Reduction" is defined in Section 4.1(i)(xii).

"Royalty Reports" means the quarterly reports deliverable by Licensee pursuant to Section 8.4(e) of the License Agreement.

"Seller" is defined in the preamble.

"Seller Indemnified Parties" is defined in Section 7.1(b).

"Sublicensee" shall have the meaning ascribed to the term Sublicensee in Section 3.3(a) of the License Agreement.

"Subsidiary" means, with respect to any Person, any corporation, partnership, joint venture or other entity, whether or not incorporated, of which at least 50% of the securities having, by their terms, ordinary voting power to elect members of the board of directors, or other bodies performing similar functions with respect to such entity, is directly or indirectly owned by such Person. Notwithstanding the foregoing, with respect to the Seller, the term "Subsidiary" shall not include Visirna or its Subsidiaries.

"Tax" or "Taxes" means any federal, state, local or non-U.S. income, gross receipts, license, payroll, employment, excise, severance, occupation, premium, windfall profits, environmental, customs duties, capital stock, franchise, profits, withholding, social security, unemployment, disability, real property, personal property, abandoned property, value added, alternative or add-on minimum, estimated or other tax of any kind whatsoever, including any interest, penalty or addition thereto, whether disputed or not.

"Third Party" shall have the meaning ascribed to the term Third Party in Section 1.94 of the License Agreement.

"Trilateral Common Interest Agreement" means a Common Interest Agreement among the Seller, the Licensee and the Buyer, substantially in the form attached hereto as Exhibit A-2.

"UCC" means Article 9 of the New York Uniform Commercial Code, as in effect from time to time.

"Visirna" means Visirna Therapeutics, Inc.

Section 1.2 Certain Interpretations. Except where expressly stated otherwise in this Agreement, the following rules of interpretation apply to this Agreement:

(a) "either" and "or" are not exclusive and "include," "includes" and "including" are not limiting and shall be deemed to be followed by the words "without limitation;"

(b) "extent" in the phrase "to the extent" means the degree to which a subject or other thing extends, and such phrase does not mean simply "if;"

(c) "hereof," "hereto," "herein" and "hereunder" and words of similar import when used in this Agreement refer to this Agreement as a whole and not to any particular provision of this Agreement;

(d) references to a Person are also to its permitted successors and assigns;

(e) definitions are applicable to the singular as well as the plural forms of such terms;

(f) unless otherwise indicated, references to an "Article", "Section" or "Exhibit" refer to an Article or Section of, or an Exhibit to, this Agreement;

(g) references to "$" or otherwise to dollar amounts refer to the lawful currency of the United States; and

(h) references to a law include any amendment or modification to such law and any rules and regulations issued thereunder, whether such amendment or modification is made, or issuance of such rules and regulations occurs, before or after the date of this Agreement.

Section 1.3 Headings. The table of contents and the descriptive headings of the several Articles and Sections of this Agreement and the Exhibits are for convenience only, do not constitute a part of this Agreement and shall not control or affect, in any way, the meaning or interpretation of this Agreement.

Article 2

PURCHASE, SALE AND ASSIGNMENT OF THE ROYALTY

Section 1.1 Closing; Purchase Price.

(a) Upon the terms and subject to the conditions of this Agreement, at the Closing, the Seller shall sell, transfer, assign and convey to the Buyer, and the Buyer shall purchase, acquire and accept from the Seller, free and clear of all Liens, other than any Liens under clauses (a) through (f), inclusive, of the definition of Permitted Liens, all of the Seller's right, title and interest in and to the Royalty. The purchase price to be paid at the Closing to the Seller for the sale, transfer, assignment and conveyance of the Seller's right, title and interest in and to the Royalty to the Buyer is the Initial Purchase Price. At the Closing, the Buyer shall pay the Seller the Initial Purchase Price by wire transfer of immediately available funds to one or more accounts specified by the Seller on Exhibit B, without any deduction or withholding on account of any Taxes.

(b) Following the Closing, upon the occurrence of each of the following events (each a "Payment Triggering Event"), if the Seller is in compliance in all material respects with its obligations under this Agreement, the Buyer shall make a cash payment (each an "Additional Purchase Price Payment") to the Seller in the amount corresponding to such Payment Triggering Event:

#	PAYMENT TRIGGERING EVENT	ADDITIONAL PURCHASE PRICE PAYMENT AMOUNT
1	Completion of the enrollment of the OCEAN(a) Phase 3 clinical trial (NCT05581303) for Olpasiran to reduce the risk of coronary heart disease death, myocardial infarction or urgent coronary revascularization in adults with atherosclerotic cardiovascular disease ("ASCVD") and elevated lipoprotein(a) ("Lp(a)"), as reasonably evidenced by (i) public disclosure of such completion by Licensee, (ii) written notice of such completion by Licensee to Seller (a copy of which shall be provided to Buyer) or (iii) the date on which clinicaltrials.gov shows the status of the OCEAN(a) Phase 3 clinical trial (NCT05581303) as "Active, not Recruiting".	$50,000,000
2	Receipt of FDA Approval for Olpasiran to reduce the risk of myocardial infarction, urgent coronary revascularization, or coronary heart disease death in adults with established cardiovascular disease and elevated Lp(a) (or any substantially similar indication for the reduction of cardiovascular event risk in adults with established cardiovascular disease and elevated Lp(a)).	$50,000,000
3	Upon the actual receipt by the Buyer of at least $70,000,000 in Royalty payments in the aggregate attributable to Net Sales that occur in any single calendar year.	$60,000,000
	TOTAL	**$160,000,000**

(c) The Seller hereby agrees and acknowledges that: (i) the Additional Purchase Price Payments are contingent payment obligations of the Buyer and there can be no assurance regarding the occurrence of any of the Payment Triggering Events and (ii) the Buyer shall have no obligation or liability with respect to any Additional Purchase Price Payment unless and until the corresponding Payment Triggering Event has occurred. With respect to (A) the first two Payment Triggering Events set forth in the table of Section 2.1(b), the Seller shall notify the Buyer in writing promptly after the Seller is aware of the achievement of such Payment Triggering Events, and (B) the third Payment Triggering Event set forth in the table of Section 2.1(b), the Buyer shall notify the Seller in writing promptly after the Buyer is aware of the achievement of such Payment Triggering Event, and in each case, the Buyer shall pay the amount of the corresponding Additional Purchase Price Payment owed to the Seller by the Buyer in accordance with Section 2.1(b) by wire transfer of immediately available funds to the account(s) specified by the Seller on Exhibit B (or such other account(s) as specified by the Seller in a writing delivered to the Buyer in accordance with Section 9.1 of this Agreement) within ten (10) Business Days following the Buyer's receipt or delivery, as applicable, of such written notice, without any deduction or withholding on account of any Taxes. For clarity, only one Additional Purchase Price Payment shall be due hereunder with respect to each Payment Triggering Event; no Additional Purchase Price Payment shall be payable for repeated achievements of any Payment Triggering Events. Each party hereto further agrees and acknowledges that the other party shall have the right to offset any amounts owed by such party to the other party hereunder.

(d) The parties hereto further agree that: (i) the aggregate Additional Purchase Price Payments payable by the Buyer hereunder shall not exceed $160,000,000 and (ii) the total Purchase Price payable to the Seller by the Buyer hereunder (inclusive of the Initial Purchase Price and, if required to be paid under this Agreement, all of the Additional Purchase Price Payments) shall in no event exceed $410,000,000 in the aggregate.

Section 1.2 No Assumed Obligations, Excluded Assets. Notwithstanding any provision in this Agreement to the contrary, the Buyer is purchasing, acquiring and accepting only the Royalty, and is not assuming any liability or obligation of the Seller of whatever nature, whether presently in existence or arising or asserted hereafter, under the License Agreement or otherwise. Except as specifically set forth herein in respect of the Royalty purchased, acquired and accepted hereunder, the Buyer does not, by such purchase, acquisition and acceptance, acquire any other contract rights of the Seller under the License Agreement or otherwise or any other assets of the Seller.

Section 1.3 True Sale. It is the intention of the parties hereto that the sale, transfer, assignment and conveyance contemplated by this Agreement be, and is, a true, complete, absolute and irrevocable sale, transfer, assignment and conveyance by the Seller to the Buyer of all of the Seller's rights, title and interests in and to the Royalty and the Seller hereby relinquishes all title and control over the Royalty upon such sale, transfer, assignment and conveyance. Neither the Seller nor the Buyer intends the transactions contemplated by this Agreement to be, or for any purpose characterized as, a loan from the Buyer to the Seller or to any of the Seller's Affiliates, or a pledge, a financing transaction or a borrowing. It is the intention of the parties hereto that the beneficial interest in and title to the Royalty and any "proceeds" (as such term is defined in the UCC) thereof shall not be part of Seller's estates in the event of the filing of a petition by or against the Seller under any Bankruptcy Laws. Each of the Seller and the Buyer hereby waives, to the maximum extent permitted by applicable law, any right to contest or otherwise assert that the sale contemplated by this Agreement does not constitute a true, complete, absolute and irrevocable sale, transfer, assignment and conveyance by the Seller to the Buyer of all of the Seller's right, title and interest in and to the Royalty under applicable law, which waiver shall, to the maximum extent permitted by applicable law, be enforceable against the Seller in any bankruptcy or insolvency proceeding relating to (a) the Seller or its Subsidiaries or (b) Visirna or its Subsidiaries (if Visirna or such Subsidiary is an affiliate of the Seller as of the date of commencement of such proceeding). Accordingly, the Seller shall treat the sale, transfer, assignment and conveyance of the Royalty as a sale of an "account" or a "payment intangible" (as appropriate) in accordance with the UCC, and the Seller hereby authorizes the Buyer to file financing statements (and continuation statements with respect to such financing statements when applicable) naming the Seller as the seller and the Buyer as the buyer in respect of the Royalty. Not in derogation of the foregoing statement of the intent of the parties hereto in this regard, and for the purposes of providing additional assurance to the Buyer in the event that, despite the intent of the parties hereto, the sale, transfer, assignment and conveyance contemplated hereby is hereafter held not to be a sale, the Seller does hereby grant to the Buyer a security interest in and to all right, title and interest of the Seller, in, to and under the Royalty and any "proceeds" (as such term is defined in the UCC) thereof as security for all of the Seller's obligations hereunder, including the payment of the Royalty, and the Seller does hereby authorize the Buyer, from and after the Closing, to file such financing statements (and continuation statements with respect to such financing statements when applicable) in such manner and such jurisdictions as are necessary or appropriate to perfect such security interest.

Article 3

CLOSING

Section 1.1 Closings; Payment of Purchase Price.

The purchase and sale of the Royalty shall take place remotely via the exchange of documents and signatures on the date hereof or such other place, time and date as the parties hereto may mutually agree (the "Closing"). At the Closing, the Buyer shall deliver (or cause to be delivered) payment of the Initial Purchase Price to the Seller by wire transfer of immediately available funds to one or more accounts specified by the Seller on Exhibit B.

Section 1.2 Bill of Sale. At the Closing, upon confirmation of the receipt of the Initial Purchase Price, each of the Seller and the Buyer shall deliver to the other party hereto a duly executed bill of sale evidencing the sale, transfer, assignment and conveyance of the Royalty, substantially in the form attached hereto as Exhibit C (the "Bill of Sale").

Section 1.3 Licensee Instruction. At the Closing, the Seller shall deliver to the Buyer an instruction letter, in the form attached hereto as Exhibit D (the "Licensee Instruction Letter"), duly executed by the Seller, instructing Licensee to pay the Royalty to the account specified by the Buyer, which shall be delivered (with Buyer's IRS Form W-8BEN-E) to Licensee following the Closing.

Section 1.4 Form W-9. At the Closing, the Seller shall deliver to the Buyer a valid, properly executed IRS Form W-9 certifying that the Seller is exempt from U.S. federal withholding tax and "backup" withholding tax.

Section 1.5 Form W-8BEN-E. At the Closing (and thereafter, at the Seller's request), the Buyer shall deliver to the Seller a valid, properly executed IRS Form W-8BEN-E certifying that the Buyer is exempt from U.S. federal withholding tax with respect to any and all royalty payments in respect of the Royalty.

Section 1.6 Data Room. Within ten (10) days after the Closing, the Seller shall have delivered to the Buyer an electronic copy of all of the information and documents posted to the virtual data room established by the Seller as of the date hereof and made available to the Buyer via Intralinks (the "Data Room").

Section 1.7 Bilateral Common Interest Agreement. At the Closing each of the Seller and the Buyer shall execute and deliver to the other party hereto the Bilateral Common Interest Agreement.

Article 4

REPRESENTATIONS AND WARRANTIES

Section 1.1 Seller's Representations and Warranties. The Seller represents and warrants to the Buyer that as of the Closing Date:

(a) Existence; Good Standing. The Seller is a corporation duly incorporated, validly existing and in good standing under the laws of Delaware. The Seller is duly licensed or qualified to do business and is in corporate good standing in each jurisdiction in which the nature of the business conducted by it or the character or location of the properties and assets owned, leased or operated by it makes such licensing or qualification necessary, except where the failure to be so licensed or qualified and in corporate good standing has not and would not reasonably be expected to have, either individually or in the aggregate, a Material Adverse Effect.

(b) Authorization. The Seller has all requisite corporate power and authority to execute, deliver and perform its obligations under this Agreement. The execution, delivery and performance of this Agreement, and the consummation of the transactions contemplated hereby, have been duly authorized by all necessary corporate action on the part of the Seller.

(c) Enforceability. The Agreement has been duly executed and delivered and constitutes a valid and binding obligation of the Seller enforceable against the Seller in accordance with its terms, except as such enforceability may be limited by applicable Bankruptcy Laws or general principles of equity (whether considered in a proceeding in equity or at law).

(d) No Conflicts. The execution, delivery and performance by the Seller of this Agreement and the consummation of the transactions contemplated hereby do not and shall not (i) contravene or conflict with the organizational documents of the Seller, (ii) contravene or conflict with or constitute a material default under any law or Judgment binding upon or applicable to the Seller, (iii) contravene or conflict with or constitute a default under the License Agreement or (iv) contravene or conflict with or constitute a material default under any other material contract or material agreement binding upon or applicable to the Seller.

(e) Consents. Except for the consents that have been obtained on or prior to the Closing or filings required by the federal securities laws or stock exchange rules, no consent, approval, license, order, authorization, registration, declaration or filing with or of any Governmental Entity or other Person is required to be done or obtained by the Seller in connection with (i) the execution and delivery by the Seller of this Agreement, (ii) the performance by the Seller of its obligations under this Agreement or (iii) the consummation by the Seller of any of the transactions contemplated by this Agreement.

(f) No Litigation. There is no action, suit, claim, investigation or proceeding pending or, to the Knowledge of the Seller, threatened, before any Governmental Entity, court or arbitrator, against or involving the Seller or any of its Subsidiaries that, individually or in the aggregate, would be reasonably be expected (with or without the giving of notice or passage of time, or both) to result in a Material Adverse Effect, nor has the Seller or any of its Subsidiaries received any letter or similar correspondence challenging or questioning the validity of this Agreement or the transactions contemplated hereby or any action taken or to be taken pursuant hereto.

(g) Compliance with Laws. Neither the Seller nor any of its Subsidiaries is in violation of, and to the Knowledge of the Seller, none of the Seller or any of its Subsidiaries is under investigation with respect to nor has the Seller or any of its Subsidiaries been threatened to be charged with or given notice of any violation of, any law or Judgment applicable to the Seller or any of its Subsidiaries, which violation would reasonably be expected (with or without the giving of notice or passage of time, or both) to have, either individually or in the aggregate, a Material Adverse Effect.

(h) No Undisclosed Events or Circumstances. To the Knowledge of the Seller, no event or circumstance has occurred or exists with respect to the Seller, any of its Subsidiaries, or their respective businesses, properties, operations or financial condition, which, under applicable law, rule or regulation, requires public disclosure or announcement by the Seller but which has not been so publicly announced or disclosed and which, individually or in the aggregate, would constitute a Material Adverse Effect.

(i) License Agreement. Attached hereto as Exhibit E is a true, correct and complete copy of the License Agreement. The Seller has delivered to the Buyer via the Data

Room true, correct and complete copies of each Related Agreement and all License Agreement Correspondence.

(i) No Other Agreements. The License Agreement and the Related Agreements are the only agreements, contracts, or other arrangements (collectively, "Contracts") between the Seller (or any predecessor or Affiliate thereof), on the one hand, and Licensee (or any predecessor or Affiliate thereof), on the other hand, relating to the subject matter thereof, and there are no other Contracts between the Seller (or any predecessor or any Affiliate thereof), on the one hand, and any other Person, including Licensee (or any predecessor or Affiliate thereof), on the other hand, that relate to the License Agreement, any Related Agreement, any Arrowhead Platform Patent (with respect to the Licensed Compounds, Licensed Products, or the Collaboration Target (including products directed thereto)), any Licensed Product Patent, a Licensed Compound or Licensed Product (including the development or commercialization thereof), or the Royalty. There is no proposal to amend or waive any provision of the License Agreement or any Related Agreement in any manner that (x) would result in a breach of this Agreement or (y) would otherwise reasonably be expected to have a Material Adverse Effect. None of the executed Contracts and no draft or proposed Contracts, in each case, between the Seller (or any predecessor or any Affiliate thereof), on the one hand, and any other Person, including Licensee (or any predecessor or Affiliate thereof), on the other hand, contains any provision, term or condition that would reasonably be expected (with or without the giving of notice or passage of time, or both) to result in a Material Adverse Effect.

(ii) Licenses/Sublicenses. Except for any Liens under clause (h) of the definition of Permitted Liens, to the Knowledge of the Seller, there are no licenses or sublicenses entered into by Licensee or any other Person (or any predecessor or Affiliate thereof) in respect of Licensee's rights and obligations under the License Agreement (including any Licensed Patents). The Seller has not received any written notice from Licensee pursuant to Section 3.3(a) of the License Agreement.

(iii) Validity and Enforceability of License Agreement; No Repudiation. The License Agreement is legal, valid, binding, enforceable (except as such enforceability may be limited by applicable Bankruptcy Laws or general principles of equity (whether considered in a proceeding in equity or at law)), and in full force and effect. The License Agreement will continue to be legal, valid, binding, enforceable (except as such enforceability may be limited by applicable Bankruptcy Laws or general principles of equity (whether considered in a proceeding in equity or at law)), and in full force and effect on identical terms immediately following the consummation of the transactions contemplated by this Agreement. No party to the License Agreement or any Related Agreements has repudiated any provision of the License Agreement or any Related Agreements and the Seller has not received any written notice challenging the validity, enforceability or interpretation of any provision of the License Agreement or any Related Agreements, including the obligation to pay any portion of the Royalty without set-off of any kind.

(iv) No Breaches or Defaults; No Repudiation. The Seller is not nor has at any time been in, and, to the Knowledge of the Seller, Licensee is not nor has at any time been in, material breach or material default under the License Agreement. To the Knowledge of the Seller, no event has occurred that with notice or lapse of time would constitute such a material breach or material default.

(v) Licensed Product. Olpasiran is a Licensed Product under the License Agreement. To the Knowledge of the Seller, Olpasiran is the sole Licensed Product being researched, developed or commercialized by or on behalf of Licensee under the License Agreement. The Seller has the right to receive the royalties under Section 8.4(a) of the License Agreement during the Royalty Term (as defined in the License Agreement) applicable to each Licensed Product for so long as Licensee, one of its Affiliates or any of its or their Sublicensees is selling such Licensed Product.

(vi) No Liens or Assignments by the Seller. The Seller has not, except for Permitted Liens and as contemplated hereby, conveyed, assigned or in any other way transferred or granted any Liens upon or with respect to all or any portion of its right, title and interest in and to the Royalty, the Seller's interest in any Licensed Patent or the License Agreement.

(vii) No Waivers or Releases. The Seller has not granted any material waiver under the License Agreement and has not released Licensee, in whole or in part, from any of its material obligations under the License Agreement.

(viii) No Termination. The Seller has not (A) given Licensee any notice of termination of the License Agreement (whether in whole or in part) or any notice expressing any intention to terminate the License Agreement or (B) received any written notice, or to the Knowledge of the Seller, any other notice of termination of the License Agreement (whether in whole or in part) or any written notice, or to the Knowledge of the Seller, any other notice expressing any intention to terminate the License Agreement. To the Knowledge of the Seller, no event has occurred that would give rise to the termination of, or either Seller or Licensee having the right to terminate, the License Agreement.

(ix) Payments Made. The Seller has timely received from Licensee the full amount of the payments due and payable under the License Agreement, to the extent such amounts have come due.

(x) No Assignments by Licensee. The Seller has not consented to any assignment, delegation or other transfer by Licensee or any of its predecessors of any of their rights or obligations under the License Agreement, and, to the Knowledge of the Seller, Licensee has not, except for Permitted Liens, assigned or otherwise transferred or granted any Lien upon or with respect to any of its rights or obligations under the License Agreement.

(xi) No Indemnification Claims. The Seller has not notified Licensee or any other Person of any claims for indemnification under the License Agreement nor has the Seller received any claims for indemnification under the License Agreement.

(xii) No Royalty Reductions. To the Knowledge of the Seller, the amount of the Royalty payable under Section 8.4(a) of the License Agreement is not subject to any claim by Licensee alleging a right of set-off, counterclaim, credit, reduction or deduction by contract or otherwise against the Royalty (each, a "Royalty Reduction"), including any Permitted Reduction. To the Knowledge of the Seller, no event or condition exists that, upon notice or passage of time or both, would reasonably be expected (with or without the giving of notice or

passage of time, or both) to permit Licensee to claim, or have the right to claim, a Permitted Reduction or another Royalty Reduction.

(xiii) No Notice of Infringement. The Seller has not received any written notice from, or given any written notice to, Licensee pursuant to Section 9.4(a) of the License Agreement.

(xiv) Audits. The Seller has not initiated, pursuant to Section 8.9 of the License Agreement, any inspection or audit of books of accounts or other records pertaining to Net Sales of the Licensed Product, or the calculation of royalties payable to the Seller on Net Sales of the Licensed Product under the License Agreement.

(xv) In-Licenses. There are no Olpasiran In-Licenses.

(j) Title to Royalty. The Seller has good and marketable title to the Royalty, free and clear of all Liens, other than any Liens under clauses (a) through (f), inclusive, of the definition of Permitted Liens. Upon payment of the Initial Purchase Price by the Buyer, the Buyer will acquire, subject to the terms and conditions set forth in this Agreement and the License Agreement, good and marketable title to the Royalty, free and clear of all Liens, other than any Liens under clauses (a) through (f), inclusive, of the definition of Permitted Liens.

(k) Intellectual Property.

(i) Exhibit G lists all Arrowhead Platform Patents, all Arrowhead Product Patents, and all Joint Patents (collectively, the "Licensed Patents"). There are no Joint Patents. The Seller is the sole owner of all of the Arrowhead Platform Patents and all of the Arrowhead Product Patents. Exhibit G specifies as to each of the Licensed Patents, (x) whether each such Licensed Patent is an Arrowhead Platform Patent or an Arrowhead Product Patent, and (y) the jurisdictions by or in which each such patent has issued as a patent or such patent application has been filed, including the respective patent numbers and application numbers and issue and filing dates.

(ii) There are no pending or, to the Knowledge of the Seller, threatened litigations, interferences, reexamination, oppositions or like procedures involving any Arrowhead Platform Patents to which the Seller or any of its Subsidiaries is a party or, to the Knowledge of the Seller, to which Licensee or any of its Affiliates is a party. To the Knowledge of the Seller, there are no pending or threatened litigations, interferences, reexamination, oppositions or like procedures involving any Licensed Product Patents or Amgen Product Patents to which the Seller or any of its Subsidiaries or Licensee or any of its Affiliates is a party. The Seller has not received any patent prosecution-related updates from Licensee pursuant to Section 9.3 of the License Agreement that contain any information that have resulted in, or would reasonably be expected (with or without the giving of notice or passage of time, or both) to result in, a Material Adverse Effect.

(iii) No Arrowhead Platform Patent and, to the Knowledge of the Seller, no Licensed Product Patent has lapsed, expired or otherwise terminated, and, to the Knowledge of the Seller, all issued Licensed Patents are valid, enforceable and in full force and effect. The Seller has not received any written notice relating to the lapse, expiration or other termination of any of the Licensed

Patents, or any written legal opinion that alleges that any of the issued Licensed Patents are invalid or unenforceable.

(iv) To the Knowledge of the Seller, there is no Person who is or claims to be an inventor under any of the Licensed Patents who is not a named inventor thereof.

(v) The Seller has not, and, to the Knowledge of the Seller, Licensee has not, received any written notice of any claim by any Person (A) challenging the inventorship or ownership of, the rights of the Seller or Licensee, as applicable, in and to, or the patentability, validity or enforceability of, any Licensed Patent, or (B) asserting that the development, manufacture, importation, sale, offer for sale or use of any Licensed Product infringes any issued patent of such Person.

(vi) To the Knowledge of the Seller, the discovery and development of the Licensed Products did not and does not infringe, misappropriate or otherwise violate any patent rights or other intellectual property rights owned by any third party, other than the Amgen Product Patents.

(vii) To the Knowledge of the Seller, the manufacture, use, marketing, sale, offer for sale, importation or distribution of the Licensed Products has not and will not, infringe, misappropriate or otherwise violate any patent rights or other intellectual property rights owned by any Third Party.

(viii) To the Knowledge of the Seller, Licensee has not obtained or been granted an In-License from a Third Party under any Patents of such Third Party that are necessary or useful to allow Licensee (and its Affiliates and Sublicensees) to make, have made, use, import, offer for sale, sell, export or otherwise exploit, Licensed Products in a particular country.

(ix) To the Knowledge of the Seller, no third party has infringed or is infringing any of the Licensed Patents.

(x) All required maintenance fees, annuities and like payments with respect to the Licensed Patents for which the Seller controls the prosecution and maintenance in accordance with Section 9.3 of the License Agreement, and to the Knowledge of the Seller, with respect to all other Licensed Patents, have been paid timely.

(xi) The Licensed Patents constitute all of the Patents owned or controlled by the Seller or any of its Affiliates that are necessary or reasonably useful to make, have made, use, sell, offer for sale, import or otherwise exploit Olpasiran.

(l) UCC Representation and Warranties. The Seller's exact legal name is, and for the immediately preceding six (6) years has been, "Arrowhead Pharmaceuticals, Inc.". The Seller is, and for the prior six (6) years has been, incorporated in Delaware.

(m) Brokers' Fees. There is no investment banker, broker, finder, financial advisor or other intermediary who has been retained by or is authorized to act on behalf of the Seller who might be entitled to any fee or commission in connection with the transactions contemplated by this Agreement.

(n) Taxes. The Seller has not received written notice from Licensee of any intention to withhold or deduct any material tax from future payments to the Seller. To the Knowledge of the Seller, there are no existing Liens for taxes on the Royalty (or any portion thereof), other than Permitted Liens. To the Knowledge of the Seller, there are no ongoing audits or investigations by any tax authority with respect to any payment made to the Seller under the License Agreement. The Seller has never taken the position for U.S. federal income tax purposes that the License Agreement is treated as a partnership for U.S. federal income tax purposes. The Seller has never received a Schedule K-1 furnished to it as a partner in a partnership as a result of being a party to the License Agreement.

Section 1.2 The Buyer's Representations and Warranties. The Buyer represents and warrants to the Seller that as of the Closing Date:

(a) Existence; Good Standing. The Buyer is an Irish collective asset-management vehicle that is duly organized, validly existing and in good standing under the laws of the Republic of Ireland.

(b) Authorization. The Buyer has the requisite right, power and authority to execute, deliver and perform its obligations under this Agreement. The execution, delivery and performance of this Agreement, and the consummation of the transactions contemplated hereby, have been duly authorized by all necessary action on the part of the Buyer.

(c) Enforceability. This Agreement has been duly executed and delivered by an authorized person of the owner trustee of the Buyer and constitutes the valid and binding obligation of the Buyer, enforceable against the Buyer in accordance with its terms, except as may be limited by applicable Bankruptcy Laws or by general principles of equity (whether considered in a proceeding in equity or at law).

(d) No Conflicts. The execution, delivery and performance by the Buyer of this Agreement do not and shall not (i) contravene or conflict with the organizational documents of the Buyer, (ii) contravene or conflict with or constitute a default under any material provision of any law binding upon or applicable to the Buyer or (iii) contravene or conflict with or constitute a default under any material contract or other material agreement or Judgment binding upon or applicable to the Buyer.

(e) Consents. Other than the filing of financing statement(s) in accordance with Section 2.3 or filings required by federal securities laws or stock exchange rules, no consent, approval, license, order, authorization, registration, declaration or filing with or of any Governmental Entity or other Person is required to be done or obtained by the Buyer in connection with (i) the execution and delivery by the Buyer of this Agreement, (ii) the performance by the Buyer of its obligations under this Agreement, or (iii) the consummation by the Buyer of any of the transactions contemplated by this Agreement.

(f) No Litigation. There is no action, suit, investigation or proceeding pending or, to the knowledge of the Buyer, threatened before any Governmental Entity to which the Buyer is a party that would, if determined adversely, reasonably be expected to prevent or materially and adversely affect the ability of the Buyer to perform its obligations under this Agreement.

(g) Financing. The Buyer has sufficient cash on hand to pay the Purchase Price. The Buyer acknowledges that its obligations under this Agreement are not contingent on obtaining financing.

(h) Brokers' Fees. There is no investment banker, broker, finder, financial advisor or other intermediary who has been retained by or is authorized to act on behalf of the Buyer who might be entitled to any fee or commission in connection with the transactions contemplated by this Agreement.

Section 1.3 No Implied Representations and Warranties. EXCEPT AS EXPRESSLY SET FORTH IN SECTION 4.1, THE SELLER MAKES NO REPRESENTATION OR WARRANTY, EXPRESSED OR IMPLIED, AT LAW OR IN EQUITY, INCLUDING WITH RESPECT TO MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, AND ANY SUCH REPRESENTATIONS OR WARRANTIES ARE HEREBY EXPRESSLY DISCLAIMED. BUYER ACKNOWLEDGES THAT, EXCEPT AS SPECIFICALLY PROVIDED IN THIS ARTICLE 4, THE SELLER HAS ASSUMED NO RESPONSIBILITIES OF ANY KIND WITH RESPECT TO ANY ACT OR OMISSION OF LICENSEE WITH RESPECT TO THE DESIGN, DEVELOPMENT, MANUFACTURE, USE, SALE, DISTRIBUTION, MARKETING OR OTHER ACTIVITIES OF LICENSEE WITH RESPECT TO ANY OF THE LICENSED PRODUCTS.

Article 5

COVENANTS

Section 1.1 Disclosures. Except for a press release previously approved in form and substance by the Seller and the Buyer or any other public announcement using substantially the same text as such press release or any other public disclosure permitted under this Agreement following the Closing, neither the Buyer nor the Seller shall, and each party hereto shall cause its respective Representatives, Affiliates and Affiliates' Representatives not to, issue a press release or other public announcement or otherwise make any public disclosure with respect to this Agreement or the subject matter hereof without the prior written consent of the other party hereto (which consent shall not be unreasonably withheld, conditioned or delayed). Notwithstanding the foregoing, the Buyer and the Seller and their respective Representatives, Affiliates, and Affiliates' Representatives may (a) make disclosures as may be required by applicable law or stock exchange rule, and (b) publicly announce the achievement of (i) a Payment Triggering Event and the payment of the corresponding Additional Purchase Price Payment, or (ii) the occurrence of a milestone event under Section 8.2 or 8.3 of the License Agreement and the payment of the corresponding milestone payment; provided that, in each case (a) and (b), the party making such disclosure shall allow the other party hereto reasonable time to comment on such press release or other public announcement or disclosure in advance of such issuance. The Buyer acknowledges that, subject to the requirements of this Section 5.1, it will be necessary for the Seller to file this Agreement with the SEC and to make other public disclosures regarding the terms of this Agreement and payments made under this Agreement in its reports filed with the SEC.

Section 1.2 Payments Received In Error.

(a) Commencing on the Closing Date and at all times thereafter, if any payment of any portion of the Royalty is made to the Seller, the Seller shall pay such amount to the Buyer, promptly (and in any event within ten (10) Business Days) after the receipt thereof, by wire transfer of immediately available funds to an account designated in writing by the Buyer. The Seller shall notify the Buyer of such wire transfer and provide reasonable details regarding the Royalty payment so received by the Seller. The Buyer shall, if requested by the Seller, provide a valid, properly executed IRS Form W-8BEN-E certifying that the Buyer is exempt from U.S. federal withholding tax with respect to any such payment. The Seller agrees that, in the event any payment of the Royalty is paid to the Seller, the Seller shall (i) until paid to the

Buyer, hold such payment received in trust for the benefit of the Buyer and (ii) have no right, title or interest in such payment and that it shall not pledge or otherwise grant any security interest therein.

(b) Commencing on the Closing Date and at all times thereafter, if any payment due under the License Agreement that does not constitute any payment of any portion the Royalty is made to the Buyer, the Buyer shall pay such amount to the Seller, promptly (and in any event within ten (10) Business Days) after the receipt thereof, by wire transfer of immediately available funds to an account designated in writing by the Seller. The Buyer shall notify the Seller of such wire transfer and provide reasonable details regarding the erroneous payment so received by the Buyer. The Buyer agrees that, in the event any payment due under the License Agreement that does not constitute the Royalty is paid to the Buyer, the Buyer shall (i) until paid to the Seller, hold such payment received in trust for the benefit of the Seller and (ii) have no right, title or interest in such payment and that it shall not pledge or otherwise grant any security interest therein.

Section 1.3 Royalty Reduction. If Licensee exercises any Royalty Reduction against any payment of the Royalty other than for a Permitted Reduction, then the Seller shall promptly (and in any event within ten (10) Business Days following the earlier of the Seller first becoming aware of such Royalty Reduction (including by Seller's receipt of written notice by Licensee or the Buyer evidencing such Royalty Reduction) and the Seller's receipt of the applicable Royalty Report) make a true-up payment to the Buyer such that the Buyer receives the full amount of such Royalty payments that would have been payable to the Buyer had such Royalty Reduction that is not a Permitted Reduction not occurred, unless the Seller, acting in good faith, believes such shortfall is a material breach by Licensee of the License Agreement and has provided notice to the Buyer under Section 5.10(a) regarding such shortfall, in which case Section 5.10(b) shall govern the enforcement of such breach, and Section 5.10(c) shall govern the disbursement of the Proceeds of such enforcement.

Section 1.4 Late Fee. A late fee of 4% over the Prime Rate shall accrue on all unpaid amounts on an annualized basis with respect to any sum that is otherwise payable by the Buyer or by the Seller to the other party under this Agreement.

Section 1.5 Royalty Reports; Notices and Other Information from Licensee. Promptly (and in any event within five (5) Business Days) following the receipt by the Seller of any Royalty Report, License Agreement Correspondence or patent prosecution correspondence provided between Licensee and the Seller under Section 9.3 of the License Agreement, the Seller shall furnish a true, correct and complete copy of the same to the Buyer, provided that the Seller may redact any information that does not relate to the Royalty, the Licensed Patents, or the Licensed Products and would not reasonably be expected (with or without the giving of notice or passage of time, or both) to have a Material Adverse Effect. After the Closing, the Seller shall (a) execute the Trilateral Common Interest Agreement and (b) use commercially reasonably efforts to obtain from Licensee (i) an agreement to send Royalty Reports directly to both the Seller and the Buyer, and (ii) Licensee's signature to the Trilateral Common Interest Agreement.

Section 1.6 Notices and Other Information to Licensee. The Seller shall, only as Mutually Agreed, send written notices or correspondence to Licensee.

Section 1.7 Inspections and Audits of Licensee. The Seller shall, only as Mutually Agreed, cause an inspection or audit to be made by an independent public accounting firm under and in accordance with Section 8.9 of the License Agreement. With respect to any inspection or audit requested by the Buyer, the Seller shall, for purposes of Section 8.9 of the License Agreement, select such independent public accounting firm as reasonably designated by the Buyer for such purpose (as long as such independent certified public accountant is reasonably

acceptable to Licensee as required by Section 8.9 of the License Agreement). The Buyer shall pay the Seller the expenses of any inspection or audit requested by the Buyer (including the fees and expenses of such independent public accounting firm designated for such purpose) that would otherwise be borne by the Seller pursuant to the License Agreement (if and as such expenses are actually incurred by the Seller).

Section 1.8 Amendment or Assignment of License Agreement. The Seller shall, only as Mutually Agreed, amend, modify, supplement or restate (or consent to any amendment, modification, supplement or restatement of) any provision of the License Agreement. The Seller shall not assign or otherwise transfer, in whole or in part, the License Agreement or any provision thereof or right thereunder without the consent of the Buyer, except for any assignment that is made in connection with an assignment of this Agreement in accordance with Section 9.3. Subject to the foregoing, promptly, and in any event within five (5) Business Days, following receipt by the Seller of any final assignment, amendment, modification, supplement or restatement of the License Agreement, the Seller shall furnish a copy of the same to the Buyer.

Section 1.9 Maintenance of License Agreement. The Seller shall comply in all material respects with its obligations under the License Agreement, and shall not take any action or forego any action that would reasonably be expected (with or without the giving of notice or passage of time, or both) to constitute a material breach thereof or material default thereunder. Promptly, and in any event within five (5) Business Days, after receipt of any (written or oral) notice from Licensee of an alleged breach or default under the License Agreement, the Seller shall give notice thereof to the Buyer, including delivering the Buyer a copy of any such written notice or a detailed written summary of any such oral notice. The Seller shall consult with the Buyer regarding such alleged breach or default and shall, only as Mutually Agreed, cure any breaches or defaults and shall give written notice within five (5) Business Days to the Buyer upon curing any such breach or default. The Seller shall, only as Mutually Agreed (a) forgive, release or compromise any amount owed to or becoming owed to the Seller under the License Agreement in respect of the Royalty, or (b) waive any obligation of, or grant any consent to, Licensee under, in respect of or related to the Royalty, Olpasiran, the Collaboration Target or the Arrowhead Licensed Technology.

Section 1.10 Enforcement of License Agreement.

(a) Notice of Breaches by Licensee. Promptly (and in any event within five (5) Business Days) after the Seller becomes aware of, or comes to believe in good faith that there has been a material breach of the License Agreement by Licensee, the Seller shall provide notice of such breach to the Buyer.

(b) Enforcement of License Agreement. The Seller shall consult with the Buyer regarding the timing, manner and conduct of any enforcement of Licensee's obligations under the License Agreement, relating to (i) any actual, anticipated or alleged breach or default under the License Agreement related to the Royalty (including any purported Royalty Reduction), Olpasiran, the Collaboration Target or the Arrowhead Licensed Technology or any matter that would reasonably be expected (with or without the giving of notice or passage of time, or both) to have a Material Adverse Effect, or (ii) any other actual, anticipated or alleged breach or default under the License Agreement. The Seller shall keep the Buyer reasonably informed of any such breach or default and provide copies as soon as practicable, but in any event within five (5) Business Days following the Seller's receipt or delivery of (A) any written notice of such breach or default, and (B) any and all filings, notices and written communications relating thereto. Following such consultation, the Seller shall exercise such rights and remedies relating to any such breach or default, in the case of clause (i), as reasonably instructed by the Buyer, and in the case of clause (ii) only as Mutually Agreed, in each case whether under the

License Agreement or by operation of law. In connection with any dispute related to any such breach or default, Seller shall employ such counsel as Mutually Agreed and reasonably acceptable to the other party and shall provide the Buyer with access to such counsel.

(c) Allocation of Proceeds and Costs of Enforcement. In the case of any breach or default by Licensee referred to in Section 5.10(b)(i), the Buyer shall reimburse the Seller for all reasonable out-of-pocket costs and expenses (including the reasonable fees and expenses of the Seller's counsel) incurred by the Seller, as such costs and expenses are incurred. The Proceeds resulting from any enforcement of Licensee's obligations under the License Agreement shall be allocated to the Seller, except with respect to such Proceeds that are related to an unpaid portion of the Royalty, which shall be allocated to the Buyer. The Seller hereby assigns and, if not presently assignable, agrees to assign to the Buyer, the amount of Proceeds due to the Buyer in accordance with this Section 5.10(c).

Section 1.11 Termination of License Agreement. The Seller shall not, (a) without the prior written consent of the Buyer (such consent to be granted or withheld in the sole discretion of the Buyer), exercise any right to terminate, agree with Licensee to terminate, or take, or permit any Affiliate or Visirna or any sublicensee of any Affiliate or Visirna to take, any action that would reasonably be expected (with or without the giving of notice or passage of time, or both) to give Licensee the right to terminate, the License Agreement in its entirety, or (b) except as Mutually Agreed, exercise any right to terminate, agree with Licensee to terminate, or take, or permit any Affiliate or Visirna or any sublicensee of any Affiliate or Visirna to take, any action that would reasonably be expected to give Licensee the right to terminate, the License Agreement in part.

Section 1.12 New Arrangements.

(a) Without limiting the provisions of this Article 5 or any other rights or remedies the Buyer may have under this Agreement, if the License Agreement is terminated in its entirety prior to the expiration of the Term (as defined in the License Agreement):

(i) the Seller will use commercially reasonable efforts to act as reasonably instructed by the Buyer, to negotiate and enter into a license, assignment or transfer agreement with Licensee for the regulatory approvals, data and patent rights owned or controlled by Licensee, including a license to the Amgen Product Patents, in each case, that are necessary or useful to make, have made, use, market, sell, offer for sale, import or otherwise exploit the Licensed Products; and

(ii) the Buyer shall have the exclusive right to negotiate or cause the Seller to use commercially reasonable efforts to negotiate and enter into, a license under the Licensed Patents with a third party, pursuant to which such third party will be granted rights to make, have made, use, market, sell, offer for sale, import and otherwise exploit the Licensed Products for any purpose that Licensee would have been permitted to make, have made, use, market, sell, offer for sale, import and otherwise exploit the Licensed Products under the License Agreement, subject to rights retained by Licensee following such termination; provided, however, that (a) the Seller shall not be required to grant licenses broader than those set forth in the License Agreement or otherwise agree to terms, conditions and limitations (including financial terms) that are, in the aggregate, materially less favorable to the Seller (taking into account the transactions under this Agreement) than those contained in the License Agreement and (b) the Buyer shall not agree to financial terms that are, in the aggregate, materially less favorable to the Seller (taking into account the transactions under this Agreement)

than those contained in the License Agreement (such a replacement licensing arrangement, a "New Arrangement"). The Seller and the Buyer shall each provide reasonable assistance to and cooperate with the other party in connection with the negotiation of, and entry into, such a license agreement, which shall not become effective earlier than the effective date of such termination of the License Agreement. Except in the case of the termination of the License Agreement by Licensee pursuant to Section 13.3 of the License Agreement, the Buyer shall reimburse the Seller for all reasonable out-of-pocket costs and expenses (including the reasonable fees and expenses of the Seller's counsel) incurred by the Seller with respect to actions taken by the Seller at the Buyer's written request in connection with the negotiation of a New Arrangement.

(b) Without limiting Section 5.12(a), should the Buyer identify any New Arrangement(s), the Seller agrees to execute and deliver a new license agreement (a "New License Agreement") effectuating such New Arrangement that satisfies the foregoing requirements of Section 5.12(a). Thereafter, the New License Agreement shall be included for all purposes in the definition of "License Agreement" under this Agreement, any payments that are equivalent to the Royalty payment due under such New License Agreement and any rights similar shall be included for all purposes under this Agreement, and the Seller's rights and obligations under this Agreement in respect of the License Agreement shall apply in respect of its rights and obligations under the New License Agreement *mutatis mutandis*, in each case without any further action by the parties hereto to amend this Agreement or the Bill of Sale.

Section 1.13 Preservation of Rights. The Seller shall not impose a Lien upon, or otherwise sell, transfer, hypothecate, assign, convey title (in whole or in part), grant any right to, or otherwise dispose of any portion of the Royalty or any of its other properties or assets if such Lien or other such transaction would have, or would reasonably be expected (with or without the giving of notice or passage of time, or both) to have, either individually or in the aggregate, a Material Adverse Effect.

Section 1.14 Enforcement; Defense; Prosecution and Maintenance.

(a) The Buyer and the Seller shall promptly inform each other of any suspected infringement by a third party they become aware of with respect to any of the Licensed Patents. The Seller shall (i) provide to the Buyer a copy of any written notice the Seller or any of its Affiliates receives of any suspected infringement of any of the Licensed Patents and all pleadings filed in such action and (ii) notify the Buyer of any material developments in any claim, suit or proceeding resulting from such infringement that are communicated by Licensee to the Seller under Section 9.4(a) of the License Agreement or otherwise as soon as practicable and in any event not less than ten (10) Business Days following such delivery.

(b) The Seller shall, only as Mutually Agreed, and to the extent permitted under the terms of Section 9.4(b) of the License Agreement (i) pursue an enforcement action in accordance with Section 9.4(b) of the License Agreement, and (ii) as to the timing, manner and conduct of any enforcement action. The Seller shall, if requested in writing by the Buyer, promptly, and in any event within ten (10) Business Days after receipt of such request, provide to the Buyer all reasonably requested documentation and information relating to any such enforcement action brought by the Seller. The Seller shall, only as Mutually Agreed, take any action in any infringement action under Section 9.4(b) of the License Agreement that the Seller has joined. In the event Licensee brings or controls an enforcement action in accordance with Section 9.4(b) of the License Agreement, the Seller shall: (x) provide copies or summaries of any status and progress reports and drafts of all material papers to be filed with the court to the extent provided by Licensee to the Seller pursuant to Section 9.4(b) of the License Agreement, and (y) otherwise act or refrain from acting as Mutually Agreed regarding such enforcement action and

to the extent of the Seller's permitted participation under the terms of Section 9.4(b) of the License Agreement. To the extent Licensee enforces any of the Licensed Patents in accordance with Section 9.4(b) of the License Agreement together with any Amgen Product Patents owned or controlled by Licensee, the Seller agrees to, only as Mutually Agreed, negotiate in good faith with Licensee and agree on a reasonable allocation of Proceeds as between the Licensed Patents and any Amgen Product Patents that were subject to such enforcement action. Solely in connection with an enforcement action involving the Licensed Patents and any Amgen Product Patents, the Seller shall obtain and deliver to the Buyer an accounting detailing the Proceeds allocated to the Licensed Patents. The Seller shall be responsible for all reasonable and documented out-of-pocket costs and expenses (including the reasonable and documented fees and expenses of the Seller's counsel) incurred by the Seller in connection with the Seller's actions pursuant to this Section 5.14(b) using counsel of the Seller's choice that is reasonably acceptable to the Buyer provided, however, that, if the Seller's actions under this Section 5.14(b) were taken at the direction of the Buyer over the good faith objection of the Seller, then, to the extent the Seller is not entitled to reimbursement by Licensee for such actions, the Buyer shall promptly on demand reimburse the Seller for the reasonable, out-of-pocket costs and expenses incurred by the Seller in connection with such Seller actions pursuant to this Section 5.14(b).

(c) The Seller shall, only as Mutually Agreed, (i) take any and all actions, and prepare, execute, deliver and file any and all agreements, documents and instruments, that are reasonably necessary or desirable to diligently prosecute, preserve and maintain any Licensed Patents for which it controls the prosecution and maintenance and to seek to extend the term of a patent or exclusivity period for a Licensed Product (including any patent term extension(s) or supplementary protection certificate(s) with respect to any such patent, regulatory exclusivity periods with respect to a Licensed Product, or the like), in each case in accordance with Sections 9.3 and 9.8 of the License Agreement, including payment of maintenance fees or annuities on any such Licensed Patents, (ii) prosecute any corrections, substitutions, reissues, reviews and reexaminations, and any other forms of patent term restoration in any applicable jurisdiction of any Licensed Patents for which it controls the prosecution and maintenance in accordance with Sections 9.3 and 9.8 of the License Agreement, (iii) defend any Licensed Patents for which it controls the defense in accordance with Section 9.7 of the License Agreement, including by bringing any legal action for infringement or defending any counterclaim of invalidity or unenforceability or action of a third party for declaratory judgment of non-infringement or non-interference raised as a defense in any such legal action for infringement, in accordance with Section 5.14(b) of this Agreement, provided, however, that, if the Seller's actions under this clause (iii) were taken at the direction of the Buyer over the good faith objection of the Seller, then, to the extent the Seller is not entitled to reimbursement by Licensee for such actions, the Buyer shall promptly on demand reimburse the Seller for the reasonable, out-of-pocket costs and expenses incurred by the Seller in connection with such Seller's actions pursuant to this clause (iii), and (iv) not disclaim or abandon, or fail to take any action necessary or desirable to prevent the disclaimer or abandonment (including through lack of enforcement against third party infringers), of any Licensed Patents for which it controls the prosecution and maintenance in accordance with Sections 9.3 and 9.8 of the License Agreement, provided, however, that if Seller desires to disclaim or abandon any Licensed Patent for which it controls the prosecution and maintenance in accordance with Sections 9.3 and 9.8 of the License Agreement, and Licensee fails to exercise its rights under Sections 9.3 and 9.8 of the License Agreement with respect to any such Licensed Patent, then the Seller shall notify the Buyer at least sixty (60) days prior to such disclaiming or abandonment, and, at Buyer's request, shall promptly assign all such Licensed Patents to Buyer. Except to the extent that the proviso to clause (iii) or (iv) above applies, the Seller shall be responsible for all reasonable and documented out-of-pocket costs and expenses (including the reasonable and documented fees and expenses of the Seller's counsel) incurred by the Seller in connection with the Seller's actions pursuant to clauses (i) through (iv) of the immediately preceding sentence using counsel of the Seller's choice that is reasonably

acceptable to the Buyer. The Buyer hereby acknowledges that Honigman LLP for purposes of clauses (i), (ii) and (iv) of this Section 5.14(c) is acceptable.

(d) Upon Buyer's request (not to exceed more than one request per calendar year), the Seller agrees to use its commercially reasonable efforts to obtain from Licensee, and deliver to the Buyer, a complete and accurate docket report for all Licensed Patents; provided, that if the Seller is unable to obtain such a docket report from Licensee in any given year, the Seller shall deliver a complete and accurate, to the Seller's knowledge, docket report for all Licensed Patents.

Section 1.15 Further Assurances. After the Closing, the Seller and the Buyer agree to execute and deliver such other documents, certificates, agreements and other writings and to take such other actions as may be reasonably necessary in order to give effect to the transactions contemplated by this Agreement.

Section 1.16 Tax Matters.

(a) Notwithstanding anything to the contrary in this Agreement, the Seller and the Buyer shall treat the transactions contemplated by this Agreement as a sale of the Royalty for United States federal, state, local and non-U.S. Tax purposes. Accordingly, any and all Royalty payments made pursuant to the License Agreement after the Closing Date shall be treated as sold to the Buyer for United States federal, state, local and non-U.S. Tax purposes. The parties shall cooperate to effect the foregoing treatment for United States federal, state, local and non-U.S. Tax purposes in the event that, notwithstanding the Licensee Instruction Letter, Licensee, any Sublicensee (as defined in the License Agreement) or any other Person makes any future remittance of Royalty payments to the Seller which the Seller must remit to the Buyer pursuant to Section 5.2(a) of this Agreement.

(b) To the extent any amount of the Royalty is withheld at source from a payment made pursuant to the License Agreement, as applicable, such withheld amount shall for all purposes of this Agreement be treated as paid to the Buyer. Any amounts withheld described in this Section 5.16(b) attributable to the Buyer shall be credited for the account of the Buyer. Notwithstanding anything to the contrary in this Agreement (including, for the avoidance of doubt, Section 5.3), the Seller shall have no obligation to gross-up or otherwise pay the Buyer any amounts with respect to source withholding. All amounts withheld as described herein shall for all purposes of this Agreement be deemed to have been received by the Buyer.

(c) The parties hereto agree not to take any position that is inconsistent with the provisions of this Section 5.16 on any Tax return or in any audit or other administrative or judicial proceeding unless (i) the other party hereto has consented in writing to such actions or (ii) the party hereto that contemplates taking such an inconsistent position has been advised by nationally recognized tax counsel in writing that there is no "reasonable basis" (within the meaning of Treasury Regulation Section 1.6662-3(b)(3)) for the position specified in this Section 5.16. If there is an inquiry by any Governmental Entity of the Seller or the Buyer related to this Section 5.16, the parties hereto shall cooperate with each other in responding to such inquiry in a reasonable manner consistent with this Section 5.16.

Article 6

CONFIDENTIALITY

Section 1.1 Confidentiality. The Seller and the Buyer each agree and acknowledge that the confidentiality provisions set forth in Section 12.1 of the License

Agreement shall apply to this Agreement *mutatis mutandis*, and each of the Seller and the Buyer shall be bound by the terms set forth therein, as if the Seller and the Buyer were Parties (as such term is defined in the License Agreement) thereunder. The parties hereto agree that the terms of this Agreement are also the Confidential Information (as such term is defined in the License Agreement) of both parties hereto.

Section 1.2 Authorized Disclosure. The Seller and the Buyer each agree and acknowledge that the authorized disclosures set forth in Section 12.2 of the License Agreement shall apply to this Agreement *mutatis mutandis*, and each of the Seller and the Buyer shall be authorized to disclose Confidential Information (as such term is defined in the License Agreement) in accordance with the terms set forth therein, as if the Seller and the Buyer were Parties (as such term is defined in the License Agreement) thereunder.

Article 7

INDEMNIFICATION

Section 1.1 General Indemnity. Subject to Section 7.3, from and after the Closing:

(a) the Seller hereby agrees to indemnify, defend and hold harmless the Buyer and its Affiliates and its and their directors, managers, trustees, officers, agents and employees (the "Buyer Indemnified Parties") from, against and in respect of all Losses suffered or incurred by the Buyer Indemnified Parties to the extent arising out of or resulting from (i) any breach of any of the representations or warranties (in each case, when made) of the Seller in this Agreement or (ii) any breach of any of the covenants or agreements of the Seller in this Agreement; provided, however, that the foregoing shall exclude any indemnification to any Buyer Indemnified Party (A) that has the effect of imposing on the Seller any liability to make payments of or in lieu of the Royalty because of any Credit Event, (B) that results from the failure of Licensee to perform any of its obligations under the License Agreement, unless directly resulting from the breach or default by the Seller of or under the License Agreement, (C) that results from the gross negligence, willful misconduct, or fraud of any Buyer Indemnified Party, (D) for any matter in respect of which any Seller Indemnified Party would be entitled to indemnification under Section 7.1(b), or (E) to the extent resulting from acts or omissions of the Seller that are in accordance with specific written instructions from the Buyer; and

(b) the Buyer hereby agrees to indemnify, defend and hold harmless the Seller and its Affiliates and its and their directors, officers, agents and employees ("Seller Indemnified Parties") from, against and in respect of all Losses suffered or incurred by the Seller Indemnified Parties to the extent arising out of or resulting from (i) any breach of any of the representations or warranties (in each case, when made) of the Buyer in this Agreement or (ii) any breach of any of the covenants or agreements of the Buyer in this Agreement; provided, however, that the foregoing shall exclude any indemnification to any Seller Indemnified Party (A) that results from the gross negligence, willful misconduct, or fraud of any Seller Indemnified Party, (B) for any matter in respect of which any Buyer Indemnified Party would be entitled to indemnification under Section 7.1(a), or (C) to the extent resulting from acts or omissions of the Buyer that are in accordance with specific written instructions from the Seller.

Section 1.2 Notice of Claims. If either a Buyer Indemnified Party, on the one hand, or a Seller Indemnified Party, on the other hand (the Buyer on behalf of such Buyer Indemnified Party on the one hand and the Seller on behalf of such Seller Indemnified Party on the other hand being hereinafter referred to as an "Indemnified Party"), has suffered or incurred any Losses for which indemnification may be sought under this Article 7, the Indemnified Party

shall so notify the other party hereto from whom indemnification is sought under this Article 7 (the "Indemnifying Party") promptly in writing describing such Loss, the amount or estimated amount thereof, if known or reasonably capable of estimation, and the method of computation of such Loss, all with reasonable particularity and containing a reference to the provisions of this Agreement in respect of which such Loss shall have occurred. If any claim, action, suit or proceeding is asserted or instituted by or against a third party with respect to which an Indemnified Party intends to claim any Loss under this Article 7, such Indemnified Party shall promptly notify the Indemnifying Party of such claim, action, suit or proceeding and tender to the Indemnifying Party the defense of such claim, action, suit or proceeding. A failure by an Indemnified Party to give notice and to tender the defense of such claim, action, suit or proceeding in a timely manner pursuant to this Section 7.2 shall not limit the obligation of the Indemnifying Party under this Article 7, except to the extent such Indemnifying Party is actually prejudiced thereby.

Section 1.3 Limitations on Liability. Except for a party hereto's breach of its confidentiality obligations under Article 6, no party hereto shall be liable for any indirect, consequential (including lost profits), punitive, special or incidental damages as a result of any breach or violation of any covenant or agreement of such party (including under this Article 7) in or pursuant to this Agreement. Notwithstanding the foregoing, the Buyer shall be entitled to make indemnification claims, in accordance with the procedures set forth in this Article 7, for Losses that include any portion of the Royalty that the Buyer was entitled to receive but did not receive timely or at all due to any indemnifiable events under this Agreement, and such portion of the Royalty shall not be deemed indirect, consequential, punitive, special or incidental damages for any purpose of this Agreement. Other than with respect to any fraud, willful misconduct, or intentional misrepresentation, (a) in no event shall the Seller's aggregate liability for Losses under Section 7.1(a)(i) or the Buyer's aggregate liability for Losses under Section 7.1(b)(i) exceed the Purchase Price less fifty percent (50%) of the Royalty payments actually received by the Buyer following the fourth anniversary of the date of the First Commercial Sale (as defined in the License Agreement) of Olpasiran in the United States, and (b) the Seller shall not have any liability for Losses under Section 7.1(a)(i) and the Buyer shall not have any liability for Losses under Section 7.1(b)(i) unless and until the aggregate amount of all Losses incurred by the indemnified party equals or exceeds $500,000, in which event the indemnifying party shall be liable for all Losses including such amount. For the avoidance of doubt, the Seller shall have no liability to the Buyer for any Permitted Reduction or Credit Event.

Section 1.4 Third Party Claims. Following the receipt of notice provided by an Indemnified Party pursuant to Section 7.2 of the commencement of any action, suit or proceeding against such Indemnified Party by a third party with respect to which such Indemnified Party intends to claim any Loss under this Article 7, an Indemnifying Party shall have the right to defend such claim, at such Indemnifying Party's expense and with counsel of its choice reasonably satisfactory to the Indemnified Party. If the Indemnifying Party assumes the defense of such claim, the Indemnified Party shall, at the request of the Indemnifying Party, use commercially reasonable efforts to cooperate in such defense; provided, that the Indemnifying Party shall bear the Indemnified Party's reasonable out-of-pocket costs and expenses incurred in connection with such cooperation. So long as the Indemnifying Party is conducting the defense of such claim as provided in this Section 7.4, the Indemnified Party may retain separate co-counsel at its expense and may participate in the defense of such claim, and neither the Indemnified Party nor the Indemnifying Party shall consent to the entry of any Judgment or enter into any settlement with respect to such claim without the prior written consent of the other party hereto unless such Judgment or settlement (A) provides for the payment by the Indemnifying Party of money as sole relief (if any) for the claimant (other than customary and reasonable confidentiality obligations relating to such claim, Judgment or settlement), (B) results in the full and general release of the Indemnified Party from all liabilities arising out of, relating to or in connection with such claim and (C) does not involve a finding or admission of any violation of

any law, rule, regulation or Judgment, or the rights of any Person, and has no effect on any other claims that may be made against the Indemnified Party. In the event the Indemnifying Party does not or ceases to conduct the defense of such claim as so provided, (i) subject to the limitations set forth in Section 7.3 and this Section 7.4, the Indemnified Party may defend against, and consent to the entry of any reasonable Judgment or enter into any reasonable settlement with respect to, such claim in any manner it may reasonably deem to be appropriate, (ii) subject to the limitations set forth in Section 7.3, the Indemnifying Party shall reimburse the Indemnified Party promptly and periodically for the reasonable out-of-pocket costs of defending against such claim, including reasonable attorneys' fees and expenses against reasonably detailed invoices, and (iii) the Indemnifying Party shall remain responsible for any Losses the Indemnified Party may suffer as a result of such claim to the full extent provided in this Article 7.

Section 1.5 Exclusive Remedy. Except as set forth in Section 9.10, from and after Closing, the rights of the parties hereto pursuant to (and subject to the conditions of) this Article 7 shall be the sole and exclusive remedy of the parties hereto and their respective Affiliates with respect to any claims (whether based in contract, tort or otherwise) resulting from or relating to any breach of the representations, warranties covenants and agreements made under this Agreement or any certificate, document or instrument delivered hereunder, and each party hereto hereby waives, to the fullest extent permitted under applicable law, and agrees not to assert after Closing, any other claim or action in respect of any such breach. Notwithstanding the foregoing, claims for common law fraud shall not be waived or limited in any way by this Article 7.

Section 1.6 Time Limitations.

(a) The Seller shall have liability under Section 7.1(a)(i) only if, on or prior to the date that is eighteen (18) months after the Closing Date, the Buyer notifies the Seller of a claim in respect of such breach, specifying the factual basis of such claim in reasonable detail (other than Sections 4.1(a), 4.1(b), 4.1(c), 4.1(d), 4.1(e), 4.1(i) (solely with respect to the first two sentences thereof), 4.1(i)(i), 4.1(i)(iii), 4.1(i)(v), 4.1(i)(vi), 4.1(i)(vii), 4.1(i)(viii), 4.1(i)(x), 4.1(i)(xii), 4.1(i)(xv), 4.1(j), 4.1(k)(i), 4.1(k)(iv), 4.1(k)(v), 4.1(k)(vi), 4.1(k)(vii), 4.1(k)(xi), 4.1(l) and 4.1(m), as to which any claims may be made at any time until the date that is six (6) months after the termination of this Agreement); and

(b) The Buyer shall have liability under Section 7.1(b)(i), only if, on or prior to the date that is eighteen (18) months after the Closing Date, the Seller notifies the Buyer of a claim in respect of such breach, specifying the factual basis of such claim in reasonable detail (other than Sections 4.2(a), 4.2(b), 4.2(c), 4.2(d), 4.2(e), and 4.2(h), as to which any claims may be made at any time until the date that is six (6) months after the termination of this Agreement).

Section 1.7 Tax Treatment for Indemnification Payments. Any indemnification payments made pursuant to this Article 7 will be treated as an adjustment to the Purchase Price for U.S. federal income tax to the fullest extent permitted by applicable law.

Article 8

TERMINATION

Section 1.1 Grounds for Termination. This Agreement may be terminated at any time by mutual written agreement of the Buyer and the Seller.

Section 1.2 Automatic Termination. Unless earlier terminated as provided in Section 8.1, this Agreement shall continue in full force and effect until sixty (60) days after the full satisfaction of all amounts due under the License Agreement to the Seller and any payments in respect of the Royalty due under this Agreement to the Buyer, at which point this Agreement shall automatically terminate, except with respect to any rights that shall have accrued prior to such termination.

Section 1.3 Survival. Notwithstanding anything to the contrary in this Article 8, the following provisions shall survive termination of this Agreement: Section 2.3 (True Sale), Section 5.1 (Disclosures), Section 5.2(b) (Payments Received in Error), Section 5.4 (Late Fee) (solely with respect to Section 5.2(b)), Section 5.7 (Inspections and Audits of Licensee) (for the period set forth in Section 8.9 of the License Agreement), Article 6 (Confidentiality) (for the period set forth in Section 12.1 of the License Agreement), Article 7 (Indemnification), this Section 8.3 (Survival) and Article 9 (Miscellaneous). Termination of the Agreement shall not relieve any party of liability in respect of breaches under this Agreement by any party on or prior to termination. In addition, in the event the License Agreement is terminated prior to its expiration date, Section 5.12 (New Arrangements) shall survive the termination of this Agreement.

Article 9

MISCELLANEOUS

Section 1.1 Notices. All notices and other communications under this Agreement shall be in writing and shall be by email with PDF attachment, certified mail, courier service or personal delivery to the following addresses, or to such other addresses as shall be designated from time to time by a party hereto in accordance with this Section 9.1:

If to the Seller, to it at:

Arrowhead Pharmaceuticals, Inc.
177 East Colorado Boulevard, Suite 700
Pasadena, CA 91105
Attention: General Counsel
Email: general.counsel@arrowheadpharma.com

With a copy to:

Gibson, Dunn & Crutcher LLP
555 Mission Street
San Francisco, CA 94105
Attention: Ryan Murr; Karen Spindler; Todd Trattner
Email: rmurr@gibsondunn.com; kspindler@gibsondunn.com; ttrattner@gibsondunn.com

If to the Buyer, to it at:

RP Management, LLC
110 E. 59th Street, Suite 3300
New York, New York 10022
Attention: General Counsel
Email: legaltransactions@royaltypharma.com

With a copy to:

Goodwin Procter LLP
100 Northern Avenue
Boston, Massachusetts 02210
Attention: Jacqueline Mercier and
Robert M. Crawford, Jr.
Email: jmercier@goodwinlaw.com;
rcrawford@goodwinlaw.com

All notices and communications under this Agreement shall be deemed to have been duly given (i) when delivered by hand, if personally delivered, (ii) when received by a recipient, if sent by email, with such receipt to be effective the date acknowledged by the recipient, (iii) upon receipt when sent via certified mail, return receipt requested, postage prepaid, with such receipt to be effective the date of delivery indicated on the return receipt, or (iv) one Business Day following sending within the United States by overnight delivery via commercial one-day overnight courier service.

Section 1.2 Expenses. Except as otherwise provided herein, all fees, costs and expenses (including any legal, accounting and banking fees) incurred in connection with the preparation, negotiation, execution and delivery of this Agreement and to consummate the transactions contemplated hereby shall be paid by the party hereto incurring such fees, costs and expenses.

Section 1.3 Assignment. The Seller shall not sell, assign or otherwise transfer all or any portion of its interest in (including its rights or obligations under) this Agreement; provided that the Seller may assign this Agreement in its entirety to an Affiliate of the Seller or to any third party that acquires all or substantially all of the Seller's business to which this Agreement relates, whether by merger, sale of assets or otherwise, so long as, (a) such Person acquires all of the Seller's interest in the Licensed Product Patents, the License Agreement and this Agreement and (b) prior to closing any such transaction, the Seller causes such Person to deliver a writing to the Buyer in which (i) if such Person is not Licensee, such Person assumes all of the obligations of the Seller to the Buyer under this Agreement, and (ii) if such Person is Licensee, Licensee assumes all of the obligations of the Seller to the Buyer hereunder and agrees to pay the Royalty to the Buyer notwithstanding any subsequent termination of the License Agreement by Licensee. Following the Closing, the Buyer may assign this Agreement, provided that (A) the Buyer promptly notifies the Seller of such assignment, (B) no such assignment shall relieve the Buyer of its obligations under this Agreement to pay any Additional Purchase Price Payments when due, (C) Buyer shall not assign to any competitor of the Seller without the Seller's prior written consent, (D) each such assignee complies with Section 3.5 (replacing "Buyer" wherever it appears with such assignee and replacing the "Closing" with the date that such assignee acquires an interest in the Buyer's rights hereunder, and (E) if the Buyer assigns its right under this Agreement to more than one party, the Licensee shall not be required to pay the Royalty to more than one bank account. This Agreement shall be binding upon, inure to the benefit of and be enforceable by, the parties hereto and their respective permitted successors and assigns. Any purported assignment in violation of this Section 9.3 shall be null and void.

Section 1.4 Amendment and Waiver.

(a) This Agreement may be amended, modified or supplemented only in a writing signed by each of the parties hereto. Any provision of this Agreement may be waived only in a writing signed by the parties hereto granting such waiver.

(b) No failure or delay on the part of any party hereto in exercising any right, power or remedy hereunder shall operate as a waiver thereof, nor shall any single or partial

exercise of any such right, power or remedy preclude any other or further exercise thereof or the exercise of any other right, power or remedy. No course of dealing between the parties hereto shall be effective to amend, modify, supplement or waive any provision of this Agreement.

Section 1.5 Entire Agreement. This Agreement and the Exhibits annexed hereto constitute the entire understanding between the parties hereto with respect to the subject matter hereof and supersede all other understandings and negotiations with respect thereto.

Section 1.6 No Third Party Beneficiaries. This Agreement is for the sole benefit of the Seller and the Buyer and their permitted successors and assigns and nothing herein expressed or implied shall give or be construed to give to any Person, other than the parties hereto and such successors and assigns, any legal or equitable rights hereunder.

Section 1.7 Governing Law. This Agreement shall be governed by, and construed in accordance with, the laws of the State of New York without giving effect to any choice or conflict of law provision or rule that would cause the application of the laws of any other jurisdiction.

Section 1.8 JURISDICTION; VENUE.

(a) EACH OF THE PARTIES HERETO HEREBY IRREVOCABLY AND UNCONDITIONALLY SUBMITS, FOR ITSELF AND ITS RESPECTIVE PROPERTY AND ASSETS, TO THE EXCLUSIVE JURISDICTION OF ANY NEW YORK STATE COURT OR FEDERAL COURT OF THE UNITED STATES OF AMERICA SITTING IN NEW YORK COUNTY, NEW YORK, AND ANY APPELLATE COURT THEREOF, IN ANY ACTION OR PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT, OR FOR RECOGNITION OR ENFORCEMENT OF ANY JUDGMENT IN RESPECT THEREOF, AND THE BUYER AND THE SELLER HEREBY IRREVOCABLY AND UNCONDITIONALLY AGREE THAT ALL CLAIMS IN RESPECT OF ANY SUCH ACTION OR PROCEEDING MAY BE HEARD AND DETERMINED IN ANY SUCH NEW YORK STATE COURT OR, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, IN SUCH FEDERAL COURT. THE BUYER AND THE SELLER HEREBY AGREE THAT A FINAL JUDGMENT IN ANY SUCH ACTION OR PROCEEDING SHALL BE CONCLUSIVE AND MAY BE ENFORCED IN OTHER JURISDICTIONS BY SUIT ON THE JUDGMENT OR IN ANY OTHER MANNER PROVIDED BY APPLICABLE LAW. EACH OF THE BUYER AND THE SELLER HEREBY SUBMITS TO THE EXCLUSIVE PERSONAL JURISDICTION AND VENUE OF SUCH NEW YORK STATE AND FEDERAL COURTS. THE BUYER AND THE SELLER AGREE, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THAT PROCESS MAY BE SERVED ON THE BUYER OR THE SELLER IN THE SAME MANNER THAT NOTICES MAY BE GIVEN PURSUANT TO SECTION 9.1 HEREOF.

(b) EACH OF THE PARTIES HERETO HEREBY IRREVOCABLY AND UNCONDITIONALLY WAIVES, TO THE FULLEST EXTENT IT MAY LEGALLY AND EFFECTIVELY DO SO, ANY OBJECTION THAT IT MAY NOW OR HEREAFTER HAVE TO THE LAYING OF VENUE OF ANY ACTION OR PROCEEDING ARISING OUT OF OR RELATING TO THIS AGREEMENT IN ANY NEW YORK STATE OR FEDERAL COURT. EACH OF THE BUYER AND THE SELLER HEREBY IRREVOCABLY WAIVES, TO THE FULLEST EXTENT PERMITTED BY APPLICABLE LAW, THE DEFENSE OF AN INCONVENIENT FORUM TO THE MAINTENANCE OF SUCH ACTION OR PROCEEDING IN ANY SUCH COURT.

(c) EACH PARTY HEREBY JOINTLY AND SEVERALLY WAIVES ANY AND ALL RIGHT TO TRIAL BY JURY IN ANY ACTION OR PROCEEDING RELATING TO THIS AGREEMENT OR ANY OTHER DOCUMENT DELIVERED HEREUNDER OR IN

CONNECTION HEREWITH, OR ANY TRANSACTION ARISING FROM OR CONNECTED TO ANY OF THE FOREGOING. EACH OF THE PARTIES REPRESENTS THAT THIS WAIVER IS KNOWINGLY, WILLINGLY, AND VOLUNTARILY GIVEN.

(d) EACH OF THE PARTIES HERETO IRREVOCABLY CONSENTS TO SERVICE OF PROCESS IN THE MANNER PROVIDED FOR NOTICES IN SECTION 9.1. NOTHING IN THIS AGREEMENT WILL AFFECT THE RIGHT OF ANY PARTY HERETO TO SERVE PROCESS IN ANY OTHER MANNER PERMITTED BY APPLICABLE LAW. EACH OF THE PARTIES HERETO WAIVES PERSONAL SERVICE OF ANY SUMMONS, COMPLAINT OR OTHER PROCESS, WHICH MAY BE MADE BY ANY OTHER MEANS PERMITTED BY NEW YORK LAW.

Section 1.9 Severability. If any term or provision of this Agreement shall for any reason be held to be invalid, illegal or unenforceable in any situation in any jurisdiction, then, to the extent that the economic and legal substance of the transactions contemplated hereby is not affected in a manner that is materially adverse to either party hereto, all other terms and provisions of this Agreement shall nevertheless remain in full force and effect and the enforceability and validity of the offending term or provision shall not be affected in any other situation or jurisdiction.

Section 1.10 Specific Performance. Each of the parties acknowledges and agrees that the other parties may be damaged irreparably in the event any of the provisions of this Agreement are not performed in accordance with their specific terms or otherwise are breached or violated, or, in the case of Article 6, are threatened to be breached. Accordingly, notwithstanding Section 7.5, each party hereto agrees that, without posting bond or other undertaking, the other party hereto shall be entitled to seek an injunction or injunctions to prevent breaches or violations of the provisions of this Agreement, or, in the case of Article 6, to prevent threatened breaches, and to seek to enforce specifically this Agreement and the terms and provisions hereof in any action, suit or other proceeding instituted in any court of the United States or any state thereof having jurisdiction over the parties and the matter in addition to any other remedy to which it may be entitled, at law or in equity. Each party further agrees that, in the event of any action for specific performance in respect of such a breach or violation of Article 6, it shall not assert the defense that a remedy at law would be adequate.

Section 1.11 Counterparts. This Agreement may be executed in any number of counterparts and by the parties hereto in separate counterparts, each of which when so executed shall be deemed to be an original and all of which taken together shall constitute one and the same agreement. Copies of executed counterparts transmitted by email or other similar means of electronic transmission, including "PDF," shall be considered original executed counterparts, provided receipt of such counterparts is confirmed.

Section 1.12 Relationship of the Parties. The relationship between the Buyer and the Seller is solely that of purchaser and seller, and neither the Buyer nor the Seller has any fiduciary or other special relationship with the other party or any of its Affiliates. This Agreement is not a partnership or similar agreement, and nothing contained herein shall be deemed to constitute the Buyer and the Seller as a partnership, an association, a joint venture or any other kind of entity or legal form for any purposes, including any Tax purposes. The Buyer and the Seller agree that they shall not take any inconsistent position with respect to such treatment in a filing with any Governmental Entity.

[Signature Page Follows]

IN WITNESS WHEREOF, the parties hereto have caused this Royalty Purchase Agreement to be executed and delivered by their respective representatives thereunto duly authorized as of the date first above written.

ARROWHEAD PHARMACEUTICALS INC.

By: _____

Name:

Title:

ROYALTY PHARMA INVESTMENTS 2019 ICAV

By: RP Management, LLC, its Manager and lawfully appointed attorney

By: _____

Name:

Title:

Exhibit A-1

Bilateral Common Interest Agreement

[See attached]

Exhibit A-2

Trilateral Common Interest Agreement

[See attached]

Exhibit B

Seller's Wire Transfer Instructions

[See attached]

Exhibit C

Form of Bill of Sale

[See attached]

Exhibit D

Form of Licensee Instruction Letter

[See attached]

Exhibit E

License Agreement

[See attached]

Exhibit F

Knowledge Parties

- **Chris Anzalone Chief Executive Officer**
- **Ken Myszkowski Chief Financial Officer**
- **James Hamilton Senior Vice President, Discovery and Translational Medicine**
- **Patrick O'Brien Chief Operating Officer and General Counsel**
- **Javier San Martin Chief Medical Officer**
- **Tracie Oliver Chief Commercial Officer**
- **Robert Teigen Vice President, Intellectual Property**

Exhibit G

Licensed Patents

[See attached]

Exhibit 31.1

CERTIFICATION PURSUANT SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Christopher Anzalone, Chief Executive Officer of Arrowhead Pharmaceuticals, Inc., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Arrowhead Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 6, 2023

/s/ CHRISTOPHER ANZALONE

Christopher Anzalone
Chief Executive Officer

Exhibit 31.2

CERTIFICATION PURSUANT SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Kenneth A. Myszkowski, Chief Financial Officer of Arrowhead Pharmaceuticals, Inc., certify that:

1. I have reviewed this Quarterly Report on Form 10-Q of Arrowhead Pharmaceuticals, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer(s) and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

(a) Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

(b) Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

(c) Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

(d) Disclosed in this report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter (the registrant's fourth fiscal quarter in the case of an annual report) that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting; and

5. The registrant's other certifying officer(s) and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

(a) All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

(b) Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: February 6, 2023

/s/ Kenneth A. Myszkowski

Kenneth A. Myszkowski,
Chief Financial Officer

Exhibit 32.1

CERTIFICATION PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Christopher Anzalone, Chief Executive Officer of Arrowhead Pharmaceuticals, Inc. (the "Company"), certify, pursuant to Rule 13(a)-14(b) or Rule 15(d)-14(b) of the Securities Exchange Act of 1934 and 18 U.S.C. Section 1350, that (i) the Quarterly Report on Form 10-Q of the Company for the quarterly period ended December 31, 2022, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and (ii) the information contained in such Quarterly Report on Form 10-Q fairly presents in all material respects the financial condition and results of operations of the Company.

Date: February 6, 2023

/s/ CHRISTOPHER ANZALONE

Christopher Anzalone
Chief Executive Officer

A signed original of these written statements required by 18 U.S.C. Section 1350 has been provided to Arrowhead Pharmaceuticals, Inc. and will be retained by Arrowhead Pharmaceuticals, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.

Exhibit 32.2

CERTIFICATION PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

I, Kenneth A. Myszkowski, Chief Financial Officer of Arrowhead Pharmaceuticals, Inc. (the "Company"), certify, pursuant to Rule 13(a)-14(b) or Rule 15(d)-14(b) of the Securities Exchange Act of 1934 and 18 U.S.C. Section 1350, that (i) the Quarterly Report on Form 10-Q of the Company for the quarterly period ended December 31, 2022, fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, and (ii) the information contained in such Quarterly Report on Form 10-Q fairly presents in all material respects the financial condition and results of operations of the Company.

Date: February 6, 2023

/s/ Kenneth A. Myszkowski

Kenneth A. Myszkowski
Chief Financial Officer

A signed original of these written statements required by 18 U.S.C. Section 1350 has been provided to Arrowhead Pharmaceuticals, Inc. and will be retained by Arrowhead Pharmaceuticals, Inc. and furnished to the Securities and Exchange Commission or its staff upon request.