

ARROWHEAD RESEARCH CORP

Form 10-K

December 14, 2015

UNITED STATES

SECURITIES AND EXCHANGE COMMISSION

Washington, DC 20549

FORM 10-K

(Mark One)

☒ ANNUAL REPORT UNDER SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934  
For the fiscal year ended September 30, 2015.

☐ TRANSITION REPORT UNDER SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934  
For the transition period from \_\_\_\_\_ to \_\_\_\_\_

Commission file number 000-21898

ARROWHEAD RESEARCH CORPORATION

(Exact name of registrant as specified in its charter)

Delaware 46-0408024  
(State of incorporation) (I.R.S. Employer Identification No.)

225 S. Lake Avenue, Suite 1050

Pasadena, California 91101

(626) 304-3400

(Address and telephone number of principal executive offices)

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

Title of each class	Name of each exchange on which registered
Common Stock, \$0.001 par value	The NASDAQ Global Select Market

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

None

Indicate by a check mark if the registrant is a well-known seasoned issuer, as defined in Rule 405 of the Securities Act. Yes ☐ No ☒

Indicate by a check mark if the registrant is not required to file reports pursuant to Section 13 or 15(d) of the Act. Yes ☐ No ☒

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 and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of Regulation S-T during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark if disclosure of delinquent filers pursuant to Item 405 of Regulation S-K is not contained herein, and will not be contained, to the best of registrant's knowledge, in definitive proxy or information statements incorporated by reference in Part III of this Form 10-K or any amendment to this Form 10-K. ☒

Indicate by check mark whether the Registrant is a large accelerated filer, an accelerated filer, or a non-accelerated filer. See definition of "accelerated filer and large accelerated filer" in Rule 12b-2 of the Exchange Act.

Large accelerated filer ☐ Accelerated filer ☒ Non-accelerated filer ☐ Smaller Reporting Company ☐

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

The aggregate market value of issuer's voting and non-voting outstanding Common Stock held by non-affiliates was approximately \$407 million based upon the closing stock price of issuer's Common Stock on March 31, 2015. Shares of common stock held by each officer and director and by each person who is known to own 10% or more of the outstanding Common Stock have been excluded in that such persons may be deemed to be affiliates of the Company. This determination of affiliate status is not necessarily a conclusive determination for other purposes.

As of December 11, 2015, 59,554,677 shares of the issuer's Common Stock were issued and outstanding.

#### DOCUMENTS INCORPORATED BY REFERENCE

Portions of the Definitive Proxy Statement to be filed for Arrowhead Research Corporation's 2016 Annual Meeting of Stockholders are incorporated by reference into Part III hereof.



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## FORWARD-LOOKING STATEMENTS

This Annual Report on Form 10-K contains certain forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934, and we intend that such forward-looking statements be subject to the safe harbors created thereby. For this purpose, any statements contained in this Annual Report on Form 10-K except for historical information may be deemed to be forward-looking statements. Without limiting the generality of the foregoing, words such as “may,” “will,” “expect,” “believe,” “anticipate,” “intend,” “could,” “estimate,” or “continue” or the negative or other variations thereof or comparable terminology are intended to identify forward-looking statements. In addition, any statements that refer to projections of our future financial performance, trends in our businesses, or other characterizations of future events or circumstances are forward-looking statements.

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

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## PART I

Unless otherwise noted, (1) the terms “Arrowhead” and “Arrowhead Research” refer to Arrowhead Research Corporation, a Delaware corporation, (2) the terms the “Company,” “we,” “us,” and “our,” refer to the ongoing business operations of Arrowhead and its Subsidiaries, whether conducted through Arrowhead or a subsidiary of Arrowhead, (3) the term “Subsidiaries” refers collectively to Arrowhead Madison Inc. (“Arrowhead Madison”), Arrowhead Australia Pty Ltd (“Arrowhead Australia”), and Ablaris Therapeutics, Inc. (“Ablaris”), (4) the term “Common Stock” refers to Arrowhead’s Common Stock, (5) the term “Preferred Stock” refers to Arrowhead’s Preferred Stock and the term “Stockholder(s)” refers to the holders of Arrowhead Common Stock.

### ITEM 1. BUSINESS

#### Description of Business

Arrowhead Research develops novel drugs to treat intractable diseases by silencing the genes that cause them. Using the industry’s broadest portfolio of RNA chemistries and efficient modes of delivery, Arrowhead therapies trigger the RNA interference mechanism to induce rapid, deep and durable knockdown of target genes. RNA interference (RNAi) is a mechanism present in living cells that inhibits the expression of a specific gene, thereby affecting the production of a specific protein. Deemed to be one of the most important recent discoveries in life science with the potential to transform medicine, the discoverers of RNAi were awarded a Nobel Prize in 2006 for their work. Arrowhead’s RNAi-based therapeutics leverage this natural pathway of gene silencing to target and shut down specific disease causing genes.

#### Platform Delivery Technology

The Dynamic Polyconjugate™ (DPC™) platform is an RNAi delivery system that promotes high levels of target gene knockdown. The DPC™ platform is engineered specifically to induce efficient endosomal escape, which is the most important differentiating feature of our proprietary technology. The liver targeted DPC™ delivery system has been used in multiple clinical trials and appears to be well tolerated using a variety of RNAi trigger molecules. The DPC™ platform is a modular system that can be optimized on a target-by-target basis, including the ability to target multiple organ systems and cell types outside of the liver.

#### Clinical Stage Drugs

- ARC-520 is an RNAi-based therapeutic designed to treat chronic hepatitis B virus (HBV) infection by reducing the expression and release of new viral particles and key viral proteins with the goal of achieving a functional cure for HBV. The Company is conducting multiple Phase 2b clinical efficacy studies.
- ARC-AAT is a novel unlocked nucleobase analog (UNA)-containing RNAi-based therapeutic for the treatment of liver disease associated with Alpha-1 Antitrypsin Deficiency (AATD), a rare genetic disease that can severely damage the liver and lungs of affected individuals. The goal of treatment with ARC-AAT is to reduce the production of the mutant Z-AAT protein to prevent and potentially reverse accumulation-related liver injury and fibrosis. The Company is conducting a Phase 1b clinical trial.

#### Pre-clinical Stage Drug Candidates

- ARC-521 is a new RNAi-based therapeutic in Arrowhead’s HBV portfolio that was developed to target both cccDNA derived mRNA transcripts, like ARC-520, as well as those from HBV DNA that has integrated into the host DNA. It is intended to address specific patient populations that are predicted to have higher ratios of integrated DNA versus cccDNA. The Company plans to begin clinical studies of ARC-521 in mid-2016.

- ARC-F12 is an RNAi-based therapeutic designed to reduce the production of factor 12 with the goal of providing a prophylactic treatment for hereditary angioedema (HAE) and thromboembolic diseases. Arrowhead is studying relevant disease models, and is considering other potential studies to support advancement of ARC-F12 into clinical trials.
- ARC-HIF2 is an RNAi-based therapeutic designed to reduce the production of hypoxia-inducible factor 2 (HIF-2 ) to treat clear cell renal cell carcinoma. It is the first drug candidate using a new DPC<sup>TM</sup> delivery vehicle designed to target tissues outside of the liver. Arrowhead is conducting studies in tumor models and is working on manufacturing scale up for the new delivery vehicle to support advancement of ARC-HIF2 into IND-enabling studies.
- ARC-LPA is an RNAi-based therapeutic designed to reduce production of apolipoprotein A (apo(a)), a key component of lipoprotein(a) (Lp(a)), which has been genetically linked with increased risk of cardiovascular diseases. ARC-LPA employs Arrowhead's new hepatic delivery format being developed for subcutaneous administration. This program has not yet been designated by Arrowhead as entering pre-IND development.



## Recent Events

Arrowhead made significant progress on product and platform development during fiscal year 2015 with an expanding pipeline of RNAi therapeutics based on the Dynamic Polyconjugate (DPC™) delivery system. The following are highlights of this progress:

- Strengthened management team and R&D staff with select key hires and expanded internal capabilities in manufacturing, RNA synthesis, toxicology, QA, program management, and clinical and regulatory operations
- Presented data on ARC-520 and ARC-AAT at AASLD Liver Meeting® 2014  
ARC-520 showed statistically significant reduction in HBsAg through day 43 after a single injection ( $p < 0.05$ )  
Repeat dosing of ARC-AAT in primates showed reduction of approximately 90% of serum alpha 1 antitrypsin (AAT) with long duration of effect suggesting that monthly or less frequent dosing may be sufficient for sustained suppression of hepatic AAT production  
ARC-AAT abstract highlighted in the AASLD President's Press Conference as a promising new treatment
- Filed for regulatory approval to begin a Phase 1 clinical trial of ARC-AAT for the treatment of liver disease associated with alpha-1 antitrypsin deficiency
  - Submitted an Investigational New Drug (IND) application to the U.S. Food and Drug Administration and submitted additional clinical trial authorization applications with regulatory authorities in various jurisdictions in Europe, Asia, and Australia/New Zealand for ARC-520
- Initiated dosing in a Phase 1 clinical trial of ARC-AAT
- Acquired Novartis Institutes for BioMedical Research, Inc ("Novartis") entire RNAi research and development portfolio and associated assets, including:  
Multiple patent families covering RNAi-trigger design rules and modifications that fall outside of key patents controlled by competitors, which the Company believes provides freedom to operate for any target and indication  
Novel intracellular targeting ligands that enhance the activity of RNAi-triggers by targeting the RNA-induced silencing complex (RISC) more effectively and improving stability once RISC is loaded  
An assignment of Novartis' license from Alnylam Pharmaceuticals, Inc. ("Alnylam") granting Arrowhead access to Alnylam intellectual property, excluding delivery, for 30 gene targets chosen by Novartis  
A pipeline of three candidates initiated by Novartis and for which Novartis has developed varying amounts of preclinical data
- Initiated dosing in Heparc-2004, a multiple-dose Phase 2b clinical study of ARC-520 in the U.S.
- Published new data in the Journal of Controlled Release, 209 (2015) 57-66, on a subcutaneously administered formulation of its DPC™ delivery system
- Completed dosing of Part A of the ARC-AAT phase 1 study in healthy volunteers, and transitioned the study into Part B in patients with PiZZ genotype alpha-1 antitrypsin deficiency
- Presented data at the TIDES Conference on the development of ARC-F12, an RNAi therapeutic for factor 12 (F12) mediated hereditary angioedema and thromboembolic diseases
- Received Orphan Drug Designation from the United States Food and Drug Administration
- Initiated multiple-dose Heparc-2002 and Heparc-2003 Phase 2b studies of ARC-520 in Europe and Asia

- Expanded Part B of the Phase 1 study of ARC-AAT to include additional treatment sites in Europe, Australia, and New Zealand
  - Nominated ARC-HIF2 against clear cell renal cell carcinoma as Arrowhead's first therapeutic candidate delivered using a new DPC™ designed to target tissues outside of the liver
  - Hosted an analyst day to discuss top-line findings from the HeparC-2001 Phase 2a clinical study of ARC-520 and findings from a study of 9 chimpanzees that have been treated monthly with ARC-520 for between 6 and 11 months. Key messages included the following:
    - Arrowhead's proprietary DPC™ platform can effectively and consistently knock down target genes in humans
    - ARC-520 achieves significant HBV s-Antigen (HBsAg) reductions in humans, particularly in treatment naïve, HBeAg-positive patients
    - Arrowhead identifies a large target HBV population for ARC-520 and describes a new paradigm for the HBV lifecycle
    - ARC-520 induces deep HBsAg reduction in chronically HBV infected chimps
    - ARC-520 has been well tolerated
    - Arrowhead expands its HBV portfolio by nominating an additional clinical candidate that is complementary to ARC-520
  - Presented data on ARC-LPa against cardiovascular disease, which uses a new subcutaneous delivery construct that Arrowhead has developed
  - Presented data at the AASLD Liver Meeting 2015 including the following:
    - ARC-520 led to robust, sustained anti-viral effects in chimpanzees with chronic HBV and also described an important new discovery that HBV DNA integrated into the host genome is likely an important source of HBV surface antigen (HBsAg) production
    - In a Phase 2a clinical study, ARC-520 effectively reduced HBV viral antigens derived from cccDNA. HBV surface antigen (HBsAg) was reduced substantially with a maximum reduction of 1.9 logs (99%) and a mean maximum reduction of 1.5 logs (96.8%) in treatment naïve e-antigen (HBeAg)-positive patients
  - Presented data at Hep DART 2015 showing that ARC-520 led to immune reactivation in 7 of 9 chimps with chronic hepatitis B infection
- Acquisition of Roche and Novartis RNAi business and assets

The last four years have brought substantial change to Arrowhead's research and development (R&D) capabilities and strategy. We are now an integrated RNAi therapeutics company, developing novel drugs that silence disease causing genes based on our broad RNAi technology platform.

The most significant step in this transition was our 2011 acquisition of the RNAi therapeutics business of Hoffmann-La Roche, Inc. and F. Hoffmann-La Roche Ltd. (collectively, "Roche"), which included the DPC™ delivery system that we have used for all our clinical drug candidates to date. Roche built this business unit in a manner that only a large pharmaceutical company is capable of: backed by expansive capital resources, Roche systematically acquired technologies, licensed expansive intellectual property rights, attracted leading scientists, developed new technologies internally, and built state-of-the-art facilities. At a time when the markets were questioning whether RNAi could become a viable therapeutic modality, we saw great promise in the technology broadly and the quality of what Roche built specifically. The acquisition provided us with three primary sources of value:

- Broad freedom to operate with respect to key patents directed to the primary RNAi-trigger formats: canonical, UNA, meroduplex, and dicer substrate structures;
- A best-in-class RNAi delivery system, which we believe to be the targetable DPC™ platform; and

- A state-of-the-art R&D facility in Madison, Wisconsin, including a large team of scientists experienced in RNAi and oligonucleotide delivery.

In addition, in March 2015 we acquired the entire RNAi research and development portfolio and associated assets of Novartis. Novartis had been working in the RNAi field for over a decade and made some very important advancements in their developments of proprietary oligonucleotide formatting and modifications. Key aspects of the acquisition include the following:

- Multiple patent families covering RNAi-trigger design rules and modifications that fall outside of key patents controlled by competitors, which we believe provides freedom to operate for any target and indication;
- Novel intracellular targeting ligands that enhance the activity of RNAi-triggers by targeting the RNA-induced silencing complex (RISC) more effectively and improving stability once RISC is loaded;
- An assignment of Novartis' license from Alnylam Pharmaceuticals, Inc. ("Alnylam") granting Arrowhead access to certain Alnylam intellectual property, excluding delivery, for 30 gene targets; and
- A pipeline of three candidates initiated by Novartis for which Novartis has developed varying amounts of preclinical data.

We see the Roche and Novartis acquisitions as a powerful combination of intellectual property, R&D infrastructure, and RNAi delivery experts. We believe we are the only company with access to all primary RNAi-trigger structures now including additional novel structures discovered by Novartis. This enables us to optimize our drug candidates on a target-by-target basis and use the structure and modifications that yield the most potent RNAi trigger. In addition, our DPC™ delivery system enables us to deliver our drug candidates efficiently to hepatocytes and to non-hepatic tissues in a highly specific manner. Our R&D team and facility enable rapid innovation and drive to the clinic, as evidenced by the speed at which we have advanced our pipeline to now include six proprietary drug candidates in a very short period of time.

We have focused our resources primarily on the DPC™ platform and on advancing our proprietary DPC™-enabled RNAi therapeutic candidates through clinical trials. Additionally, with our increased R&D headcount, Arrowhead now has the infrastructure, expertise, IP portfolio, chemistry, manufacturing and control (CMC) capabilities, and management that we believe is necessary to support potential partnerships and research collaborations with large biopharma companies from discovery stage through commercialization.

#### Pipeline Overview

Our internal preclinical and clinical development programs are designed to create value directly through our proprietary candidates. These programs also drive value to the technology platform as proof of concept for the power of the programs to enable innovative new therapies.

## Clinical Trials

The following table serves as a summary of our ongoing and completed clinical trials as of September 30, 2015:

Drug	Study Name	Stage	Status	Description	ClinicalTrials.gov Identifier
ARC-520	Heparc-1001	Phase 1	Enrollment Complete	Single dose escalation study in healthy volunteers to evaluate safety and tolerability of ARC-520	NCT01872065
	Heparc-1002	Phase 1	Enrolling	Single dose study to evaluate tolerability of increasing infusion rates of ARC-520	NCT02535416
	Heparc-2001	Phase 2a	Enrollment Complete	Single dose escalation study in HBV patients to evaluate reduction in viral antigens in response to ARC-520	NCT02065336
	Heparc-2001 OLE	Phase 2a	Enrolling	Open label multi-dose extension study in patients completing Heparc-2001	NCT02065336
	Heparc-2002	Phase 2b	Enrolling	Multi-dose study to determine the depth of hepatitis B surface antigen (HBsAg) reduction in response to ARC-520 in combination with entecavir or tenofovir in hepatitis B envelope antigen (HBeAg) negative patients	NCT02604199
	Heparc-2003	Phase 2b	Enrolling	Multi-dose study to determine the depth of HBsAg reduction in response to ARC-520 in combination with entecavir or tenofovir in HBeAg positive patients	NCT02604212
	Heparc-2004	Phase 2b	Enrolling	Multi-dose study to determine the depth of HBsAg reduction in response to ARC-520 in combination with entecavir or tenofovir in HBeAg positive patients	NCT02452528
	Heparc-2008 (MONARCH)	Phase 2b	Not Yet Enrolling	Open label multi-dose study to evaluate ARC-520 alone and in combination with other therapeutics in patients with chronic HBV	NCT02577029
	ARC-AATARCAAT-1001	Phase 1a/1b	Enrolling	Single dose escalation study to determine the safety, tolerability and effect on circulating alpha-1 antitrypsin levels of ARC-AAT in healthy volunteers and patients	NCT02363946
	Internal Clinical Programs – ARC-520				

## ARC-520 – Hepatitis B Virus Infection

ARC-520 is an RNAi therapeutic candidate for the treatment of chronic hepatitis B infection with the goal of achieving a functional cure. It is the first clinical candidate to use our proprietary DPC™ technology and includes two siRNA duplexes, each conjugated to a cholesterol derivative to enhance liver delivery and cellular uptake. We have designed ARC-520 to be co-administered with an active excipient, a masked, hepatocyte targeted polymeric amine (the DPC™ delivery system).

Figure 1: ARC-520 schematic

We see the need for a next generation HBV treatment with a finite treatment period and an attractive dosing regimen, and that can be used at earlier stages of disease. We believe a novel therapeutic approach such as this that can effectively treat or provide a functional cure (seroclearance of HBsAg and with or without development of excess patient antibodies against HBsAg) has the potential to take significant market share and may expand the available market to include patients that are currently untreated.

#### Chronic Hepatitis B Virus

According to the World Health Organization, 360 million people worldwide are chronically infected with hepatitis B virus, of which 500,000 to 1,000,000 people die each year from HBV related liver disease. Chronic HBV infection is defined by the presence of hepatitis B surface antigen (HBsAg) for more than 6 months. In the immune tolerant phase of chronic infection, which can last for many years, the infected person typically produces very high levels of viral DNA and viral antigens. However, the infection is not cytotoxic and the carrier may have no symptoms of illness. Over time, the ongoing production of viral antigens causes inflammation and necrosis, leading to elevation of liver enzymes such as alanine and aspartate transaminases, hepatitis, fibrosis, and liver cancer (hepatocellular carcinoma, or HCC). If untreated, as many as 25% to 40% of chronic HBV carriers ultimately develop cirrhosis or HCC. Antiviral therapy is generally prescribed when liver enzymes become elevated.

## Current Treatments

The current standard of care for treatment of chronic HBV infection is a daily oral dose of nucleotide/nucleoside analogs (NUCs) or a regimen of interferon injections for approximately one year. NUCs are generally well tolerated, but patients may need lifetime treatment because viral replication often rebounds upon cessation of treatment. Interferon therapeutics can result in a functional cure in 10-20% of some patient types, but treatment is often associated with significant side effects, including severe flu-like symptoms, marrow suppression, and autoimmune disorders.

## Goal of ARC-520 Treatment

ARC-520 is designed to silence the production of all HBV gene products with the goal of achieving a functional cure. The siRNAs in ARC-520 target multiple components of HBV production including the pregenomic RNA that would be reverse transcribed to generate the viral DNA. The siRNAs intervene at the mRNA level, upstream of where NUCs act, and target the mRNAs that produce HBsAg proteins, the viral polymerase, the core protein that forms the capsid, the pre-genomic RNA, the HBeAg, and the hepatitis B X antigen (HBxAg). NUCs are effective at reducing production of viral particles, but are ineffective at controlling production of HBsAg and other HBV gene products. Arrowhead believes that a reduction in the production of HBsAg and other proteins that NUCs are ineffective at controlling is necessary to effective HBV therapy, because those proteins are thought to be major contributors to repression of the immune system and the persistence of liver disease secondary to HBV infection.

Figure 2: Chronic HBV mechanism untreated

Figure 3: Mechanism of action NUCs

Figure 4: Mechanism of action ARC-520

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## Nonclinical Data

Efficacy data in mouse models of HBV infection show that ARC-520 is capable of reducing HBsAg by greater than 3 log (99.9%), HBV DNA by approximately 3 logs, and HBeAg to the limit of detection. Pharmacologic effects persist for approximately one month after a single dose of ARC-520 in mice models. Safety data in rodents and non-human primates indicate an acceptable safety margin. Preclinical data in a chimpanzee chronically infected with HBV demonstrate that intravenous administration of two doses (2 mg/kg on day 1, and 3 mg/kg on day 15) of ARC-520 resulted in substantial and sustained reductions in HBV DNA, HBeAg, and HBsAg, which did not return to baseline until study day 43, 43, and 71, respectively. In addition, an increase in serum alanine transaminase (ALT) occurred 4 weeks after the second dose, coincident with the nadir of circulating HBsAg. This is suggestive of a therapeutic immunological flare, which is thought to be part of a cascade that under chronic therapy may lead to HBsAg seroclearance and functional cure. Observed increases in key chemokine/cytokine mRNAs are also consistent with a T-cell mediated immunological event.

Additional nonclinical data from a multiple dose study in 9 chimpanzees were reported in 2015. At the start of the study, five chimpanzees were HBeAg-positive and four chimpanzees were HBeAg-negative. Deep sequencing and phylogenetic analyses indicated the HBV sequence was a chimpanzee variant of human HBV. To reduce viral replication prior to treatment with ARC-520, chimpanzees were treated for 8-24 weeks with entecavir (ETV) or ETV+ tenofovir (TDF) in one case. Following the lead-in period, animals were administered ARC-520 intravenously at 4-week intervals. Dose levels administered were 2, 3, or 4 mg/kg ARC-520, along with maintenance doses of ETV or ETV+TDF.

The study showed a robust, sustained direct anti-viral effect on HBsAg production in all HBeAg-positive and -negative chimpanzees during ARC-520 treatment. One chimpanzee achieved sustained virologic response (SVR) off-therapy and two chimpanzees exhibited signs of immune reactivation. HBeAg-positive chimpanzees displayed the highest levels of HBsAg knockdown - up to 2.7 log. In HBeAg-negative chimpanzees, HBsAg knockdown was also substantial - up to 0.9 log. ARC-520 was well tolerated after multiple doses up to 4 mg/kg ARC-520 (highest dose tested). Evidence indicates integrated HBV DNA is a significant source of total HBsAg, especially in HBeAg-negative chimpanzees.

## Phase 1 (Heparc-1001)

Arrowhead completed nine dose cohorts in the Heparc-1001 Phase 1 trial in 2014. The study was designed to characterize the safety profile of ARC-520 across a range of doses and evaluate pharmacokinetics. It was a single-center, randomized, double-blind, placebo-controlled, single dose-escalation, first-in-human study of ARC-520 administered intravenously to healthy adult volunteers. All subjects received either placebo or ARC-520 in doses ranging from 0.01 mg/kg to 4 mg/kg. The study successfully enrolled all 54 subjects (36 received ARC-520, 18 placebo) at a single center in Melbourne, Australia.

There have been no reports of serious adverse events (SAEs), no dose limiting toxicities, no discontinuations due to adverse events (AEs), and a modest overall occurrence rate of AEs without a clear dose-related increase in frequency or severity. There has been a modest occurrence rate of non-clinically significant abnormal laboratory tests. There were no reported drug related or clinically significant differences for vital signs or ECGs between subjects receiving drug versus placebo. One arrhythmia noted on telemetry occurred in a subject with similar previously undiagnosed prior cardiac atrial rhythm abnormalities and one occurrence of hypotension that appears to have been artifact from a failing automated blood pressure machine.

One occurrence each of moderate flushing and urticarial rash seen at dose levels of 0.3 mg/kg and 2.0 mg/kg respectively led to the subsequent reduction, by half, in infusion rate of ARC-520 as well as the introduction of pretreatment with an oral over-the-counter antihistamine. Since the introduction of these mitigations, no additional signs of hypersensitivity or infusion reactions have been seen.



There were mild creatinine elevations in 6% of subjects receiving ARC-520 and 6% receiving placebo, which were transient with rapid (<24 hours) return to baseline. There were no signs of tubular damage on laboratory evaluation and these subjects had no additional clinical symptoms. Overall, the changes in creatinine are similar between ARC-520 and placebo groups and thought to be, at least primarily, due to dietary intake of protein. There were no changes in ALT, AST or CK considered to be clinically significant by the study investigator.

In summary, ARC-520, when administered as a single dose up to 4 mg/kg to healthy volunteers, appears to be well tolerated. The table below shows the incidence of treatment emergent adverse events observed in greater than 5% of subjects.

Adverse Events >5%		
	Placebo (n=18) ARC-520 (n=36)	
All Attributions		
All AEs	67%	67%
Mild	72%	69%
Moderate	28%	31%
Severe	0%	0%
Headache	33%	14%
URI	28%	19%
Somnolence	6%	8%
Lethargy	6%	6%
Creatinine increase	6%	6%
Myalgia	0%	6%
Dizziness	0%	6%

Figure 5: Phase 1 AE reporting

#### Phase 2a (Heparc-2001)

In 2015 Arrowhead reported data from the Heparc-2001 Phase 2a multicenter, randomized, double-blind, placebo-controlled, dose-escalation study designed to determine the depth and duration of hepatitis B surface antigen (HBsAg) reduction after administration of ARC-520 in combination with entecavir in patients with chronic HBV infection. Secondary objectives included the assessment of safety and tolerability of escalating single doses of ARC-520 co-administered with a fixed dose of entecavir and multiple additional secondary and exploratory endpoints. Significant details about the seven cohorts are included below.

Cohort	Prior entecavir (ETV)	Patient Type	ARC-520 dose	Active/Placebo	Baseline HBsAg Mean (range) Log IU/mL	Status
1	Yes	HBeAg-neg	1.0 mg/kg	6/2	3.4 (3.0-4.2)	Complete/Unblinded
2	Yes	HBeAg-neg	2.0 mg/kg	6/2	3.5 (3.2-4.3)	Complete/Unblinded
3	Yes	HBeAg-neg	3.0 mg/kg	6/2	3.6(3.1-4.0)	Complete/Unblinded
4	Yes	HBeAg-neg	4.0 mg/kg	6/2	3.4 (3.2-4.0)	Complete/Unblinded
5	Yes	HBeAg-pos	4.0 mg/kg	6/2	3.6 (3.1-4.2)	Complete/Unblinded
6*	Yes	HBeAg-pos	2 x 2.0 mg/kg (two weeks apart)	6/0	3.3 (3.0-3.6)	Complete/Open label
7	No	HBeAg-pos	4.0mg/kg	6/0	4.0 (0.8-4.9)	Ongoing / Openlabel
		HBeAg-neg		6/0	2.9 (1.0-3.6)	

Figure 6: Phase 2a dose cohorts

In connection with Heparc-2001, fifty-eight patients were successfully dosed with 48 receiving the drug and 10 receiving a placebo. 20 females and 38 males were enrolled, all of Chinese ethnicity, with a mean age of 41 years

(range of 23 to 59). Topline results were reported at an analyst and investor day hosted by the Company and additional details were presented at the 2015 AASLD Liver Meeting. To date there have been no serious AEs, no dose limiting toxicities, no discontinuations due to medication AEs, and a modest occurrence rate of AEs. All reported AEs were deemed unrelated to study drug by the principal investigator. Safety labs continue to lack indication of end organ toxicity, with a low occurrence rate of abnormal laboratory tests with no observed relationship to timing or dose.

Adverse Events	1 mg/kg (N=6)	2mg/kg (N=6)	3 mg/kg (N=6)	4 mg/kg (N=24)	2 mg/kg x2 (N=6)	Placebo (N=10)
All AEs	1	5	1	2	1	0
Extravasation		1 mild				
Malaise		1 mod				
Influenza	1 mild					
Blood CK increase		1 mild				
Diabetes Mellitus		1 mild				
Pain in extremity			1 mild			
Presyncope		1 mod				
Headache				1 mild		
Dizziness				1 mild		
Fever					1 mild	

Figure 7: Phase 2a AE reporting

Arrowhead measured the Log reduction of quantitative HBsAg, HBcrAg, and HBeAg from baseline as an assessment of ARC-520 activity. This is the first time that a reduction in HBsAg, HBcrAg, and HBeAg mediated through RNA interference has been reported in chronic HBV patients. In this study, ARC-520 effectively inhibited cccDNA-derived mRNA with reductions up to 1.9 logs (99%). ARC-520 had a direct antiviral effect that lasted up to 57 days after a single dose. In patients exhibiting a delayed response, duration of over 85 days was observed. The best qHBsAg reduction was seen in treatment naïve HBeAg-positive patients. HBeAg-negative patients showed a delayed response. HBeAg-negative, ETV experienced patients showed a dose response in HBcrAg but qHBsAg dose response was less pronounced. HBeAg positive, ETV experienced patients had a substantially higher reduction in HBeAg and HBcrAg compared to HBsAg. Variations in viral antigen reduction are consistent with lower levels of cccDNA derived mRNA transcripts in chronic ETV patients and HBeAg negative patients. These data are summarized in the figures below.

				Log reduction from baseline			
				Mean (max)			
Cohort	Dose	HBeAgPrior	HBsAg	HBcrAg	HBeAg		
	(mg/kg)	status	ETV				
1	1	Neg	Y	-0.2 (-0.3)*	-0.2 (-0.2)	N/A	
2	2	Neg	Y	-0.2 (-0.3)*	-0.5 (-0.5)	N/A	
3	3	Neg	Y	-0.3 (-0.4)*	-0.4 (-0.7)	N/A	
4	4	Neg	Y	-0.4 (-0.5)*	-0.9 (-1.1)	N/A	
5	4	Pos	Y	-0.3 (-0.7)*	-0.9 (-1.1)	-1.2 (-1.7)	
6‡	2x2	Pos	Y	-0.5 (-0.8)+	-0.7 (-1.2)	Pending	
7‡,†	4	Pos	N	-1.5 (-1.9)+	Pending	Pending	
7‡	4	Neg	N	-0.2 (-0.8)+	Pending	N/A	

\*Roche Elecsys batch analyzed data set +Abbott Architect data ‡Preliminary data, analysis is ongoing †Excluding transitional patient

Figure 8: Max reduction in viral antigens

Figure 9: Mean reduction in HBsAg in treatment naive patients (cohort 7)

Phase 2b

Multiple dose and combination studies of ARC-520 aimed at producing functional cures are underway. These studies include Heparc-2001 open label extension, Heparc-2002, Heparc-2003, Heparc-2004, and the MONARCH study (Heparc-2008). There are clinical sites for these studies in the US, Europe, Asia, and Australia/New Zealand.

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## Internal Clinical Programs – ARC-AAT

### ARC-AAT – Liver Disease Associated with Alpha-1 Antitrypsin Deficiency

Arrowhead has developed a therapeutic candidate (ARC-AAT) for the treatment of liver disease associated with Alpha-1 Antitrypsin Deficiency (AATD), a rare genetic disease that severely damages the liver and lungs of affected individuals. ARC-AAT employs a novel unlocked nucleobase analog (UNA)-containing RNAi molecule designed for systemic delivery using the DPC™ delivery system. Pre-clinical studies have demonstrated that ARC-AAT is highly effective at knocking down the Alpha-1 antitrypsin (AAT) gene transcript and reducing the hepatic production of the mutant AAT protein.

Figure 10: ARC-AAT schematic  
Alpha-1 Antitrypsin Deficiency

AATD is a genetic disorder associated with liver disease in children and adults and pulmonary disease in adults. AAT is a circulating glycoprotein protease inhibitor that is primarily synthesized and secreted by liver hepatocytes. Its physiologic function is the inhibition of neutrophil proteases to protect healthy tissues during inflammation and prevent tissue damage. The most common disease variant, the Z mutant, has a single amino acid substitution that results in improper folding of the protein. The mutant protein cannot be effectively secreted and accumulates in globules in the hepatocytes. This triggers continuous hepatocyte injury, leading to fibrosis, cirrhosis, and increased risk of hepatocellular carcinoma.

### Current Treatments

Individuals with the homozygous PiZZ genotype have severe deficiency of functional AAT leading to pulmonary disease and hepatocyte injury and liver disease. Lung disease is frequently treated with AAT augmentation therapy. However, augmentation therapy does nothing to treat liver disease, and there is no specific therapy for hepatic manifestations. There is a significant unmet need as liver transplant, with its attendant morbidity and mortality, is currently the only available cure.

### Goal of ARC-AAT Treatment

The goal of treatment with ARC-AAT is prevention and potential reversal of Z-AAT accumulation-related liver injury and fibrosis. Reduction of inflammatory Z-AAT protein, which has been clearly defined as the cause of progressive liver disease in AATD patients, is important as it is expected to halt the progression of liver disease and allow fibrotic tissue repair.

### Preclinical Data

In preclinical studies with PiZ mice, which are genetically modified to produce the mutant human AAT (Z-AAT), ARC-AAT induced a greater than 95 percent reduction in circulating AAT after a single dose. The addition of chemical modifications, including UNAs, slowed the rebound in production of AAT compared to canonical siRNAs, and produced a substantially improved duration of effect.

After eight weeks of treatment in multi-dose studies in PiZ mice, soluble (monomeric) and insoluble (polymeric) forms of Z-AAT were greatly reduced in the livers of PiZ mice treated with ARC-AAT. In addition, liver globule burden was substantially reduced from baseline levels and in comparison to treatment with saline, which showed progressive globule formation (shown in the figure below). These data were submitted as an abstract to the 2014 AASLD Liver Meeting and selected for presentation at this conference.

Baseline	AAT-UNA q2w	Saline
5 weeks old		
	13 weeks old	13 weeks old

Figure 11: Reduction in Z-AAT globules in livers of PiZ mice

In primate studies, knockdown of AAT in serum persisted for over ten weeks with greater than 80 percent knockdown observed at the six-week time point. Multi-dose studies in primates showed a sustained reduction of AAT with once every six weeks dosing, suggesting that once monthly or less frequent dosing is sufficient to maintain ~80-90% knockdown (shown in the figure below).

Figure 12: Long term reduction of AAT in NHPs following repeat dosing with ARC-AAT

(ARC-EX1 is a DPC™ delivery system)

## The Alpha-1 Project

Arrowhead has an agreement with The Alpha-1 Project (TAP), the venture philanthropy subsidiary of the Alpha-1 Foundation. TAP's mission is to support organizations in pursuit of cures and therapies for lung and liver disease caused by Alpha-1 Antitrypsin Deficiency. Under the terms of the agreement, TAP will partially fund the development of ARC-AAT. In addition to the funding, TAP will make its scientific advisors available to Arrowhead, assist with patient recruitment for clinical trials with its Alpha-1 Foundation Patient Research Registry, and engage in other collaborative efforts that support the development of ARC-AAT.

### Phase 1

Arrowhead is conducting a single dose Phase 1 clinical study of ARC-AAT. The study is a multi-center, randomized, placebo-controlled, double-blind, single dose-escalation, first-in-human study to evaluate the safety, tolerability and pharmacokinetics of ARC-AAT and the effect on circulating AAT levels. The study has been enrolling dose cohorts of six participants each, with participants randomized at a ratio of 2:1 (active:placebo) to receive a single intravenous injection of either ARC-AAT or placebo (normal saline). The study consists of two parts; Part A in healthy volunteers and part B currently being conducted in patients with PiZZ genotype AATD. Dosing in patients (part B) began at a dose level used in healthy volunteers that met pre-defined criteria for AAT knockdown and then continued dose escalation may proceed under the protocol. The study evaluates participants for 28 days following dosing, with additional follow-up if needed every 2 weeks until AAT levels return to baseline.

### Orphan Drug Designation

In June 2015, Arrowhead was granted the orphan drug designation for ARC-AAT by the U.S. Food and Drug Administration (FDA). Orphan drug designation provides incentives for sponsors to develop products for rare diseases. These incentives include increased engagement with FDA on drug development activities, exemption from all future product-specific regulatory fees, the opportunity to apply for R&D funding, tax credits, an increased chance of priority review, and 7 years of orphan exclusivity at the time of New Drug Application (NDA).

### Preclinical Programs

In addition to our clinical candidates, we are actively engaged in the discovery and development of additional pre-clinical stage products for intravenous and subcutaneous administered therapeutics targeting the liver, as well as programs targeting extra-hepatic tissues. We focus on disease targets that are well suited for intervention with targeted RNAi therapeutics using our DPC<sup>TM</sup> delivery platform.

### ARC-521

ARC-521 is a new RNAi-based therapeutic in Arrowhead's HBV portfolio that was developed to target both cccDNA derived mRNA transcripts, like ARC-520, as well as those from HBV DNA that has integrated into the host DNA. It is intended to address specific patient populations that are predicted to have higher ratios of integrated DNA versus cccDNA. The Company plans to begin clinical studies of ARC-521 in mid-2016.

### ARC-F12

ARC-F12 is an RNAi-based therapeutic designed to reduce the production of factor 12 with the goal of providing a prophylactic treatment for hereditary angioedema (HAE) and thromboembolic diseases. Arrowhead is conducting relevant disease models, and is considering other potential studies to support advancement of ARC-F12 into clinical trials.

### ARC-HIF2



ARC-HIF2 is an RNAi-based therapeutic designed to reduce the production of hypoxia-inducible factor 2 (HIF-2 ) to treat clear cell renal cell carcinoma. It is the first drug candidate using a new DPC™ delivery vehicle designed to target tissues outside of the liver. Arrowhead is conducting tumor models and is working on manufacturing scale up for the new delivery vehicle to support advancement of ARC-HIF2 into IND-enabling studies.

#### ARC-LPA

ARC-LPA is an RNAi-based therapeutic designed to reduce production of apolipoprotein A (apo(a)), a key component of lipoprotein(a) (Lp(a)), which has been genetically linked with increased risk of cardiovascular diseases. ARC-LPA employs Arrowhead's new hepatic delivery format being developed for subcutaneous administration. This program has not yet been officially designated by Arrowhead as entering pre-IND development.

#### Partner-based Programs

Alnylam Pharmaceuticals

In January 2012, Arrowhead granted Alnylam a license to utilize the DPC™ delivery technology for a single RNAi therapeutic product. Alnylam is collaborating with Arrowhead to develop this technology for an undisclosed target. Alnylam has not publically disclosed what progress, if any, it may have made with respect to this target. Arrowhead is eligible to receive milestone payments and royalties on worldwide sales.

#### Shire

In December 2012, Arrowhead signed a research collaboration and license agreement with Shire AG (“Shire”) to develop and commercialize targeted peptide-drug conjugates (PDCs) utilizing Arrowhead’s human-derived Homing Peptide platform and Shire’s therapeutic payloads. Arrowhead may receive research funding and could be eligible for development, regulatory, and commercialization milestone payments of up to \$32.8 million for each development candidate, plus additional milestone payments for a second indication, and royalties on worldwide sales.

#### RNA Interference & the Benefits of RNAi Therapeutics

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. Deemed to be one of the most important recent discoveries in life science with the potential to transform medicine, the discoverers of RNAi were awarded a Nobel Prize in 2006 for their work. RNAi-based therapeutics may leverage this natural pathway of gene silencing to target and shut down specific disease causing genes.

#### Figure 13: Mechanism of RNA interference

Small molecule and antibody drugs have proven effective at inhibiting certain cell surface, intracellular, and extracellular targets. However, other drug targets such as intranuclear genes and some proteins have proven difficult to inhibit with traditional drug-based and biologic therapeutics. Developing effective drugs for these targets would have the potential to address large underserved markets for the treatment of many diseases. Using the ability to specifically silence any gene, RNAi therapeutics may be able to address previously “undruggable” targets, unlocking the market potential of such targets.

#### Advantages of RNAi as a Therapeutic Modality

- Silences the expression of disease causing genes;

- Potential to address any target in the transcriptome including previously "undruggable" targets;
- Rapid lead identification;
- High specificity;
- Opportunity to use multiple RNA sequences in one drug product for synergistic silencing of related targets; and
- RNAi therapeutics are uniquely suited for personalized medicine through target and cell specific delivery and gene knockdown.

#### Addressing the RNAi Delivery Challenge

To date, the primary challenge to the development of RNAi therapeutics has been delivering the fragile, often immunogenic and otherwise rapidly cleared RNAi trigger molecules, into the cytoplasm of the cell, where RNAi activity occurs. This hurdle has prevented many RNAi therapeutics from reaching their full potential. Many companies have attempted to overcome the delivery challenge. Most early systems involved various carriers such as liposomes. However, development in humans has been limited due to toxicity and immunogenicity of these approaches when studied in clinical trials.

#### The Dynamic Polyconjugate™ RNAi Delivery System

The DPC™ delivery system represents an innovative solution to the RNAi delivery problem, specifically designed to overcome barriers to systemic administration of RNAi trigger molecules. Developed by Arrowhead scientists, the inspiration for DPC™ technology came from the physical characteristics of viruses, nature's own nanoparticles for nucleic acid delivery. Viruses are efficient at finding their target cells and delivering their nucleic acid payload to the proper cellular compartment. Key features of viruses are their small size, their overall negative surface charge, their specificity for particular cell types based on receptors unique to that cell, and their ability to disassemble and release their nucleic acid cargo to the proper cell compartment in response to cellular triggers. All of these features are incorporated into DPC™ technology.

Prototypical DPC delivery systems are small, generally 5-20 nanometers (nm) in size, with an amphipathic polymer backbone. Arrowhead has a library of polymers, enabling optimization based on factors such as preferred mode of administration, pharmacokinetics, and target tissue. Shielding agents such as polyethylene glycol and targeting ligands may be reversibly attached to the polymer backbone. In some constructs, the RNAi trigger payload is attached to the DPC™ delivery system, while in other constructs, the RNAi trigger circulates attached to a different carrier. When attached, the DPC™ delivery system construct protects the RNAi trigger payload while allowing the polymer to circulate in the blood without creating undue toxicity. The targeting ligand guides it to the cell type of interest where, together with the RNAi trigger, it is taken up into a membrane-enclosed cellular compartment known as an endosome. The polymer is selected for its ability to disrupt the endosomal membrane, which allows the RNAi trigger to be released into the cytoplasm. There, it engages the cell's RNAi machinery, ultimately resulting in knockdown of target gene expression. This membrane active chemistry of the DPC™ polymeric backbone is modified, or "masked", using proprietary chemistry until it reaches the endosome where pH changes cause the masking chemistries to fall off. Masking of the polymer's membrane active chemistry accomplishes two interrelated objectives that are critical to in vivo RNAi delivery:

- Reduction of toxicity by controlling when the membrane disruptive property of the polymer is activated; and
- Inhibition of non-specific interactions with blood components and non-targeted cell types.

Figure 14: Single molecule DPCs™

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### Co-injection of DPCs™ and RNAi Triggers

Arrowhead has developed multiple forms of the prototypical DPC™ delivery system. ARC-520 and ARC-AAT use a DPC™ formulation whereby the RNAi trigger is conjugated to cholesterol and is not attached to the DPC™. Pre-clinical studies have shown co-injection of the liver-targeted DPC™ polymer together with the RNAi trigger conjugated to a lipophilic moiety, such as cholesterol, results in a greater than 500-fold increase in the potency when compared to the RNAi trigger with cholesterol alone. This formulation retains the potent endosomal escape capabilities of Arrowhead's DPC™ platform, simplifies drug manufacturing, and creates new targeting opportunities.

Figure 15: Mechanism of action for co-injected DPCs

## Subcutaneous Administration of RNAi Therapeutics

Arrowhead has also developed multiple delivery formulations for subcutaneous administration of RNAi therapeutics where the RNAi triggers are conjugated to the delivery vehicle. Using these vehicles, high-level target gene knockdown has been observed in animal studies. Arrowhead intends to utilize a subcutaneous formulation in its ARC-LPA program and in additional programs where chronic dosing may be required.

## Intellectual Property

The Company controls approximately 306 issued patents (including 66 for DPCs; 25 for hydrodynamic gene delivery; 26 for pH labile molecules; 7 for polyampholyte; 5 for template polymerization; 12 for delivery polymers; 133 for RNAi trigger molecules; 1 for targeting molecules; 1 for liver expression vector; and 29 for Homing Peptides), including European validations, and 247 patent applications (108 applications in 13 families for DPCs; 140 applications in 23 families for RNAi trigger targets; and 8 for Homing Peptides). The pending applications have been filed throughout the world, including, in the United States, Argentina, ARIPO (Africa Regional Intellectual Property Organization), Australia, Brazil, Canada, Chile, China, Eurasian Patent Organization, Europe, Hong Kong, Israel, India, Indonesia, Iraq, Jordan, Japan, Republic of Korea, Mexico, New Zealand, OAPI (African Intellectual Property Organization), Peru, Philippines, Russian Federation, Saudi Arabia, Singapore, Thailand, Taiwan, Venezuela, Vietnam, and South Africa.

## RNAi Triggers

The Company owns patents directed to RNAi triggers targeted to reduce expression of hepatitis B viral proteins as well the RRM2 gene.

Patent Group	Estimated Year of Expiration
RNAi Triggers	
Patent directed to HBV RNAi triggers	2032
Patent directed to RRM2 RNAi triggers	2031
-ENaC	2028
-ENaC	2031
-Catenin	2033
KRAS	2033
HSF1	2030, 2032
APOC3	2034
Cx43	2029
HIF1A	2026
FRP-1	2026
HCV	2023
PDtype4	2026
PI4Kinase	2028
HRH1	2027
SYK	2027
TNF-	2027
20	

## Dynamic Polyconjugates

The DPC related patents have issued in the United States, Australia, Canada, Europe, France, Germany, Italy, Spain, Switzerland, United Kingdom, India, Japan, Mexico, New Zealand, Philippines, Russia, South Korea, Singapore, and South Africa. The Company also controls a number of patents directed to hydrodynamic nucleic acid delivery, which issued in the United States, Australia and Europe (validated in Austria, Belgium, Switzerland, Germany, Denmark, Spain, Finland, France, the United Kingdom, Hungary, Ireland, Italy, Netherlands and Sweden). The approximate year of expiration for each of these various groups of patents are set forth below:

Patent Group	Estimated Year of Expiration
Dynamic Polyconjugates™ (DPC™)	
Dynamic Polyconjugates	2027
Dynamic Polyconjugates – second iteration	2031
Membrane Active Polymers	2027
Membrane Active Polymers – Additional Iterations	2024
Membrane Active Polymers – Additional Iterations	2032
Copolymer Systems	2024
Polynucleotide-Polymer Composition	2024
ARC-520 Polymer	2031
ARC-521 Composition	2035
Masking Chemistry	2031
Masking Chemistry	2035
Polyampholyte Delivery	2017
pH Labile Molecules	2020
Endosomolytic Polymers	2020
Hydrodynamic delivery	
First iterations	2015
Second iteration	2020
Third iteration	2024

The RNAi and drug delivery patent landscapes are complex and rapidly evolving. As such, we may need to obtain additional patent licenses prior to commercialization of our candidates. You should review the factors identified in “Risk Factors” in Part I, Item 1A of this Annual Report on Form 10-K.

## Homing Peptides

We also control patents related to our Homing Peptide platforms, related to Adipotide, our drug candidate for the treatment for obesity and related metabolic disorders. Approximately seven of these patents are United States patents and the remaining patents are validated in Belgium, Switzerland, Germany, Spain, France, Japan, the United Kingdom, Ireland, Greece, Italy, Netherlands, Portugal, Sweden and Turkey.

Patent Group	Estimated Year of Expiration
Adipotide®	
Targeting moieties and conjugates	2021
Targeted Pharmaceutical Compositions	2021
Homing Peptides	
EphA5 Targeting Peptides	2027
IL-11R Targeting Peptides	2022





## Non-Exclusively Licensed Patent Rights obtained from Roche

Roche and the Company entered into a Stock and Asset Purchase Agreement on October 21, 2011 pursuant to which Roche assigned to Arrowhead its entire rights under certain licenses including: the License and Collaboration Agreement between Roche and Alnylam dated July 8, 2007 (the “Alnylam License”); the Non-Exclusive Patent License Agreement between Roche and MDRNA, Inc. dated February 12, 2009 (“MDRNA License”); and the Non-Exclusive License Agreement between Roche and City of Hope dated September 19, 2011 (the “COH License”) (Collectively the “RNAi Licenses”). The RNAi Licenses provide the Company with non-exclusive, worldwide, perpetual, irrevocable, royalty-bearing rights and the right to sublicense a broad portfolio of intellectual property relating to the discovery, development, manufacture, characterization, and use of therapeutic products that function through the mechanism of RNA interference for specified targets.

### Terms of the Alnylam License

The Alnylam License provides us with a non-exclusive, worldwide, perpetual, irrevocable, royalty-bearing right and sublicenseable license under Alnylam’s rights in certain intellectual property existing as of its effective date, to engage in discovery, development, commercialization and manufacturing activities, including to make, have made, use, offer for sale, sell and import certain licensed products in certain fields. The fields include the treatment or prophylaxis of indications comprising an RNAi compound complementary to, and function in mediating the RNAi of, a target known or believed to be primarily implicated in one or more primary therapeutic areas. The primary therapeutic areas are cancer, hepatic, metabolic disease and pulmonary disease. The hepatic therapeutic area specifically excludes targets of infectious pathogen.

The Alnylam license excludes access to intellectual property specifically related to “Blocked Targets.” “Blocked Targets” are those targets that are subject to a contractual obligation of a pre-existing agreement between Alnylam and its alliance partners.

Under the Alnylam License, we may be obligated to pay development and sales milestone payments of up to the mid to upper double digit millions of dollars for each licensed product that progresses through clinical trials in a particular indication, receives marketing approval for that indication and is the subject of a first commercial sale. Additionally, we may be obligated to pay mid to high single digit percentage royalties on sales of such products.

### Core Patents relating to RNAi

The RNAi Licenses include patents relating to the general structure, architecture, and design of double-stranded oligonucleotide molecules, which engage RNA interference mechanisms in a cell. These rights include the “Tuschl II” patents, including issued U.S. Patent Nos. 7,056,704; 7,078,196; 7,078,196; 8,329,463; 8,362,231; 8,372,968; and 8,445,327; “Tuschl I” patents, including U.S. Patent Nos. 8,394,628 and 8,420,391; and allowed “Tuschl I” patent application, U.S. Publication No. 2011024446; “City of Hope” patents, including U.S. Patent No. 8,084,599; and “Kreutzer-Limmer” patents assigned to Alnylam, including U.S. Patent Nos. 7,829,693; 8,101,594; 8,119,608; 8,202,980; and 8,168,776.

Thomas Tuschl is the first named inventor on “Tuschl I” and “Tuschl II.” “Tuschl I” refers to the patents arising from the patent application entitled “The Uses of 21-23 Sequence-Specific Mediators of Double-Stranded RNA Interference as a Tool to Study Gene Function and as a Gene-Specific Therapeutic.” “Tuschl II” patents refer to the patents and patent applications arising from the patent application entitled “RNA Interference Mediating Small RNA Molecules.” “City of Hope” is the first named assignee of certain core RNAi trigger patents. The second named assignee of these patents is Integrated DNA Technologies, Inc. Kreutzer-Limmer patents refer to the Alnylam patents and patent applications, relating to core siRNA IP, which includes inventors, Roland Kreutzer and Stefan Limmer.

### Chemical modifications of double-stranded oligonucleotides

The RNAi Licenses also include patents related to modifications of double-stranded oligonucleotides, including modifications to the base, sugar, or internucleoside linkage, nucleotide mimetics, and end modifications, which do not abolish the RNAi activity of the double-stranded oligonucleotides. Also included are patents relating to modified double-stranded oligonucleotides, such as meroduplexes described in U.S. Publication No. 20100209487 assigned to Marina Biotech (f/k/a MDRNA, Inc.), and microRNAs described in U.S. Patent Nos. 7,582,744; 7,674,778, and 7,772,387 assigned to Alnylam as well as U.S. Patent No. 8,314,227 related to unlocked nucleic acids (UNA). The '227 patent was assigned by Marina Biotech to Arcturus Therapeutics, Inc. but remains part of the MDRNA License. The RNAi Licenses also include rights from INEX/Tekmira relating to lipid-nucleic acid particles, and oligonucleotide modifications to improve pharmacokinetic activity including resistance to degradation, increased stability, and more specific targeting of cells from Alnylam and ISIS Pharmaceuticals, Inc.

#### Manufacturing techniques for the double-stranded oligonucleotide molecules or chemical modifications

The RNAi Licenses also include patents relating to the synthesis and manufacture of double-stranded oligonucleotide molecules for use in RNA interference, as well as chemical modifications of such molecules, as described above. These include methods of synthesizing the double-stranded oligonucleotide molecules such as in the core “Tuschl I” allowed U.S. Application No. 12/897,749, the core “Tuschl II” U.S. Patent Nos. 7,056,704; 7,078,196; and 8,445,327; and Alnylam’s U.S. Patent Nos. 8,168,776, as well as methods of making chemical modifications of the double-stranded oligonucleotides such as described in Alnylam’s U.S. Patent No. 7,723,509 and INEX’s U.S. Patent Nos. 5,976,567; 6,858,224; and 8,484,282. Patent applications are currently pending that further cover manufacturing techniques for double-stranded oligonucleotide molecules or chemical modifications.

#### Uses and Applications of Double-Stranded Oligonucleotide Molecules or Chemical modifications

The RNAi Licenses also include patents related to uses of the double-stranded oligonucleotides that function through the mechanism of RNA interference. These include for example, the core “Tuschl I” U.S. Patent No. 8,394,628 and “Tuschl II” U.S. Patent No. 8,329,463; Alnylam’s U.S. Patent Nos. 7,763,590; 8,101,594, and 8,119,608, and City of Hope’s U.S. Patent No. 8,084,599. Other more specific uses have been acquired and patent applications are currently pending that cover additional end uses and applications of double-stranded oligonucleotides functioning through RNA interference.

#### License from Alnylam

In January 2012, we obtained a license from Alnylam under its rights in certain RNAi intellectual property to develop and commercialize RNAi-based products targeting RNAs encoded by the genome of HBV.

Alnylam granted us a worldwide non-exclusive sublicensable royalty bearing license under Alnylam’s general RNAi intellectual property estate to research, develop and commercialize RNAi-based products targeting HBV RNAs in combination with DPC™ technology. Alnylam further granted us a worldwide sublicensable exclusive royalty bearing license under its target-specific RNAi patent rights to research, develop and commercialize RNAi-based products targeting HBV RNAs in combination with DPC™ technology. Alnylam further agreed to forego the development of any RNAi-based products targeting HBV RNAs in combination with DPC™ technology.

Under the license from Alnylam, we may be obligated to pay development and sales milestone payments of up to the low double digit millions of dollars for each licensed product that progresses through clinical trials, receives marketing approval and is the subject of a first commercial sale. Additionally, we may be obligated to pay low single digit percentage royalties on sales of such products.

#### License to Alnylam

In consideration for the licenses from Alnylam, in January 2012 we granted Alnylam a worldwide non-exclusive, sublicensable royalty bearing license under our broad and target-specific DPC™ intellectual property rights to research, develop and commercialize RNAi-based products against a single undisclosed target in combination with DPC™ technology. Under the license to Alnylam, Alnylam may be obligated to pay us development and sales milestone payments of up to the low double digit millions of dollars for each licensed product that progresses through clinical trials, receives marketing approval and is the subject of a first commercial sale. Additionally, Alnylam may be obligated to pay us low single digit percentage royalties on sales of such products.

#### University of Texas MD Anderson Cancer Center License

In December 2010, we obtained an exclusive worldwide license from the University of Texas MD Anderson Cancer Center in Houston, Texas (“UTMDACC”) related to Adipotide technology (the “UTMDACC License”). The UTMDACC

License granted us a royalty-bearing, exclusive right (with the right to sublicense) under certain UTMDACC patents to develop and commercialize certain products in the fields of: 1) therapeutics, diagnostics and research services that both (i) incorporate peptides that specifically target adipose tissue, and (ii) are used to treat, diagnose or research solely either (a) obesity, overweight and/or (b) metabolic conditions related to, caused by and/or associated with obesity and overweight, e.g., diabetes; and 2) cancer therapies, diagnostics and research products associated with a specific targeting moiety. We also have rights to certain improvements to the technology.

In consideration for the license, we paid UTMDACC an upfront fee of \$2 million and are obligated to pay annual fees initially equal to \$50,000 increasing up to a maximum of \$100,000, with such annual fees creditable against milestone payments.

We may be obligated to pay development milestone payments of up to \$8.3 million for each UTMDACC licensed product that progresses through clinical trials and receives U.S. marketing approval. Additional EU and Japanese approval milestone payments are in the low single digit million dollar range. If a commercial drug is developed and approved, royalty payments on net sales of UTMDACC licensed products are in the low single digit range. If we sublicense or partner a UTMDACC licensed product,

UTMDACC would receive partnering fee percentages in the range of single digits to the twenties, depending on the stage of development of the partnered UTMDACC licensed product.

The term of the UTMDACC License is linked to the last to expire patents licensed therein or 15 years if a licensed product contains only licensed know-how. We are obligated to actively and effectively attempt to commercialize the UTMDACC Technology and submit to UTMDACC a Phase 2 clinical trial protocol within two years of obtaining an approved IND. We are also obligated to commence a Phase 2 clinical trial within four years and a Phase 3 clinical trial within seven years of approval of an IND. However, we may obtain yearly extensions of time upon the payment of an increasing fee in the range of tens of thousands of dollars up to several hundred thousand dollars. We also have diligence obligations with respect to any UTMDACC Improvements later added to the license.

#### Acquisition of Assets from Novartis

On March 3, 2015, the Company entered into an Asset Purchase and Exclusive License Agreement (the “RNAi Purchase Agreement”) with Novartis pursuant to which the Company acquired Novartis’ RNAi assets and rights thereunder. Pursuant to the RNAi Purchase Agreement, the Company acquired or licensed certain patents and patent applications owned or controlled by Novartis related to RNAi therapeutics, assignment of Novartis’s rights under a license from Alnylam (the “Alnylam-Novartis License”), rights to three pre-clinical RNAi candidates, and a license to certain Novartis assets (the “Licensed Novartis Assets”). The patents acquired from Novartis include multiple patent families covering delivery technologies and RNAi-trigger design rules and modifications. The Licensed Novartis Assets include an exclusive, worldwide right and license, solely in the RNAi field, with the right to grant sublicenses through multiple tiers under or with respect to certain patent rights and know how relating to delivery technologies and RNAi-trigger design rules and modifications. Under the assigned Alnylam-Novartis License, the Company has acquired a worldwide, royalty-bearing, exclusive license with limited sublicensing rights to existing and future Alnylam intellectual property (coming under Alnylam’s control on or before March 31, 2016), excluding intellectual property concerning delivery technology, to research, develop and commercialize 30 undisclosed gene targets.

#### Research and Development

##### Research and Development Facility

Arrowhead’s research and development operations are located in Madison, Wisconsin and are housed in two facilities. The main facility was built and equipped by Roche and was part of our 2011 acquisition of Roche’s RNA therapeutics business. A second research and development facility, located in a nearby Madison suburb, was opened in 2015 as operations expanded. Substantially all of the Company’s assets are located either in these facilities or in our corporate headquarters in Pasadena. A summary of our research and development facilities is provided below:

- Approximately 87 scientists;
- State-of-the-art laboratories in two buildings: main building has 27,000 total sq. ft. (16,000 sq. ft. lab, 11,000 sq. ft. office); second building has 2,900 total sq. ft. (1,700 sq. ft. lab, 1,200 sq. ft. office);
- Complete small animal facility;
- Primate colony housed at the Wisconsin National Primate Research Center, an affiliate of the University of Wisconsin;
- In-house histopathology capabilities;
- Animal models for metabolic, viral, and oncologic diseases;
- Animal efficacy and safety assessment;
- Polymer, peptide, oligonucleotide and small molecule synthesis and analytics capabilities (HPLC, NMR, MS, etc.);
- Polymer, peptide and oligonucleotide PK, biodistribution, clearance methodologies; and
- Conventional and confocal microscopy, flow cytometry, Luminex platform, qRT-PCR, clinical chemistry analytics.

##### Research and Development Expenses

Research and development (R&D) expenses consist of costs incurred in discovering, developing and testing our clinical candidates and platform technologies. R&D expenses also include costs related to clinical trials, including costs of contract research organizations to recruit patients and manage clinical trials. Other costs associated with clinical trials include manufacturing of clinical supplies, as well as good laboratory practice (“GLP”) toxicology studies necessary to support clinical trials, both of which are

outsourced to cGMP-compliant manufacturers and GLP-compliant laboratories. Total research and development expense for fiscal 2015 was \$47.3 million, an increase from \$23.1 million in 2014 and \$8.7 million in 2013.

We employ approximately 87 employees in an R&D function, primarily working from our facility in Madison, Wisconsin. These employees are engaged in various areas of research on Arrowhead candidate and platform development including synthesis and analytics, PK/biodistribution, formulation, CMC and analytics, tumor and extra-hepatic targeting, bioassays, live animal research, toxicology/histopathology, clinical and regulatory operations, and other areas. Salaries and payroll-related expenses for our R&D activities were \$11.6 million in fiscal 2015, \$7.8 million in fiscal 2014, and \$4.1 million in fiscal 2013. Laboratory supplies including animal-related costs for in-vivo studies were \$3.1 million, \$2.3 million, and \$1.3 million in fiscal 2015, 2014, and 2013, respectively.

Costs related to manufacture of clinical supplies, GLP toxicology studies and other outsourced lab studies, as well as clinical trial costs were \$41.8 million, \$18.8 million, and \$6.1 million in fiscal 2015, 2014, and 2013 respectively.

Facility-related costs, primarily rental costs for our leased laboratory in Madison, Wisconsin were \$1.0 million, \$0.9 million, and \$0.7 million in fiscal 2015, 2014, and 2013, respectively. Other research and development expenses were \$1.4 million, \$1.2 million, and \$0.6 million in fiscal 2015, 2014 and 2013, respectively. These expenses are primarily related to milestone payments, which can vary from period to period depending on the nature of our various license agreements, and the timing of reaching various development milestones requiring payment.

#### Government Regulation

Government authorities in the United States, at the federal state, and local levels, and in other countries and jurisdictions, including the European Union, extensively regulate, among other things, the research, development, testing, product approval, manufacture, quality control, manufacturing changes, packaging, storage, recordkeeping, labeling, promotion, advertising, sales, distribution, marketing, and import and export of drugs and biologic products. All of our foreseeable product candidates are expected to be regulated as drugs. The processes for obtaining regulatory approval in the U.S. and in foreign countries and jurisdictions, along with compliance with applicable statutes and regulations and other regulatory authorities both pre- and post-commercialization, are a significant factor in the production and marketing of our products and our R&D activities and require the expenditure of substantial time and financial resources.

#### Review and Approval of Drugs in the United States

In the U.S., the FDA and other government entities regulate drugs under the Federal Food, Drug, and Cosmetic Act (the "FDCA"), the Public Health Service Act, and the regulations promulgated under those statutes, as well as other federal and state statutes and regulations. Failure to comply with applicable legal and regulatory requirements in the U.S. at any time during the product development process, approval process, or after approval, may subject us to a variety of administrative or judicial sanctions, such as a delay in approving or refusal by the FDA to approve pending applications, withdrawal of approvals, delay or suspension of clinical trials, issuance of warning letters and other types of regulatory letters, product recalls, product seizures, total or partial suspension of production or distribution, injunctions, fines, civil monetary penalties, refusals of or debarment from government contracts, exclusion from the federal healthcare programs, restitution, disgorgement of profits, civil or criminal investigations by the FDA, U.S. Department of Justice, State Attorneys General, and/or other agencies, False Claims Act suits and/or other litigation, and/or criminal prosecutions.

An applicant seeking approval to market and distribute a new drug in the U.S. must typically undertake the following:

(1) completion of pre-clinical laboratory tests, animal studies, and formulation studies in compliance with the FDA's GLP regulations;

- (2) submission to the FDA of an Investigational New Drug Application (“IND”) for human clinical testing, which must become effective without FDA objection before human clinical trials may begin;
- (3) approval by an independent institutional review board (“IRB”), representing each clinical site before each clinical trial may be initiated;
- (4) performance of adequate and well-controlled human clinical trials in accordance with the FDA’s current good clinical practice (“cGCP”) regulations, to establish the safety and effectiveness of the proposed drug product for each indication for which approval is sought;
- (5) preparation and submission to the FDA of a New Drug Application (“NDA”);



- (6) satisfactory review of the NDA by an FDA advisory committee, where appropriate or if applicable,
- (7) satisfactory completion of one or more FDA inspections of the manufacturing facility or facilities at which the drug product, and the active pharmaceutical ingredient or ingredients thereof, are produced to assess compliance with current good manufacturing practice (“cGMP”) regulations and to assure that the facilities, methods, and controls are adequate to ensure the product’s identity, strength, quality, and purity;
- (8) payment of user fees, as applicable, and securing FDA approval of the NDA; and
- (9) compliance with any post-approval requirements, such as any Risk Evaluation and Mitigation Strategies (“REMS”) or post-approval studies required by the FDA.

#### Preclinical Studies and an IND

Preclinical studies can include in vitro and animal studies to assess the potential for adverse events and, in some cases, to establish a rationale for therapeutic use. The conduct of preclinical studies is subject to federal regulations and requirements, including GLP regulations. Other studies include laboratory evaluation of the purity, stability and physical form of the manufactured drug substance or active pharmaceutical ingredient and the physical properties, stability and reproducibility of the formulated drug or drug product. An IND sponsor must submit the results of the preclinical tests, together with manufacturing information, analytical data, any available clinical data or literature and plans for clinical studies, among other things, to the FDA as part of an IND. Some preclinical testing, such as longer-term toxicity testing, animal tests of reproductive adverse events and carcinogenicity, may continue after the IND is submitted. An IND automatically becomes effective 30 days after receipt by the FDA, unless before that time the FDA raises concerns or questions related to a proposed clinical trial and places the trial on clinical hold. In such a case, the IND sponsor and the FDA must resolve any outstanding concerns before the clinical trial can begin. As a result, submission of an IND may not result in the FDA allowing clinical trials to commence.

Following commencement of a clinical trial under an IND, the FDA may place a clinical hold on that trial. A clinical hold is an order issued by the FDA to the sponsor to delay a proposed clinical investigation or to suspend an ongoing investigation. A partial clinical hold is a delay or suspension of only part of the clinical work requested under the IND. For example, a specific protocol or part of a protocol is not allowed to proceed, while other protocols may do so. No more than 30 days after imposition of a clinical hold or partial clinical hold, the FDA will provide the sponsor a written explanation of the basis for the hold. Following issuance of a clinical hold or partial clinical hold, an investigation may only resume after the FDA has notified the sponsor that the investigation may proceed. The FDA will base that determination on information provided by the sponsor correcting the deficiencies previously cited or otherwise satisfying the FDA that the investigation can proceed.

#### Human Clinical Studies in Support of an NDA

Clinical trials involve the administration of the investigational product to human subjects under the supervision of qualified investigators in accordance with cGCP requirements, which include, among other things, the requirement that all research subjects provide their informed consent in writing before their participation in any clinical trial. Clinical trials are conducted under written study protocols detailing, among other things, the objectives of the study, the parameters to be used in monitoring safety and the effectiveness criteria to be evaluated. A protocol for each clinical trial and any subsequent protocol amendments must be submitted to the FDA as part of the IND. In addition, an IRB representing each institution participating in the clinical trial must review and approve the plan for any clinical trial before it commences at that institution, and the IRB must conduct continuing review and reapprove the study at least annually. The IRB must review and approve, among other things, the study protocol and informed consent information to be provided to study subjects. An IRB must operate in compliance with FDA regulations. Information about certain clinical trials must be submitted within specific timeframes to the NIH for public dissemination on its ClinicalTrials.gov website.

Human clinical trials are typically conducted in three sequential phases, which may overlap or be combined:

Phase 1: The product candidate is initially introduced into healthy human subjects or patients with the target disease or condition and tested for safety, dosage tolerance, absorption, metabolism, distribution, excretion and, if possible, to gain an early indication of its effectiveness.

Phase 2: The product candidate is administered to a limited patient population to identify possible adverse effects and safety risks, to preliminarily evaluate the efficacy of the product for specific targeted diseases and to determine dosage tolerance and optimal dosage.

Phase 3: The product candidate is administered to an expanded patient population, generally at geographically dispersed clinical trial sites, in well-controlled clinical trials to generate enough data to statistically evaluate the efficacy and safety of the product for

approval, to establish the overall risk-benefit profile of the product, and to provide adequate information for the labeling of the product.

Progress reports detailing the results of the clinical trials must be submitted at least annually to the FDA and more frequently if serious adverse events occur. Phase 1, Phase 2, and Phase 3 clinical trials may not be completed successfully within any specified period, or at all. Furthermore, the FDA or the sponsor may suspend or terminate a clinical trial at any time on various grounds, including a finding that the research subjects are being exposed to an unacceptable health risk. Similarly, an IRB can suspend or terminate approval of a clinical trial at its institution, or an institution it represents, if the clinical trial is not being conducted in accordance with the IRB's requirements or if the drug has been associated with unexpected serious harm to patients. The FDA will typically inspect one or more clinical sites in late-stage clinical trials to assure compliance with cGCP and the integrity of the clinical data submitted.

#### Submission of an NDA to the FDA

Assuming successful completion of required clinical testing and other requirements, the results of the preclinical and clinical studies, together with detailed information relating to the product's chemistry, manufacture, controls and proposed labeling, among other things, are submitted to the FDA as part of an NDA requesting approval to market the drug product for one or more indications. Under federal law, the submission of most NDAs is additionally subject to an application user fee, currently exceeding \$2.3 million for fiscal year 2016, and the sponsor of an approved NDA is also subject to annual product and establishment user fees, currently exceeding \$114,450 per product and \$585,200 per establishment for fiscal year 2016. These fees are typically increased annually.

Under certain circumstances, the FDA will waive the application fee for the first human drug application that a small business, defined as a company with less than 500 employees, or its affiliate, submits for review. An affiliate is defined as a business entity that has a relationship with a second business entity if one business entity controls, or has the power to control, the other business entity, or a third party controls, or has the power to control, both entities. In addition, an application to market a prescription drug product that has received orphan designation is not subject to a prescription drug user fee unless the application includes an indication for other than the rare disease or condition for which the drug was designated.

The FDA conducts a preliminary review of an NDA within 60 days of its receipt and informs the sponsor by the 74th day after the FDA's receipt of the submission to determine whether the application is sufficiently complete to permit substantive review. The FDA may request additional information rather than accept an NDA for filing. In this event, the application must be resubmitted with the additional information. The resubmitted application is also subject to review before the FDA accepts it for filing. Once the submission is accepted for filing, the FDA begins an in-depth substantive review. The FDA has agreed to specified performance goals in the review process of NDAs. Most such applications are meant to be reviewed within ten months from the date of filing, and most applications for "priority review" products are meant to be reviewed within six months of filing. The review process may be extended by the FDA for three additional months to consider new information or clarification provided by the applicant to address an outstanding deficiency identified by the FDA following the original submission.

Before approving an NDA, the FDA typically will inspect the facility or facilities where the product is manufactured. The FDA will not approve an application unless it determines that the manufacturing processes and facilities are in compliance with cGMP requirements and adequate to assure consistent production of the product within required specifications. Additionally, before approving an NDA, the FDA will typically inspect one or more clinical sites to assure compliance with cGCP.

The FDA also may require submission of an REMS plan to mitigate any identified or suspected serious risks. The REMS plan could include medication guides, physician communication plans, assessment plans, and elements to assure safe use, such as restricted distribution methods, patient registries, or other risk minimization tools.

The FDA is required to refer an application for a novel drug to an advisory committee or explain why such referral was not made. Typically, an advisory committee is a panel of independent experts, including clinicians and other scientific experts, that reviews, evaluates and provides a recommendation as to whether the application should be approved and under what conditions. The FDA is not bound by the recommendations of an advisory committee, but it considers such recommendations carefully when making decisions.

## The FDA's Decision on an NDA

On the basis of the FDA's evaluation of the NDA and accompanying information, including the results of the inspection of the manufacturing facilities, the FDA may issue an approval letter or a complete response letter. An approval letter authorizes commercial marketing of the product with specific prescribing information for specific indications. A complete response letter generally outlines the deficiencies in the submission and may require substantial additional testing or information in order for the FDA to reconsider the application. If and when those deficiencies have been addressed to the FDA's satisfaction in a resubmission of the NDA, the FDA will issue an approval letter. The FDA has committed to reviewing such resubmissions in two or six months depending on the type of information included. Even with submission of this additional information, the FDA ultimately may decide that the application does not satisfy the regulatory criteria for approval.

If the FDA approves a product, it may limit the approved indications for use for the product, require that contraindications, warnings or precautions be included in the product labeling, require that post-approval studies, including Phase 4 clinical trials, be conducted to further assess the drug's safety after approval, require testing and surveillance programs to monitor the product after commercialization, or impose other conditions, including distribution restrictions or other risk management mechanisms, including REMS, which can materially affect the potential market and profitability of the product. The FDA may prevent or limit further marketing of a product based on the results of post-market studies or surveillance programs. After approval, some types of changes to the approved product, such as adding new indications, manufacturing changes and additional labeling claims, are subject to further testing requirements and FDA review and approval.

The product may also be subject to official lot release, meaning that the manufacturer is required to perform certain tests on each lot of the product before it is released for distribution. If the product is subject to official release, the manufacturer must submit samples of each lot, together with a release protocol showing a summary of the history of manufacture of the lot and the results of all of the manufacturer's tests performed on the lot, to the FDA. The FDA may in addition perform certain confirmatory tests on lots of some products before releasing the lots for distribution. Finally, the FDA will conduct laboratory research related to the safety and effectiveness of drug products.

Under the Orphan Drug Act, the FDA may grant orphan drug designation to a drug intended to treat a rare disease or condition, which is generally a disease or condition that affects fewer than 200,000 individuals in the United States, or more than 200,000 individuals in the U.S. and for which there is no reasonable expectation that the cost of developing and making available in the U.S. a drug for this type of disease or condition will be recovered from sales in the U.S. for that drug. Orphan drug designation must be requested before submitting an NDA, and both the drug and the disease or condition must meet certain criteria specified in the Orphan Drug Act and FDA's implementing regulations at 21 C.F.R. Part 316. The granting of an orphan drug designation does not alter the standard regulatory requirements and process for obtaining marketing approval. Safety and effectiveness of a drug must be established through adequate and well-controlled studies.

After the FDA grants orphan drug designation, the identity of the therapeutic agent and its potential orphan use are disclosed publicly by the FDA. If a product that has orphan drug designation subsequently receives the first FDA approval for the disease for which it has such designation, the product is entitled to orphan product exclusivity, which means that the FDA may not approve any other application to market the same drug for the same indication, except in very limited circumstances, for seven years.

## Post-Approval Requirements

Drugs manufactured or distributed pursuant to FDA approvals are subject to pervasive and continuing regulation by the FDA, including, among other things, requirements relating to recordkeeping, periodic reporting, product sampling and distribution, advertising and promotion and reporting of adverse experiences with the product. After approval, most changes to the approved product, such as adding new indications or other labeling claims, are subject to prior

FDA review and approval. There also are continuing, annual user fee requirements for any marketed products and the establishments at which such products are manufactured, as well as new application fees for supplemental applications with clinical data.

In addition, drug manufacturers and other entities involved in the manufacture and distribution of approved drugs are required to register their establishments with the FDA and state agencies, and are subject to periodic unannounced inspections by the FDA and these state agencies for compliance with cGMP requirements. Changes to the manufacturing process are strictly regulated and often require prior FDA approval before being implemented. FDA regulations also require investigation and correction of any deviations from cGMP and impose reporting and documentation requirements upon the sponsor and any third-party manufacturers that the sponsor may decide to use. Accordingly, manufacturers must continue to expend time, money, and effort in the area of production and quality control to maintain cGMP compliance.

Once an approval is granted, the FDA may withdraw the approval if compliance with regulatory requirements and standards is not maintained or if problems occur after the product reaches the market. Later discovery of previously unknown problems with a product, including adverse events or problems with manufacturing processes of unanticipated severity or frequency, or failure to comply with regulatory requirements, may result in revisions to the approved labeling to add new safety information; imposition of post-market studies or clinical trials to assess new safety risks; or imposition of distribution or other restrictions under a REMS program. Other potential consequences include, among other things:

- restrictions on the marketing or manufacturing of the product, complete withdrawal of the product from the market or product recalls;
- fines, warning letters or holds on post-approval clinical trials;
- refusal of the FDA to approve pending NDAs or supplements to approved NDAs, or suspension or revocation of product license approvals;
  - product seizure or detention, or refusal to permit the import or export of products; or
- injunctions or the imposition of civil or criminal penalties.

The FDA strictly regulates marketing, labeling, advertising and promotion of products that are placed on the market. Drugs may be promoted only for the approved indications and in accordance with the provisions of the approved label. The FDA and other agencies actively enforce the laws and regulations prohibiting the promotion of off-label uses, and a company that is found to have improperly promoted off-label uses may be subject to significant liability.

In addition, the distribution of prescription pharmaceutical products is subject to the Prescription Drug Marketing Act (PDMA), which regulates the distribution of drugs and drug samples at the federal level, and sets minimum standards for the registration and regulation of drug distributors by the states. Both the PDMA and state laws limit the distribution of prescription pharmaceutical product samples and impose requirements to ensure accountability in distribution.

#### Abbreviated New Drug Applications for Generic Drugs

In 1984, with passage of the Drug Price Competition and Patent Term Restoration Act of 1984 (commonly referred to as the “Hatch-Waxman Amendments”) amending the FDCA, Congress authorized the FDA to approve generic drugs that are the same as drugs previously approved by the FDA under the NDA provisions of the statute. To obtain approval of a generic drug, an applicant must submit an abbreviated new drug application (ANDA) to the agency. In support of such applications, a generic manufacturer may rely on the preclinical and clinical testing previously conducted for a drug product previously approved under an NDA, known as the reference listed drug, or RLD. To reference that information, however, the ANDA applicant must demonstrate, and the FDA must conclude, that the generic drug does, in fact, perform in the same way as the RLD it purports to copy. Specifically, in order for an ANDA to be approved, the FDA must find that the generic version is identical to the RLD with respect to the active ingredients, the route of administration, the dosage form, and the strength of the drug.

At the same time, the FDA must also determine that the generic drug is “bioequivalent” to the innovator drug. Under the statute, a generic drug is bioequivalent to a RLD if “the rate and extent of absorption of the generic drug do not show a significant difference from the rate and extent of absorption of the RLD.” Upon approval of an ANDA, the FDA indicates that the generic product is “therapeutically equivalent” to the RLD and it assigns a therapeutic equivalence rating to the approved generic drug in its publication “Approved Drug Products with Therapeutic Equivalence Evaluations,” also referred to as the “Orange Book.” Physicians and pharmacists consider the therapeutic equivalence rating to mean that a generic drug is fully substitutable for the RLD. In addition, by operation of certain state laws and numerous health insurance programs, the FDA’s designation of a therapeutic equivalence rating often results in substitution of the generic drug without the knowledge or consent of either the prescribing physician or patient.

Under the Hatch-Waxman Amendments, the FDA may not approve an ANDA until any applicable period of nonpatent exclusivity for the RLD has expired. The FDCA provides a period of five years of data exclusivity for new drug containing a new chemical entity. In cases where such exclusivity has been granted, an ANDA may not be filed with the FDA until the expiration of five years unless the submission is accompanied by a Paragraph IV certification, in which case the applicant may submit its application four years following the original product approval. The FDCA also provides for a period of three years of exclusivity if the NDA includes reports of one or more new clinical investigations, other than bioavailability or bioequivalence studies, that were conducted by or for the applicant and are essential to the approval of the application. This three-year exclusivity period often protects changes to a previously approved drug product, such as a new dosage form, route of administration, combination or indication.



### Hatch-Waxman Patent Certification and the 30 Month Stay

Upon approval of an NDA or a supplement thereto, NDA sponsors are required to list with the FDA each patent with claims that cover the applicant's product or a method of using the product. Each of the patents listed by the NDA sponsor is published in the Orange Book. When an ANDA applicant files its application with the FDA, the applicant is required to certify to the FDA concerning any patents listed for the reference product in the Orange Book, except for patents covering methods of use for which the ANDA applicant is not seeking approval.

Specifically, the applicant must certify with respect to each patent that:

- the required patent information has not been filed;
- the listed patent has expired;
- the listed patent has not expired, but will expire on a particular date and approval is sought after patent expiration; or
- the listed patent is invalid, unenforceable or will not be infringed by the new product.

A certification that the new product will not infringe the already approved product's listed patents or that such patents are invalid or unenforceable is called a Paragraph IV certification. If the applicant does not challenge the listed patents or indicate that it is not seeking approval of a patented method of use, the ANDA application will not be approved until all the listed patents claiming the referenced product have expired. If the ANDA applicant has provided a Paragraph IV certification to the FDA, the applicant must also send notice of the Paragraph IV certification to the NDA and patent holders once the ANDA has been accepted for filing by the FDA. The NDA and patent holders may then initiate a patent infringement lawsuit in response to the notice of the Paragraph IV certification. The filing of a patent infringement lawsuit within 45 days after the receipt of a Paragraph IV certification automatically prevents the FDA from approving the ANDA until the earlier of 30 months, expiration of the patent, settlement of the lawsuit or a decision in the infringement case that is favorable to the ANDA applicant.

To the extent that a Section 505(b)(2) applicant is relying on studies conducted for an already approved product, the applicant is required to certify to the FDA concerning any patents listed for the approved product in the Orange Book to the same extent that an ANDA applicant would. As a result, approval of a 505(b)(2) NDA can be stalled until all the listed patents claiming the referenced product have expired, until any non-patent exclusivity, such as exclusivity for obtaining approval of a new chemical entity, listed in the Orange Book for the referenced product has expired, and, in the case of a Paragraph IV certification and subsequent patent infringement suit, until the earlier of 30 months, settlement of the lawsuit or a decision in the infringement case that is favorable to the Section 505(b)(2) applicant.

### Pediatric Studies and Exclusivity

Under the Pediatric Research Equity Act of 2003, an NDA or supplement thereto must contain data that are adequate to assess the safety and effectiveness of the drug product for the claimed indications in all relevant pediatric subpopulations, and to support dosing and administration for each pediatric subpopulation for which the product is safe and effective. With enactment of the Food and Drug Administration Safety and Innovation Act, or FDASIA, in 2012, sponsors must also submit pediatric study plans prior to the assessment data. Those plans must contain an outline of the proposed pediatric study or studies the applicant plans to conduct, including study objectives and design, any deferral or waiver requests, and other information required by regulation. The applicant, the FDA, and the FDA's internal review committee must then review the information submitted, consult with each other, and agree upon a final plan. The FDA or the applicant may request an amendment to the plan at any time.

The FDA may, on its own initiative or at the request of the applicant, grant deferrals for submission of some or all pediatric data until after approval of the product for use in adults, or full or partial waivers from the pediatric data requirements. Additional requirements and procedures relating to deferral requests and requests for extension of deferrals are contained in FDASIA. Unless otherwise required by regulation, the pediatric data requirements do not apply to products with orphan designation.

Pediatric exclusivity is another type of non-patent marketing exclusivity in the United States and, if granted, provides for the attachment of an additional six months of marketing protection to the term of any existing regulatory exclusivity, including the non-patent and orphan exclusivity. This six-month exclusivity may be granted if an NDA sponsor submits pediatric data that fairly respond to a written request from the FDA for such data. The data do not need to show the product to be effective in the pediatric population studied; rather, if the clinical trial is deemed to fairly respond to the FDA's request, the additional protection is granted. If reports of requested pediatric studies are submitted to and accepted by the FDA within the statutory time limits, whatever statutory or regulatory periods of exclusivity or patent protection cover the product are extended by six months. This is not a patent term extension, but it effectively extends the regulatory period during which the FDA cannot accept or approve another application.

## Patent Term Restoration and Extension

A patent claiming a new drug product may be eligible for a limited patent term extension under the Hatch-Waxman Amendments. Those Amendments permit a patent restoration of up to five years for patent term lost during product development and the FDA regulatory review. The restoration period granted is typically one-half the time between the effective date of an IND and the submission date of a NDA, plus the time between the submission date of a NDA and ultimate approval. Patent term restoration cannot be used to extend the remaining term of a patent past a total of 14 years from the product's approval date. Only one patent applicable to an approved drug product is eligible for the extension, and the application for the extension must be submitted prior to the expiration of the patent in question. The U.S. Patent and Trademark Office reviews and approves the application for any patent term extension or restoration in consultation with the FDA.

## Review and Approval of Drug Products in the European Union

In order to market any product outside of the United States, a company must also comply with numerous and varying regulatory requirements of other countries and jurisdictions regarding quality, safety and efficacy and governing, among other things, clinical trials, marketing authorization, commercial sales and distribution of our products. Whether or not it obtains FDA approval for a product, the company would need to obtain the necessary approvals by the comparable foreign regulatory authorities before it can commence clinical trials or marketing of the product in those countries or jurisdictions. The approval process ultimately varies between countries and jurisdictions and can involve additional product testing and additional administrative review periods. The time required to obtain approval in other countries and jurisdictions might differ from and be longer than that required to obtain FDA approval. Regulatory approval in one country or jurisdiction does not ensure regulatory approval in another, but a failure or delay in obtaining regulatory approval in one country or jurisdiction may negatively impact the regulatory process in others.

Pursuant to the European Clinical Trials Directive, a system for the approval of clinical trials in the European Union has been implemented through national legislation of the member states. Under this system, an applicant must obtain approval from the competent national authority of a European Union member state in which the clinical trial is to be conducted. Furthermore, the applicant may only start a clinical trial after a competent ethics committee has issued a favorable opinion. Clinical trial applications must be accompanied by an investigational medicinal product dossier with supporting information prescribed by the European Clinical Trials Directive and corresponding national laws of the member states and further detailed in applicable guidance documents.

To obtain marketing approval of a drug under European Union regulatory systems, an applicant must submit a marketing authorization application (MAA) either under a centralized or decentralized procedure.

The centralized procedure provides for the grant of a single marketing authorization by the European Commission that is valid for all European Union member states. The centralized procedure is compulsory for specific products, including for medicines produced by certain biotechnological processes, products designated as orphan medicinal products, advanced therapy products and products with a new active substance indicated for the treatment of certain diseases. For products with a new active substance indicated for the treatment of other diseases and products that are highly innovative or for which a centralized process is in the interest of patients, the centralized procedure may be optional.

Under the centralized procedure, the Committee for Medicinal Products for Human Use (CHMP) established at the European Medicines Agency (EMA) is responsible for conducting the initial assessment of a drug. The CHMP is also responsible for several post-authorization and maintenance activities, such as the assessment of modifications or extensions to an existing marketing authorization. Under the centralized procedure in the European Union, the maximum timeframe for the evaluation of an MAA is 210 days, excluding clock stops, when additional information or written or oral explanation is to be provided by the applicant in response to questions of the CHMP. Accelerated

evaluation might be granted by the CHMP in exceptional cases, when a medicinal product is of major interest from the point of view of public health and in particular from the viewpoint of therapeutic innovation. In this circumstance, the EMA ensures that the opinion of the CHMP is given within 150 days.

The decentralized procedure is available to applicants who wish to market a product in various European Union member states where such product has not received marketing approval in any European Union member states before. The decentralized procedure provides for approval by one or more other, or concerned, member states of an assessment of an application performed by one member state designated by the applicant, known as the reference member state. Under this procedure, an applicant submits an application based on identical dossiers and related materials, including a draft summary of product characteristics, and draft labeling and package leaflet, to the reference member state and concerned member states. The reference member state prepares a draft assessment report and drafts of the related materials within 120 days after receipt of a valid application. Within 90 days of receiving the reference member state's assessment report and related materials, each concerned member state must decide whether to approve the assessment report and related materials.

If a member state cannot approve the assessment report and related materials on the grounds of potential serious risk to public health, the disputed points are subject to a dispute resolution mechanism and may eventually be referred to the European Commission, whose decision is binding on all member states.

#### Data and Market Exclusivity in the European Union

In the European Union, new chemical entities qualify for eight years of data exclusivity upon marketing authorization and an additional two years of market exclusivity. This data exclusivity, if granted, prevents regulatory authorities in the European Union from referencing the innovator's data to assess a generic (abbreviated) application for eight years, after which generic marketing authorization can be submitted, and the innovator's data may be referenced, but not approved for two years. The overall ten-year period will be extended to a maximum of eleven years if, during the first eight years of those ten years, the marketing authorization holder obtains an authorization for one or more new therapeutic indications which, during the scientific evaluation prior to their authorization, are held to bring a significant clinical benefit in comparison with existing therapies. Even if a compound is considered to be a new chemical entity and the sponsor is able to gain the prescribed period of data exclusivity, another company nevertheless could also market another version of the drug if such company can complete a full MAA with a complete database of pharmaceutical test, preclinical tests and clinical trials and obtain marketing approval of its product.

#### Pharmaceutical Coverage, Pricing and Reimbursement

Significant uncertainty exists as to the coverage and reimbursement status of products approved by the FDA and other government authorities. Sales of products will depend, in part, on the extent to which the costs of the products will be covered by third-party payors, including government health programs such as, in the United States, Medicare and Medicaid, commercial health insurers and managed care organizations. The process for determining whether a payor will provide coverage for a product may be separate from the process for setting the price or reimbursement rate that the payor will pay for the product once coverage is approved. Third-party payors may limit coverage to specific products on an approved list, or formulary, which might not include all of the approved products for a particular indication.

In order to secure coverage and reimbursement for any product that might be approved for sale, a company may need to conduct expensive pharmacoeconomic studies in order to demonstrate the medical necessity and cost-effectiveness of the product, in addition to the costs required to obtain FDA or other comparable regulatory approvals. A payor's decision to provide coverage for a drug product does not necessarily imply that an adequate reimbursement rate will be approved. Third-party reimbursement may not be sufficient to maintain price levels high enough to realize an appropriate return on our investment in product development.

The containment of healthcare costs has become a priority of federal, state and foreign governments, and the prices of drugs have been a focus in this effort. Third-party payors are increasingly challenging the prices charged for medical products and services and examining the medical necessity and cost-effectiveness of medical products and services, in addition to their safety and efficacy. If these third-party payors do not consider a product to be cost effective compared to other available therapies, they may not cover the product after approval as a benefit under their plans or, if they do, the level of payment may not be sufficient to allow a company to sell its products at a profit. The U.S. government, state legislatures and foreign governments have shown significant interest in implementing cost containment programs to limit the growth of government-paid health care costs, including price controls, risk sharing, restrictions on reimbursement and requirements for substitution of generic products for branded prescription drugs. Adoption of such controls and measures, and tightening of restrictive policies in jurisdictions with existing controls and measures, could limit payments for pharmaceuticals. As a result, the marketability of any product which receives regulatory approval for commercial sale may suffer if the government and third-party payors fail to provide adequate coverage and reimbursement.

In addition, an increasing emphasis on managed care in the United States has increased and will continue to increase the pressure on drug pricing. Coverage policies, third-party reimbursement rates and drug pricing regulation may change at any time. In particular, the Patient Protection and Affordable Care Act, as amended by the Health Care and Education Affordability Reconciliation Act, contains provisions that may reduce the profitability of drug products, including, for example, increased rebates for drugs sold to Medicaid programs, extension of Medicaid rebates to Medicaid managed care plans, mandatory discounts for certain Medicare Part D beneficiaries and annual fees based on pharmaceutical companies' share of sales to federal health care programs. Even if favorable coverage and reimbursement status is attained for one or more products that receive regulatory approval, less favorable coverage policies and reimbursement rates may be implemented in the future.

In the European Union, pricing and reimbursement schemes vary widely from country to country. Some countries provide that drug products may be marketed only after a reimbursement price has been agreed. Some countries may require the completion of additional studies that compare the cost-effectiveness of a particular product candidate to currently available therapies. For example, the European Union provides options for its member states to restrict the range of drug products for which their national health insurance systems provide reimbursement and to control the prices of medicinal products for human use. European Union member states may approve a specific price for a drug product or it may instead adopt a system of direct or indirect controls on the profitability of the company placing the drug product on the market. Other member states allow companies to fix their own prices for drug products, but monitor and control company profits. The downward pressure on health care costs in general, particularly prescription drugs, has become intense. As a result, increasingly high barriers are being erected to the entry of new products. In addition, in some countries, cross-border imports from low-priced markets exert competitive pressure that may reduce pricing within a country. Any country that has price controls or reimbursement limitations for drug products may not allow favorable reimbursement and pricing arrangements for any of our products.

### Healthcare Laws and Regulation

Healthcare providers, physicians and third-party payors will play a primary role in the recommendation and prescription of drug products that are granted marketing approval. Arrangements with third-party payors and customers are subject to broadly applicable fraud and abuse and other healthcare laws and regulations that may constrain the business or financial arrangements and relationships through which we market, sell and distribute our products for which we obtain marketing approval. Restrictions under applicable federal and state healthcare laws and regulations, include the following:

- the federal healthcare Anti-Kickback Statute prohibits, among other things, persons from knowingly and willfully soliciting, offering, receiving or providing remuneration, directly or indirectly, in cash or in kind, to induce or reward either the referral of an individual for, or the purchase, order or recommendation of, any good or service, for which payment may be made, in whole or in part, under a federal healthcare program such as Medicare and Medicaid;
- the federal Foreign Corrupt Practices Act (FCPA) prohibits, among other things, U.S. corporations and their persons acting on their behalf from offering, promising, authorizing or making payments to any foreign government official, including certain healthcare professionals in many countries, in an attempt to obtain or retain business or otherwise seek preferential treatment abroad;
- the federal False Claims Act imposes civil penalties, and provides for civil whistleblower or qui tam actions, against individuals or entities for knowingly presenting, or causing to be presented, to the federal government, claims for payment that are false or fraudulent, making a false statement material to a false or fraudulent claim, or improperly avoiding, decreasing, or concealing an obligation to pay money to the federal government;
- the federal Health Insurance Portability and Accountability Act of 1996 (HIPAA) imposes criminal and civil liability for executing a scheme to defraud any healthcare benefit program or making false statements relating to healthcare matters;
- HIPAA, as amended by the Health Information Technology for Economic and Clinical Health Act and its implementing regulations, also imposes obligations, including mandatory contractual terms, with respect to safeguarding the privacy, security and transmission of individually identifiable health information;
- the federal false statements statute prohibits knowingly and willfully falsifying, concealing or covering up a material fact or making any materially false statement in connection with the delivery of or payment for healthcare benefits, items or services;
- the federal Physician Payment Sunshine Act requires manufacturers of drugs, devices, biologics and medical supplies to report to the Department of Health and Human Services information related to payments and other transfers of value to physicians and teaching hospitals and physician ownership and investment interests; and
- analogous state and foreign laws and regulations, such as state anti-kickback and false claims laws, may apply to sales or marketing arrangements and claims involving healthcare items or services reimbursed by nongovernmental third-party payors, including private insurers.

Some state laws require pharmaceutical companies to comply with the pharmaceutical industry's voluntary compliance guidelines and the relevant compliance guidance promulgated by the federal government in addition to requiring drug manufacturers to report information related to payments to physicians and other health care providers or marketing expenditures. State and foreign laws also govern the privacy and security of health information in some circumstances, many of which differ from each other in significant ways and often are not preempted by HIPAA, thus complicating compliance efforts.

#### Certain Financial Information

The financial information required in this Item 1 is included in Part II, Item 6 and Part IV, Item 15 of this Annual Report Form 10-K.



## Corporate Information

Arrowhead was originally incorporated in South Dakota in 1989, and was reincorporated in Delaware in 2000. The Company's principal executive offices are located at 225 South Lake Avenue, Suite 1050, Pasadena, California 91101, and its telephone number is (626) 304-3400. We also operate a research and development facility in Madison, Wisconsin. As of September 30, 2015, Arrowhead had 104 full-time employees.

## Investor Information

Our internet website address is <http://www.arrowheadresearch.com>. Our reports filed or furnished pursuant to Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended, including our annual reports on Form 10-K, our quarterly reports on Form 10-Q and our current reports on Form 8-K, and amendments to those reports, are accessible through our website, free of charge, as soon as reasonably practicable after these reports are filed electronically with, or otherwise furnished to, the SEC. These SEC reports can be accessed through the "Investors" section of our website.

You may read and copy any materials we file with the SEC at the SEC's Public Reference Room at 100 F Street, NE, Washington, DC 20549. You may obtain information on the operation of the Public Reference Room by calling the SEC at 1-800-SEC-0330. The SEC also maintains an Internet website that contains reports, proxy and information statements, and other information regarding Arrowhead and other issuers that file electronically with the SEC. The SEC's Internet website address is <http://www.sec.gov>.

## ITEM 1A. RISK FACTORS

You should carefully consider the risks discussed below and all of the other information contained in this report in evaluating us and an investment in our securities. If any of the following risks and uncertainties should occur, they could have a material adverse effect on our business, financial condition or results of operations. In that case, the trading price of our Common Stock could decline. Additionally, we note that we have accrued net losses annually since inception given the stage of our drug development. We urge you to consider our likelihood of success and prospects in light of the risks, expenses and difficulties frequently encountered by entities at similar stages of development.

### Risks Related to Our Company

Drug development is time consuming, expensive and risky.

We are focused on technology related to new and improved pharmaceutical candidates. Product candidates that appear promising in the early phases of development, such as in animal and early human clinical trials, often fail to reach the market for a number of reasons, such as:

Clinical trial results may be unacceptable, even though preclinical trial results were promising;

Inefficacy and/or harmful side effects in humans or animals;

The necessary regulatory bodies, such as the U.S. Food and Drug Administration, may not approve our potential product for the intended use, or at all; and

Manufacturing and distribution may be uneconomical.

For example, the positive pre-clinical results in animals for ARC-520, ARC-AAT, and our other programs may not be replicated in human clinical studies. These programs may be also found to be unsafe in humans, particularly at higher doses needed to achieve the desired levels of efficacy. Also, the positive safety results for ARC-520 from single dose human clinical studies may not be replicated in other human studies, including multiple dose studies. Clinical trial results are frequently susceptible to varying interpretations by scientists, medical personnel, regulatory personnel, statisticians and others, which often delays, limits, or prevents further clinical development or regulatory approvals of potential products. Clinical trials can take many years to complete, including the process of study design, clinical site selection and the recruitment of patients. As a result, we can experience significant delays in completing clinical studies, which can increase the cost of developing a drug candidate and shorten the time that an approved product may be protected by patents. If our drug candidates are not successful in human clinical trials, we may be forced to curtail or abandon certain development programs. If we experience significant delays in commencing or completing our clinical studies, we could suffer from significant cost overruns, which could negatively affect our capital resources and our ability to complete these studies.

There are substantial risks inherent in attempting to commercialize new drugs, and, as a result, we may not be able to successfully develop products for commercial use.

Our research and development efforts involve therapeutics based on RNA interference and our delivery systems, which are largely unproven technologies. Our scientists and engineers are working on developing technology in the early stages. However, such technology's commercial feasibility and acceptance are unknown. Scientific research and development requires significant amounts of capital and takes a long time to reach commercial viability, if it can be

achieved at all. To date, our research and development projects have not produced commercially viable drugs, and may never do so. During the research and development process, we may experience technological barriers that we may be unable to overcome. Further, certain underlying premises in our development programs, including ARC-520, are not proven. For instance, the theory that knockdown of S-antigen in chronic hepatitis B patients will result in a functional cure is unproven. Thus, even if ARC-520 is successful at reducing S-antigen levels in patients, it may not be a commercially viable drug if there is not a corresponding medical benefit related to the underlying Hepatitis B infection. Similarly, if ARC-AAT successfully reduces the production of mutant alpha-1 antitrypsin in the liver, it may not lead to a reduction of globules in the liver, and even if it leads to a reduction in such globules, this may not lead to other beneficial hepatic changes. It is also unknown at this time what changes in the liver may be required to gain regulatory approval and/or favorable reimbursement,. Because of these and similar uncertainties, it is possible that no commercial products will be successfully developed. If we are unable to successfully develop commercial products, we will be unable to generate revenue or build a sustainable or profitable business.

Our drug candidates are in the early stages of development and because we have a short development history with both RNA interference and our delivery technologies, there is a limited amount of information about us upon which you can evaluate our business and prospects.

We have no approved drugs and thus have not begun to market or generate revenues from the commercialization of any products. We have only a limited history upon which one can evaluate our RNAi therapeutic business as our drug candidates are still at an early stage of development. Thus, we have limited experience and have not yet demonstrated an ability to successfully overcome

many of the risks and uncertainties frequently encountered by companies in new and rapidly evolving fields, particularly in the biopharmaceutical area. For example, to execute our business plan, we will need to successfully:

Execute product development activities using unproven technologies;

Build, maintain and protect a strong intellectual property portfolio;

Demonstrate safety and efficacy of our drug candidates in multiple human clinical studies;

Receive FDA approval and approval from similar foreign regulatory bodies;

Gain market acceptance for the development and commercialization of any drugs we develop;

Ensure our products are reimbursed by commercial and/or government payors at a rate that permits commercial viability;

Develop and maintain successful strategic relationships with suppliers, distributors, and commercial licensing partners; and

Manage our spending and cash requirements as our expenses will increase in the near term if we add programs and additional preclinical and clinical trials.

If we are unsuccessful in accomplishing these objectives, we may not be able to develop products, raise capital, expand our business or continue our operations.

We may be unable to attract revenue-generating collaborations with other pharmaceutical and biotech companies to advance our drug candidates.

Our business strategy includes obtaining collaborations with other pharmaceutical and biotech companies to support the development of our therapeutic siRNA and other drug candidates. We may not be able to attract such partners, and even if we are able to enter into such partnerships, the terms may be less favorable than anticipated. Further, entering into partnership agreements may limit our commercialization options and/or require us to share revenues and profits with our partners. If we are unable to enter into any of these agreements on commercially attractive terms, we may be unable to develop certain programs due to a limited availability of resources, and we may need to raise additional capital, which could be dilutive to our existing investors.

We will need to achieve commercial acceptance of our drug candidates to generate revenues and achieve profitability.

Even if our research and development efforts yield technologically feasible applications, we may not successfully develop commercial products. Drug development takes years of study in human clinical trials prior to regulatory approval, and, even if we are successful, it may not be on a timely basis. During our drug development period, superior competitive technologies may be introduced which could diminish or extinguish the potential commercial uses for our drug candidates. Additionally, the degree to which the medical community and consumers will adopt any product we develop is uncertain. The rate and degree of market acceptance of our products will depend on a number of factors, including the establishment and demonstration in the medical community of the clinical efficacy and safety of our products, their potential advantage over alternative treatments, and the costs to patients and third-party payors, including insurance companies and Medicare. Recent efforts in the United States and abroad to reduce overall healthcare spending has put significant pressure on the price of prescription drugs and certain companies have been publicly criticized for the relatively high cost of their therapies. These pressures may force us to sell any approved

drugs at a lower price than we or analysts may anticipate, or may result in lower levels of reimbursement and coverage from third parties.

We cannot predict whether significant commercial market acceptance for our products, if approved, will ever develop, and we cannot reliably estimate the projected size of any such potential market. Our revenue growth and achievement of profitability will depend substantially on our ability to introduce products that will be accepted by the medical community. If we are unable to cost-effectively achieve acceptance of our technology among the medical establishment and patients, or if the associated products do not achieve wide market acceptance, our business will be materially and adversely affected.

#### Risks Related to Our Financial Condition

We have a history of net losses, and we expect to continue to incur net losses and may not achieve or maintain profitability.

We have incurred net losses since our inception, including net losses of \$91.9 million for the year ended September 30, 2015. We expect that our operating losses will continue for the foreseeable future as we continue our drug development and discovery efforts. To achieve profitability, we must, either directly or through licensing and/or partnering relationships, meet certain milestones, successfully develop and obtain regulatory approval for one or more drug candidates and effectively manufacture, market and sell any drugs we successfully develop. Even if we successfully commercialize drug candidates that receive regulatory approval, we may not be able to realize revenues at a level that would allow us to achieve or sustain profitability.

Accordingly, we may never generate significant revenue and, even if we do generate significant revenue, we may never achieve profitability.

We will require substantial additional funds to complete our research and development activities.

Our business currently does not generate the cash that is necessary to finance our operations. Subject to the success of the research and development programs of our company and our partners, and potential licensing or partnering transactions, we will likely need to raise additional capital to:

Fund research and development infrastructure and activities relating to the development of our drug candidates, including pre-clinical and clinical trials and manufacturing to support these efforts;

Fund our general and administrative infrastructure and activities;

Pursue business development opportunities for our technologies;

Add to and protect our intellectual property; and

Retain our management and technical staff.

Our future capital needs depend on many factors, including:

- The scope, duration and expenditures associated with our research and development;
- Regulatory requirements for our clinical trials;
- The extent to which our R&D and clinical efforts are successful;
- The outcome of potential partnering or licensing transactions, if any, and the extent to which our business development efforts result in the acquisition of new programs or technologies;
- Competing technological developments;
- Our intellectual property positions, if any, in our products; and
- The regulatory approval process and regulatory standards for our drug candidates.

We will need to raise additional funds through public or private equity offerings, debt financings or additional strategic alliances and licensing arrangements in the future to continue our operations. We may not be able to obtain additional financing on terms favorable to us, if at all. General market conditions may make it very difficult for us to seek financing from the capital markets, and the terms of any financing may adversely affect the holdings or the rights of our stockholders. For example, if we raise additional funds by issuing equity securities, further dilution to our stockholders will result, which may substantially dilute the value of your investment. In addition, as a condition to

providing additional funds to us, future investors may demand, and may be granted, rights superior to those of existing stockholders. Debt financing, if available, may involve restrictive covenants that could limit our flexibility in conducting future business activities and, in the event of insolvency, would be paid before holders of equity securities received any distribution of corporate assets. In order to raise additional funds through alliance, joint venture or licensing arrangements, we may be required to relinquish rights to our technologies or drug candidates, or grant licenses on terms that are not favorable to us. If adequate funds are not available, we may have to further delay, reduce or eliminate one or more of our planned activities. These actions would likely reduce the market price of our common stock.

If the estimates we make, or the assumptions on which we rely, in preparing our consolidated financial statements prove inaccurate, our actual results may vary from those reflected in our accruals.

Our consolidated financial statements have been prepared in accordance with accounting principles generally accepted in the United States of America (GAAP). The preparation of these consolidated financial statements requires us to make estimates and judgments that affect the reported amounts of our assets, liabilities, revenues and expenses, the amounts of charges accrued by us and related disclosure of contingent assets and liabilities. We base our estimates on historical experience and on various other assumptions that we believe to be reasonable under the circumstances. We cannot assure you, however, that our estimates, or the assumptions underlying them, will be correct.

The investment of our cash, cash equivalents and fixed income marketable securities is subject to risks which may cause losses and affect the liquidity of these investments.

At September 30, 2015, we had \$17.5 million in fixed income marketable securities. These investments are in corporate bonds nearing maturity, but our investments may also include commercial paper, securities issued by the U.S. government obligations, certificates of deposit and money market funds meeting the criteria of our investment policy, which is focused on the preservation of

our capital. These investments are subject to general credit, liquidity, and market and interest rate risks, particularly in the current economic environment. We may realize losses in the fair value of these investments or a complete loss of these investments, which would have a negative effect on our consolidated financial statements. In addition, should our investments cease paying or reduce the amount of interest paid to us, our interest income would suffer. The market risks associated with our investment portfolio may have an adverse effect on our results of operations, liquidity and financial condition.

We may not be able to effectively secure first-tier technologies when competing against other companies or investors.

Our future success may require that we acquire patent rights and know-how to new or complimentary technologies. However, we compete with a substantial number of other companies that may also compete for technologies we desire. In addition, many venture capital firms and other institutional investors, as well as other pharmaceutical and biotech companies, invest in companies seeking to commercialize various types of emerging technologies. Many of these companies have greater financial, scientific and commercial resources than us. Therefore, we may not be able to secure the technologies we desire. Furthermore, should any commercial undertaking by us prove to be successful, there can be no assurance competitors with greater financial resources will not offer competitive products and/or technologies.

#### Risks Associated with Reliance on Third Parties

We will need to establish additional relationships with strategic and development partners to fully develop our drug candidates and market any approved products.

We do not possess all of the financial and development resources necessary to develop and commercialize products that may result from our technologies. Unless we expand our product development capacity and enhance our internal marketing capability, we may need to make appropriate arrangements with strategic partners to develop and commercialize any drug candidates that may be approved. If we do not find appropriate partners, or if our existing arrangements or future agreements are not successful, our ability to develop and commercialize products could be adversely affected. Even if we are able to find collaborative partners, the overall success of the development and commercialization of product candidates in those programs will depend largely on the efforts of other parties and will be beyond our control. In addition, in the event we pursue our commercialization strategy through collaboration or licenses to third parties, there are a variety of technical, business and legal risks, including:

We may not be able to control the amount and timing of resources that our collaborators may be willing or able to devote to the development or commercialization of our drug candidates or to their marketing and distribution; and

Disputes may arise between us and our collaborators that result in the delay or termination of the research, development or commercialization of our drug candidates or that result in costly litigation or arbitration that diverts our management's resources.

The occurrence of any of the above events or other related events could impair our ability to generate revenues and harm our business and financial condition.

We may lose a considerable amount of control over our intellectual property and may not receive anticipated revenues in strategic transactions, particularly where the consideration is contingent on the achievement of development or sales milestones.

Our business model has been to develop new technologies and to utilize the intellectual property created through the research and development process to develop commercially successful products. If the acquirers of our technologies



fail to achieve performance milestones, we may not receive a significant portion of the total value of any sale, license or other strategic transaction.

We rely on outside sources for various components and processes for our products.

We rely on third parties for various components and processes for our product candidates. We may not be able to achieve multiple sourcing because there may be no acceptable second source, other companies may choose not to work with us, or the component or process sought may be so new that a second source does not exist, or does not exist on acceptable terms. There may be a disruption or delay in the performance of our third-party contractors, suppliers or collaborators which is beyond our control. If such third parties are unable to satisfy their commitments to us, the development of our products would be adversely affected. Therefore, it is possible that our development plans will have to be slowed down or stopped completely at times due to our inability to obtain required raw materials, components and outsourced processes at an acceptable cost, if at all, or to get a timely response from vendors.

We have limited manufacturing capability and must rely on third-party manufacturers to manufacture our clinical supplies and commercial products, if and when approved, and if they fail to meet their obligations, the development and commercialization of our products could be adversely affected.

We have limited manufacturing capabilities and experience. ARC-520 and our other drug candidates are composed of multiple components and require specialized formulations for which scale-up and manufacturing could be difficult. We have limited experience

in such scale-up and manufacturing requiring us to depend on a limited number of third parties, who may not be able to deliver in a timely manner, or at all. In order to develop products, apply for regulatory approvals and commercialize our products, we will need to develop, contract for, or otherwise arrange for the necessary manufacturing capabilities. Our internal manufacturing capabilities are limited to small-scale production of material for use in in vitro and in vivo experiments that is not required to be produced under cGMP standards. There are a limited number of manufacturers that supply synthetic siRNAs. There are risks inherent in pharmaceutical manufacturing that could affect the ability of our contract manufacturers to meet our delivery time requirements or provide adequate amounts of material to meet our needs. Included in these risks are synthesis and purification failures and contamination during the manufacturing process, which could result in unusable product and cause delays in our development process, as well as additional expense to us.

Additionally, our product candidates have not yet been manufactured for commercial use. If any of our product candidates become approved for commercial sale, we will need to establish third-party manufacturing capacity. A third-party manufacturing partner may require us to fund capital improvements to support the scale-up of manufacturing and related activities. The third-party manufacturer may not be able to establish scaled manufacturing capacity for an approved product in a timely or economic manner, if at all. If a manufacturer is unable to provide commercial quantities of such an approved product, we will have to successfully transfer manufacturing technology to a different manufacturer. Engaging a new manufacturer for such an approved product could require us to conduct comparative studies or utilize other means to determine bioequivalence of the new and prior manufacturers' products, which could delay or prevent our ability to commercialize such an approved product. If any of these manufacturers is unable or unwilling to increase its manufacturing capacity or if we are unable to establish alternative arrangements on a timely basis or on acceptable terms, the development and commercialization of such an approved product may be delayed or there may be a shortage in supply. Any inability to manufacture our product candidates or future approved drugs in sufficient quantities when needed would seriously harm our business.

Manufacturers of our approved products, if any, must comply with cGMP requirements enforced by the FDA and foreign health authorities through facilities inspection programs. These requirements include quality control, quality assurance, and the maintenance of records and documentation. Manufacturers of our approved products, if any, may be unable to comply with these cGMP requirements and with other FDA, state, and foreign regulatory requirements. We have little control over our manufacturers' compliance with these regulations and standards. A failure to comply with these requirements may result in fines and civil penalties, suspension of production, suspension or delay in product approval, product seizure or recall, or withdrawal of product approval. If the safety of any quantities supplied is compromised due to our manufacturer's failure to adhere to applicable laws or for other reasons, we may not be able to obtain regulatory approval for or successfully commercialize our products, which would seriously harm our business.

We rely on third parties to conduct our clinical trials, and if they fail to fulfill their obligations, our development plans may be adversely affected.

We rely on independent clinical investigators, contract research organizations and other third-party service providers to assist us in managing, monitoring and otherwise carrying out our clinical trials. We have contracted with, and we plan to continue to contract with, certain third-parties to provide certain services, including site selection, enrollment, monitoring and data management services. Although we depend heavily on these parties, we do not control them and therefore, we cannot be assured that these third-parties will adequately perform all of their contractual obligations to us. If our third-party service providers cannot adequately and timely fulfill their obligations to us, or if the quality and accuracy of our clinical trial data is compromised due to failure by such third-parties to adhere to our protocols or regulatory requirements or if such third-parties otherwise fail to meet deadlines, our development plans may be delayed or terminated. Further, if clinical study results are compromised, then we may need to repeat the affected studies, which could result in significant additional costs and delays to us.

Risks related to managing our operations

Our success depends on the attraction and retention of senior management and scientists with relevant expertise.

Our future success depends to a significant extent on the continued services of our key employees, including our senior scientific, technical and managerial personnel. We do not maintain key man life insurance for any of our executives and we do not maintain employment agreements with most senior officers or employees. Competition for qualified employees in the pharmaceutical industry is high, and our ability to execute our strategy also will depend on our ability to continue to attract and retain qualified scientists and management. If we are unable to find, hire and retain qualified individuals, we will have difficulty implementing our business plan in a timely manner, or at all.

We may have difficulty expanding our operations successfully as we evolve from a company primarily involved in discovery and pre-clinical testing into one that develops and commercializes drugs.

We expect that as we increase the number of product candidates we are developing we will also need to expand our operations. This expected growth may place a strain on our administrative and operational infrastructure. As product candidates we develop enter and advance through clinical trials, we will need to expand our development, regulatory, manufacturing, marketing and sales capabilities or contract with other organizations to provide these capabilities for us. As our operations expand due to our development progress, we expect that we will need to manage additional relationships with various collaborators, suppliers and other organizations. Our ability to manage our operations and future growth will require us to continue to improve our operational, financial and management controls, reporting systems and procedures. We may not be able to implement improvements to our management information and control systems in an efficient or timely manner and may discover deficiencies in existing systems and controls.

Our business and operations could suffer in the event of information technology system failures.

Our internal computer systems and those of our contractors and consultants are vulnerable to damage from computer viruses, unauthorized access, natural disasters, terrorism, war, and telecommunication and electrical failures. Such events could cause interruption of our operations and loss of intellectual property. For example, the loss of pre-clinical trial data or data from completed or ongoing clinical trials for our product candidates could result in delays in our regulatory filings and development efforts and significantly increase our costs. To the extent that any disruption or security breach were to result in a loss of or damage to our data, or inappropriate disclosure of confidential, proprietary or private information, we could incur liability, we could lose valuable trade secret rights, and the development of our product candidates could be delayed.

#### Risks related to development and regulatory approval of our product candidates

The manufacture and sale of human therapeutic products are governed by a variety of statutes and regulations. There can be no assurance that our product candidates will obtain regulatory approval.

The sale of human therapeutic products in the U.S. and foreign jurisdictions is subject to extensive and time consuming regulatory approval which requires:

- controlled research and human clinical testing;
- establishment of the safety and efficacy of the product;
- government review and approval of a submission containing manufacturing, pre-clinical and clinical data; and
- adherence to cGMP regulations during production and storage.

The product candidates we currently have under development will require significant development, pre-clinical and clinical testing and investment of significant funds before their commercialization. Some of our product candidates, if approved, will require the completion of post-market studies. There can be no assurance that any of our products will be further developed and approved. The process of completing clinical testing and obtaining required approvals will take a number of years and require the use of substantial resources. Further, there can be no assurance that product candidates employing a new technology will be shown to be safe and effective in clinical trials or receive applicable regulatory approvals. If we fail to obtain regulatory approvals for any or all of our products, we will not be able to market such product and our operations may be adversely affected.

If testing of a particular product candidate does not yield successful results, then we will be unable to commercialize that product candidate.

We must demonstrate our product candidates' safety and efficacy in humans through extensive clinical testing. Our research and development programs are at an early stage of development. We may experience numerous unforeseen events during, or as a result of, the testing process that could delay or prevent commercialization of any products, including the following:

- the results of pre-clinical studies may be inconclusive, or they may not be indicative of results that will be obtained in human clinical trials;
- safety and efficacy results attained in early human clinical trials may not be indicative of results that are obtained in later clinical trials;
- after reviewing test results, we may abandon projects that we might previously have believed to be promising;
- we or our regulators, may suspend or terminate clinical trials because the participating subjects or patients are being exposed to unacceptable health risks; and
- our product candidates may not have the desired effects or may include undesirable side effects or other characteristics that preclude regulatory approval or limit their commercial use if approved.

Clinical testing is very expensive, takes many years, and the outcomes are uncertain. The data collected from our clinical trials may not be sufficient to support approval of our product candidates by the regulatory authorities. The clinical trials of our product candidates may not be completed on schedule, and the regulatory authorities may not ultimately approve any of our product candidates for commercial sale. If we fail to adequately demonstrate the safety and efficacy of a product candidate, it would prevent regulatory approval of the product candidate, which could prevent us from achieving profitability.

It may take us longer than we are currently projecting to complete our clinical trials, and we may not be able to complete them at all.

Although for planning purposes, we project the commencement, continuation and completion of our clinical trials, a number of factors, including scheduling conflicts with participating clinicians and clinical institutions, and difficulties in identifying or enrolling patients who meet trial eligibility criteria, may cause significant delays. We may not commence or complete clinical trials involving any of our product candidates as projected or may not conduct them successfully.

Even if our clinical studies are successful and we achieve regulatory approval, the approved product label may be more limited than we or analysts anticipate, which could limit the commercial opportunity for our product candidates.

At the time drugs are approved for commercialization, they are given a “product label” from the FDA or other regulatory body. In most countries this label sets forth the approved indication for marketing, and identifies potential safety concerns for prescribing physicians and patients. While we intend to seek as broad a product label as possible for our product candidates, we may receive a narrower label than is expected by either us or third parties, such as stockholders and securities analysts. For example, any approved products may only be indicated to treat refractory patients (i.e., those who have failed some other first-line therapy). Similarly, it is possible that only a specific sub-set of patients safely responds to our drug candidates. As a result, our product candidates, even if successful in clinical trials, could be approved only for a subset of patients. Additionally, safety considerations may result in contraindications that could further limit the scope of an approved product label. Any of these or other safety and efficacy considerations could limit the commercial opportunity for our product candidates.

Even if our product candidates are approved for commercialization, future regulatory reviews or inspections may result in the suspension or withdrawal of one or more of our products, closure of a facility or enforcement of substantial fines.

If regulatory approval to sell any of our product candidates is received, regulatory agencies will subject any marketed product(s), as well as the manufacturing facilities, to continual review and periodic inspection. If previously unknown problems with a product or manufacturing and laboratory facility are discovered, or we fail to comply with applicable regulatory approval requirements, a regulatory agency may impose restrictions on that product or on us. The agency may require the withdrawal of the product from the market, closure of the facility or enforcement of substantial fines.

We face potential product liability exposure, and if successful claims are brought against us, we may incur substantial liability for a product candidate and may have to limit its commercialization.

The use of our product candidates in clinical trials and the sale of any products for which we obtain marketing approval expose us to the risk of product liability claims. Product liability claims might be brought against us by clinical trial participants, consumers, health-care providers, pharmaceutical companies, or others selling our products. If we cannot successfully defend ourselves against these claims, we may incur substantial liabilities. Regardless of merit or eventual outcomes of such claims, product liability claims may result in:

- decreased demand for our product candidates;

- impairment of our business reputation;
  - withdrawal of clinical trial participants;
  - costs of litigation;
  - substantial monetary awards to patients or other claimants;
  - loss of revenues; and
  - the inability to commercialize our product candidates.
- Although we currently have liability insurance for our clinical trials, our insurance coverage may not be sufficient to reimburse us for all expenses or losses we may suffer. Moreover, insurance coverage is becoming increasingly expensive and, in the future, we may not be able to maintain insurance coverage at a reasonable cost or in sufficient amounts to protect us against losses.

If a natural or man-made disaster strikes our research and development facility or otherwise affects our business, it could delay our progress developing our product candidates.

We conduct research and development in a facility in Madison, Wisconsin. The facilities and the equipment we use are costly to replace and require substantial lead time to repair or replace. Our facilities may be harmed by natural or man-made disasters, including, without limitation, earthquakes, floods, fires and acts of terrorism; and if our facilities are affected by a disaster, our development efforts would be delayed. Significant delays in our development efforts could materially impact our ability to obtain regulatory approval and to commercialize our products. Any insurance we maintain against damage to our property and the disruption of our business due to disaster may not be sufficient to cover all of our potential losses and may not continue to be available to us on acceptable terms, or at all. In addition, our development activities could be harmed or delayed by a shutdown of the U.S. government, including the FDA.

The successful commercialization of our product candidates, if approved, will depend in part on the extent to which government authorities and health insurers establish adequate reimbursement levels and pricing policies.

Sales of any approved drug candidate will depend in part on the availability of coverage and reimbursement from third-party payers such as government insurance programs, including Medicare and Medicaid, private health insurers, health maintenance organizations and other health care related organizations, who are increasingly challenging the price of medical products and services. Accordingly, coverage and reimbursement may be uncertain. Adoption of any drug by the medical community may be limited if third-party payers will not offer coverage. Additionally, significant uncertainty exists as to the reimbursement status of newly approved drugs. Cost control initiatives may decrease coverage and payment levels for any drug and, in turn, the price that we will be able to charge and/or the volume of our sales. We are unable to predict all changes to the coverage or reimbursement methodologies that will be applied by private or government payers. Any denial of private or government payer coverage or inadequate reimbursement could harm our business and reduce our revenue. If we partner with third parties with respect to any of our product candidates, we may be reliant on that partner to obtain reimbursement from government and private payors for the drug, if approved, and any failure of that partner to establish adequate reimbursement could have a negative impact on our revenues and profitability.

In addition, both the federal and state governments in the United States and foreign governments continue to propose and pass new legislation, regulations, and policies affecting coverage and reimbursement rates, which are designed to contain or reduce the cost of health care. Further federal and state proposals and healthcare reforms are likely, which could limit the prices that can be charged for the product candidates that we develop and may further limit our commercial opportunity. There may be future changes that result in reductions in potential coverage and reimbursement levels for our product candidates, if approved and commercialized, and we cannot predict the scope of any future changes or the impact that those changes would have on our operations.

If future reimbursement for approved product candidates, if any, is substantially less than we project, or rebate obligations associated with them are substantially greater than we expect, our net revenue and profitability could be materially and adversely impacted.

We may not enjoy the market exclusivity benefits of our orphan drug designation.

Although we have obtained an orphan designation for ARC-AAT in the treatment of alpha-1 antitrypsin deficiency, ARC-AAT may not be the first product to receive approval for that indication. Under the Orphan Drug Act, the first product with an orphan designation receives market exclusivity, which prohibits FDA from approving the “same” drug for the same indication. The FDA has stated that drugs can be the “same” even when they are not identical, but has not provided guidance with respect to how it will determine “sameness” for RNAi drugs. It is possible that another RNAi drug could be approved for the treatment of alpha-1 antitrypsin deficiency before ARC-AAT, which means that we may not obtain orphan drug exclusivity and could also potentially be blocked from approval until the first product’s orphan drug exclusivity period expires or we demonstrate, if we can, that ARC-AAT is superior. Further, even if we



obtain orphan drug exclusivity for a product, that exclusivity may not effectively protect the product from competition because different drugs can be approved for the same condition. Even after an orphan drug is approved and granted orphan drug exclusivity, the FDA can subsequently approve the same drug for the same condition if the FDA concludes that the later drug is safer, more effective or makes a major contribution to patient care.

#### Risks Related to Our Intellectual Property Rights

Our ability to protect our patents and other proprietary rights is uncertain, exposing us to the possible loss of competitive advantage.

We have licensed rights to pending patents and have filed and expect to continue to file patent applications. Researchers sponsored by us may also file patent applications that we may need to license. Such patent applications may not be available for licensing or may not be economically feasible to license. Certain of our patents may not be granted or may not contain claims of the necessary breadth because, for example, prior patents exist. If a particular patent is not granted, the value of the invention described in the patent would be diminished. Further, even if these patents are granted, they may be difficult to enforce. Even if ultimately

successful, efforts to enforce our patent rights could be expensive, distracting for management, cause our patents to be invalidated or held unenforceable, and thus frustrate commercialization of products. Even if patents are issued and are enforceable, others may develop similar, superior or parallel technologies to any technology developed by us and not infringe on our patents. Our technology may prove to infringe upon patents or rights owned by others. Patent prosecution and maintenance is expensive, and we may be forced to curtail prosecution or maintenance if our cash resources are limited. Thus, the patents held by or licensed to us may not afford us any meaningful competitive advantage. If we are unable to derive value from our licensed or owned intellectual property, the value of your investment may decline.

We are party to technology license agreements with third parties that require us to satisfy obligations to keep them effective and, if these agreements are terminated, our technology and our business would be seriously and adversely affected.

We are party to license agreements with Novartis, Alnylam, City of Hope, and other entities to incorporate their proprietary technologies into our drug products under development. These license agreements require us to pay royalties and satisfy other conditions, including conditions in some cases related to the commercialization of the licensed technology. We may not be able to successfully incorporate these technologies into marketable products or, if we do, sales may not be sufficient to recover the amounts that we are obligated to pay to the licensors. If we fail to satisfy our obligations under these agreements, the terms of the licenses may be materially modified, such as by rendering currently exclusive licenses non-exclusive, or it may give our licensors the right to terminate their respective agreement with us, which would limit our ability to implement our current business plan and harm our business and financial condition.

We may be subject to patent infringement claims, which could result in substantial costs and liability and prevent us from commercializing our potential products.

Because the intellectual property landscape in the fields in which we participate is rapidly evolving and interdisciplinary, it is difficult to conclusively assess our freedom to operate without infringing on third party rights. However, we are currently aware of certain patent rights held by third parties that, if found to be valid and enforceable, could be alleged to render one or more of our business lines infringing. If a claim should be brought and is successful, we may be required to pay substantial damages, be forced to abandon any affected business lines and/or seek a license from the patent holder. In addition, any patent infringement claims brought against us, whether or not successful, may cause us to incur significant expenses and divert the attention of our management and key personnel from other business concerns. These could negatively affect our results of operations and prospects. We cannot be certain that patents owned or licensed by us will not be challenged, potentially successfully, by others.

In addition, if our product candidates infringe the intellectual property rights of third parties, these third parties may assert infringement claims against our customers, licensees, and other parties with whom we have business relationships and we may be required to indemnify those parties for any damages they suffer as a result of these claims. The claims may require us to initiate or defend protracted and costly litigation on behalf of customers, licensees, and other parties regardless of the merits of these claims. If any of these claims succeed, we may be forced to pay damages on behalf of those parties or may be required to obtain licenses for the products they use. If we cannot obtain all necessary licenses on commercially reasonable terms, we may be unable to continue selling such products.

We license patent rights from third-party owners and we rely on such owners to obtain, maintain and enforce the patents underlying such licenses.

We are a party to a number of licenses that give us rights to third-party intellectual property that is necessary or useful for our business. In particular, we have obtained licenses from, among others, Novartis and Alnylam. We also expect to enter into additional licenses to third-party intellectual property in the future.

Our success will depend in part on the ability of our licensors to obtain, maintain and enforce patent protection for our licensed intellectual property, in particular, those patents to which we have secured exclusive rights. Our licensors may not successfully prosecute the patent applications to which we are licensed. Even if patents are issued in respect of these patent applications, our licensors may fail to maintain these patents, may determine not to pursue litigation against other companies that are infringing these patents, or may pursue such litigation less aggressively than we would. Without protection for the intellectual property we license, other companies might be able to offer substantially identical products for sale, which could adversely affect our competitive business position and harm our business prospects.

Our technology licensed from various third parties may be subject to retained rights.

Our licensors often retain certain rights under their agreements with us, including the right to use the underlying technology for noncommercial academic and research use, to publish general scientific findings from research related to the technology, and to make customary scientific and scholarly disclosures of information relating to the technology. It is difficult to monitor whether our licensors

limit their use of the technology to these uses, and we could incur substantial expenses to enforce our rights to our licensed technology in the event of misuse.

Confidentiality agreements with employees and others may not adequately prevent disclosure of trade secrets and other proprietary information.

In order to protect our proprietary technology and processes, we rely in part on confidentiality agreements with our collaborators, employees, consultants, outside scientific collaborators and sponsored researchers, and other advisors. These agreements may not effectively prevent disclosure of confidential information and may not provide an adequate remedy in the event of unauthorized disclosure of confidential information. In addition, others may independently discover trade secrets and proprietary information, and in such cases we could not assert any trade secret rights against such party. Costly and time-consuming litigation could be necessary to enforce and determine the scope of our proprietary rights, and failure to obtain or maintain trade secret protection could adversely affect our competitive business position.

#### Risks Related to our Stock

Stockholder equity interest may be substantially diluted in any additional financing.

Our certificate of incorporation authorizes the issuance of 145,000,000 shares of Common Stock and 5,000,000 shares of Preferred Stock, on such terms and at such prices as our Board of Directors may determine. The following serves as a summary of share issuance activity during the fiscal year ended September 30, 2015:

- Issued 250,143 shares of Common Stock pursuant to the exercise of stock options, warrants and exchange rights and the vesting of restricted stock units;
- Issued 3,321,383 shares of Common Stock in consideration for the assets acquired as part of the Novartis asset acquisition in March 2015; and
- Issued 1,316,215 shares of Common Stock pursuant to the conversion of certain Preferred Stock held by the Company's shareholders.

As of September 30, 2015, we had 59,544,677 shares of Common Stock issued and outstanding. The issuance of additional securities in financing transactions by us or through the exercise of options or warrants will dilute the equity interests of our existing stockholders, perhaps substantially, and could result in dilution in the tangible net book value of a share of our Common Stock, depending upon the price and other terms on which the additional shares are issued.

Our Common Stock price has fluctuated significantly over the last several years and may continue to do so in the future, without regard to our results of operations and prospects.

Because we are early in the stage of our drug development, there are few objective metrics by which our progress may be measured. Consequently, we expect that the market price of our Common Stock will likely continue to fluctuate significantly. We may not generate substantial revenue from the license or sale of our technology for several years, if at all. In the absence of product revenue as a measure of our operating performance, we anticipate that investors and market analysts will assess our performance by considering factors such as:

Announcements of developments related to our business;

Our ability to enter into or extend investigation phase, development phase, commercialization phase and other agreements with new and/or existing partners;

Announcements regarding the status of any or all of our collaborations or products, including clinical trial results;

Market perception and/or investor sentiment regarding our technology;

Announcements of actions taken by regulatory authorities; such as the U.S. Food and Drug Administration;

Announcements regarding developments in the RNA interference or biotechnology fields in general;

Announcements regarding clinical trial results with our products or competitors' products;

Market perception and/or announcements regarding other companies developing products in the field of biotechnology generally or specifically RNA interference;

The issuance of competitive patents or disallowance or loss of our patent rights;

The addition or departure of key executives; and

Variations in our operating results.

We will not have control over many of these factors but expect that they may influence our stock price. As a result, our stock price may be volatile and such volatility could result in the loss of all or part of your investment.

Litigation claims may result in financial losses or harm our reputation and may divert management resources.

When the market price of a stock is volatile, holders of that stock have often initiated securities class action litigation against the company that issued the stock. Certain of our stockholders have recently brought such lawsuits against us, pursuant to which we could incur substantial costs. We cannot predict with certainty the eventual outcome of this or any other litigation, arbitration or third-party inquiry. We may not be successful in defending ourselves or asserting our rights in current or future lawsuits, investigations, or claims that have been or may be brought against us and, as a result, our business could be materially harmed. These lawsuits, arbitrations, investigations or claims may result in large judgments or settlements against us, any of which could have a negative effect on our financial performance and business. Additionally, lawsuits, arbitrations and investigations can be expensive to defend, whether or not the lawsuit, arbitration or investigation has merit, and the defense of these actions may divert the attention of our management and other resources that would otherwise be engaged in running our business.

The market for purchases and sales of our Common Stock may be limited, and the sale of a limited number of shares could cause the price to fall sharply.

Although our Common Stock is listed for trading on the NASDAQ Global Select Market, at various times our securities have been relatively thinly traded. Investor trading patterns could serve to exacerbate the volatility of the price of our stock. For example, mandatory sales of our Common Stock by institutional holders could be triggered if an investment in our Common Stock no longer satisfies their investment standards and guidelines. It may be difficult to sell shares of our Common Stock quickly without significantly depressing the value of the stock. Unless we are successful in developing continued investor interest in our stock, sales of our stock could result in major fluctuations in the price of the stock.

If securities or industry analysts do not publish research reports about our business or if they make adverse recommendations regarding an investment in our stock, our stock price and trading volume may decline.

The trading market for our Common Stock can be influenced by the research and reports that industry or securities analysts publish about our business. Currently, coverage of our Company by industry and securities analysts is limited. Investors have many investment opportunities and may limit their investments to companies that receive greater coverage from analysts. If additional industry or securities analysts do not commence coverage of the Company, the trading price of our stock could be negatively impacted. If one or more of the analysts downgrade our stock or comment negatively on our prospects, our stock price may decline. If one or more of these analysts cease to cover our industry or us or fail to publish reports about the Company regularly, our Common Stock could lose visibility in the financial markets, which could also cause our stock price or trading volume to decline. Further, incorrect judgments, estimates or assumptions made by research analysts may adversely affect our stock price, particularly if subsequent performance falls below the levels that were projected by the research analyst(s), even if we did not set or endorse such expectations. Any of these events could cause further volatility in our stock price and could result in substantial declines in the value of our stock.

We do not intend to declare cash dividends on our Common Stock.

We will not distribute cash to our stockholders unless and until we can develop sufficient funds from operations to meet our ongoing needs and implement our business plan. The time frame for that is unpredictable and investors

should not expect dividends in the near future, if at all.

Our Board of Directors has the authority to issue shares of “blank check” preferred stock, which may make an acquisition of the Company by another company more difficult.

We have adopted and may in the future adopt certain measures that may have the effect of delaying, deferring or preventing a takeover or other change in control of the Company that a holder of our Common Stock might consider in its best interest. Specifically, our Board of Directors, without further action by our stockholders, currently has the authority to issue up to 5,000,000 shares of preferred stock and to fix the rights (including voting rights), preferences and privileges of these shares (“blank check” preferred). Such preferred stock may have rights, including economic rights, senior to our Common Stock.

ITEM 1B. UNRESOLVED STAFF COMMENTS

None.

ITEM 2. PROPERTIES

The Company does not own any real property. The following table summarizes the company's leased facilities as of September 30, 2015. The Company does not own any real property.

	Office Space	Monthly Rent	Lease Commencement	Lease Term
Pasadena, California	8,500 sq. ft.	\$24,000	August, 16, 2012	7 years
Madison, Wisconsin	27,000 sq. ft.	\$79,000	February, 16, 2009	10 years
Middleton, Wisconsin	2,900 sq. ft.	\$6,000	May, 18, 2015	1 year

ITEM 3. LEGAL PROCEEDINGS

Legal Proceedings are set forth in our financial statement schedules in Part IV, Item 15 of this Annual Report and are incorporated herein by reference. See Note 7 — Commitments and Contingencies of Notes to Consolidated Financial Statements of Part IV, Item 15. Exhibits and Financial Statement Schedules.

ITEM 4. MINE SAFETY DISCLOSURES

Not applicable.

PART II

ITEM MARKET FOR REGISTRANT'S COMMON EQUITY, RELATED STOCKHOLDER MATTERS AND  
5. ISSUER PURCHASES OF EQUITY SECURITIES

Price Range of Common Stock

Our Common Stock is traded on the NASDAQ Global Select Market under the symbol "ARWR". The following table sets forth the high and low sales prices for a share of the Company's Common Stock during each period indicated.



	Fiscal Year Ended September 30,			
	2015		2014	
	High	Low	High	Low
1st Quarter	\$14.03	\$5.00	\$11.07	\$5.86
2nd Quarter	9.06	6.15	26.57	9.92
3rd Quarter	8.00	6.08	18.28	9.79
4th Quarter	7.62	5.01	16.96	10.72

#### Shares Outstanding

At December 11, 2015, 59,554,677 shares of the Company's Common Stock were issued and outstanding, and were owned by 135 stockholders of record, based on information provided by the Company's transfer agent.

#### Dividends

The Company has never paid dividends on its Common Stock and does not anticipate that it will do so in the foreseeable future.

#### Securities Authorized for Issuance Under the Equity Compensation Plans

The disclosure required under this item related to equity compensation plans is incorporated by reference from Item 12 of Part III of this Annual Report on Form 10-K.

#### Sales of Unregistered Securities

All information under this Item has been previously reported on our Current Reports on Form 8-K.

#### Repurchases of Equity Securities

We did not repurchase any shares of our Common Stock during the years ended September 30, 2015, 2014 and 2013.

#### Performance Graph

The following performance graph shall not be deemed “soliciting material” or to be “filed” with the SEC, nor shall such information be incorporated by reference into any future filing under the Securities Act of 1933 or Securities Exchange Act of 1934, each as amended, except to the extent that we specifically incorporate it by reference into such filing. The graph compares the cumulative 5-year total return to shareholders on our Common Stock relative to the cumulative total returns of the NASDAQ Composite Index and the NASDAQ Biotechnology Index. We selected the NASDAQ Biotechnology Index because we believe the index reflects the market conditions within the industry in which we primarily operate. The comparison of total return on investment, defined as the change in year-end stock price plus reinvested dividends, for each of the periods assumes that \$100 was invested on September 30, 2010, in each of our Common Stock, the NASDAQ Composite Index and the NASDAQ Biotechnology Index, with investment weighted on the basis of market capitalization.

The comparisons in the following graph are based on historical data and are not intended to forecast the possible future performance of our Common Stock.

## ITEM 6. SELECTED FINANCIAL DATA

The following selected financial data has been derived from our audited consolidated financial statements and should be read

in conjunction with the consolidated financial statements, the related notes thereto and the independent auditors' report thereon, and

"Management's Discussion and Analysis of Financial Condition and Results of Operations," which are included elsewhere in this

Form 10-K and in previously filed annual reports on Form 10-K of Arrowhead Research Corporation.

	Year Ended September				
	2015	2014	2013	2012	2011
<b>OPERATING SUMMARY</b>					
REVENUE	\$382,000	\$175,000	\$290,266	\$146,875	\$296,139
<b>OPERATING EXPENSES</b>					
Research and development	47,267,361	23,138,050	8,705,627	5,391,463	3,277,760
Acquired in-process research and development	10,142,786	-	-	-	-
Salaries and payroll-related costs	16,554,008	12,829,355	6,667,669	6,414,921	1,408,366
General and administrative expenses	7,931,184	5,894,008	3,488,864	6,439,323	3,821,550
Stock-based compensation	10,232,897	5,696,173	1,536,271	1,241,404	1,376,921
Depreciation and amortization	2,336,207	1,345,655	1,751,412	1,748,975	241,808
Impairment expense	-	2,172,387	1,308,047	-	-
Contingent consideration - fair value adjustments	1,891,533	2,375,658	1,421,652	-	-
TOTAL OPERATING EXPENSES (a)	96,355,976	53,451,286	24,879,542	21,236,086	10,126,405
OPERATING LOSS	(95,973,976 )	(53,276,286 )	(24,589,276 )	(21,089,211 )	(9,830,266 )
<b>LOSS FROM CONTINUING OPERATIONS</b>					
Income (loss) from discontinued operations	-	-	(354 )	(80 )	1,373,396
Gain on disposal of discontinued operations	-	-	-	-	3,919,213
NET LOSS	(91,940,882 )	(58,725,412 )	(31,703,433 )	(22,110,723 )	(3,492,399 )
Net (gain) loss attributable to non-controlling interests	-	95,222	560,144	984,795	363,514
NET LOSS ATTRIBUTABLE TO ARROWHEAD	\$(91,940,882 )	\$(58,630,190 )	\$(31,143,289 )	\$(21,125,928 )	\$(3,128,885 )
<b>EARNINGS PER SHARE (BASIC):</b>					
Income (loss) from continuing operations attributable to Arrowhead					
common shareholders	\$(1.60 )	\$(1.25 )	\$(1.30 )	\$(1.90 )	\$(1.18 )
Income (loss) from discontinued operations attributable to Arrowhead	\$-	\$-	\$-	\$-	\$0.74

common shareholders					
Net Income (Loss) attributable to Arrowhead common shareholders	\$(1.60)	) \$(1.25)	) \$ (1.30)	) \$(1.90)	) \$(0.44)

## EARNINGS PER SHARE

(DILUTED):

Income (loss) from continuing operations attributable to Arrowhead					
common shareholders	\$(1.60)	) \$(1.25)	) \$ (1.30)	) \$(1.90)	) \$(1.08)

Income (loss) from discontinued operations attributable to Arrowhead					
common shareholders	\$-	\$-	\$ -	\$-	\$0.68

Net Income (Loss) attributable to Arrowhead common shareholders	\$(1.60)	) \$(1.25)	) \$ (1.30)	) \$(1.90)	) \$(0.40)
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Weighted average shares outstanding - basic	57,358,442	46,933,030	24,002,224	11,129,766	7,181,121
Weighted average shares outstanding - diluted	57,358,442	46,933,030	24,002,224	11,129,766	7,830,407

CASH DIVIDEND PAID PER COMMON SHARE	\$-	\$-	\$ -	\$-	\$-
	September 30, 2015	2014	2013	2012	2011

## FINANCIAL POSITION SUMMARY

CASH AND CASH EQUIVALENTS (b)	\$81,214,354	\$132,510,610	\$ 19,114,444	\$3,377,288	\$7,507,389
SHORT- AND LONG-TERM INVESTMENTS (b)	17,539,902	44,741,378	10,732,414	106,500	634,585
TOTAL ASSETS (b)	132,267,914	182,816,756	37,329,631	16,527,818	15,888,563
CAPITAL LEASE OBLIGATIONS	758,340	972,331	1,282,458	1,497,259	-
OTHER LONG-TERM OBLIGATIONS	6,204,917	4,226,137	1,808,709	1,108,563	742,446

- (a) The increase in our Total Operating Expenses during the year ended September 30, 2015 is primarily due to the progress achieved on our lead clinical candidate for HBV, ARC-520. The primary costs incurred during fiscal year 2015 related to manufacturing of clinical supplies for the ARC-520 phase 2b clinical trial, toxicology studies, and the cost associated with the administration of the clinical trials. Additionally, the Company incurred a \$10.1 million expense related to the acquisition of in-process research and development from the Novartis asset acquisition in March 2015.
- (b) The decrease in Cash and Cash Equivalents, Short- and Long-Term Investments, and Total Assets as of September 30, 2015 as compared to September 30, 2014, primarily relates to expenditures discussed above.



ITEM 7. MANAGEMENT'S DISCUSSION AND ANALYSIS OF FINANCIAL CONDITION AND RESULTS OF OPERATIONS

Description of Business

Unless otherwise noted, (1) the term "Arrowhead" refers to Arrowhead Research Corporation, a Delaware corporation, (2) the terms the "Company," "we," "us," and "our," refer to the ongoing business operations of Arrowhead and its Subsidiaries, whether conducted through Arrowhead or a subsidiary of Arrowhead, (3) the term "Subsidiaries" refers collectively to Arrowhead Madison Inc. ("Arrowhead Madison"), Arrowhead Australia Pty Ltd ("Arrowhead Australia"), and Ablaris Therapeutics, Inc. ("Ablaris"), (4) the term "Common Stock" refers to Arrowhead's Common Stock, (5) the term "Preferred Stock" refers to Arrowhead's Preferred Stock and the term "Stockholder(s)" refers to the holders of Arrowhead Common Stock.

Overview

Arrowhead Research develops novel drugs to treat intractable diseases by silencing the genes that cause them. Using the industry's broadest portfolio of RNA chemistries and efficient modes of delivery, Arrowhead therapies trigger the RNA interference mechanism to induce rapid, deep and durable knockdown of target genes. RNA interference (RNAi) is a mechanism present in living cells that inhibits the expression of a specific gene, thereby affecting the production of a specific protein. Deemed to be one of the most important recent discoveries in life science with the potential to transform medicine, the discoverers of RNAi were awarded a Nobel Prize in 2006 for their work. Arrowhead's RNAi-based therapeutics leverage this natural pathway of gene silencing to target and shut down specific disease causing genes.

Arrowhead operates lab facilities in Madison and Middleton, Wisconsin, where the Company's research and development activities, including the development of RNAi therapeutics, are based. The Company's principal executive offices are located in Pasadena, California.

During fiscal year 2015, the Company continued to develop its lead clinical candidate, ARC-520, for the treatment of chronic hepatitis B as well as its second clinical candidate, ARC-AAT, an RNAi therapeutic designed to treat liver disease associated with Alpha-1 antitrypsin deficiency (AATD). The Company continued its Phase 2 studies in ARC-520, with no dose-limiting toxicities or serious adverse events having been observed to date. The Company submitted an Investigational New Drug application to the FDA in December 2014 for ARC-520 to initiate phase 2b multi-dose studies to determine the depth of hepatitis B surface antigen (HBsAg) reduction following ARC-520 injection. The Company received feedback from the FDA, and based on that feedback the Company adjusted the protocol in order to begin the trial. In April 2015, the application was approved by the FDA. In June 2015, the Company received regulatory clearance in Germany for two additional Phase 2b multiple-dose studies of ARC-520 to be conducted in parallel, and also expects to file with additional Australian, Asian and European agencies to begin additional phase 2 studies.

In May 2015, the Company completed protocol-required dosing of healthy volunteers in an on-going phase 1 study of ARC-AAT, and in July 2015, initiated dosing of patients in Part B of that same study. The study recently received regulatory clearance in the United Kingdom, Germany and New Zealand, and is currently recruiting patients at several sites in those countries. In June 2015, ARC-AAT was granted orphan drug designation by the FDA.

During fiscal year 2015, the Company expanded its candidate pipeline by nominating several additional pre-clinical candidates including: ARC-F12, a treatment for factor 12 (F12) mediated angioedemic and thromboembolic diseases, ARC-HIF2, a treatment for clear cell renal cell carcinoma (ccRCC), and ARC-521, a complementary candidate to ARC-520 for the treatment of chronic hepatitis B infection.

In March 2015, the Company completed the acquisition of Novartis' entire RNAi research and development portfolio and associated assets. The acquisition included assignment of certain patents and patent applications owned or

controlled by Novartis related to RNAi therapeutics, an exclusive license in the RNAi field to other patents and patent applications owned or controlled by Novartis, assignment of a third party license, three pre-clinical RNAi candidates, and other related assets. This acquisition is expected to significantly expand the Company's RNAi capabilities as the assets are integrated.

The Company continues to develop other clinical candidates for future clinical trials, including intravenously-administered therapeutics targeting gene knockdown in the liver, as well as formulations for administering RNAi-based therapeutics by subcutaneous administration. Clinical candidates are tested internally and through GLP toxicology studies at outside laboratories, and drug materials for such studies, and for clinical trials, are contracted to third-party manufacturers when cGMP production is required. 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 program costs, and if the clinical candidates progress through human testing, program costs will increase.

Net losses were \$91.9 million, \$58.7 million and \$31.7 million during the years ended September 30, 2015, 2014 and 2013, respectively. Diluted losses per share were \$1.60, \$1.25 and \$1.30 during the years ended September 30, 2015, 2014 and 2013, respectively.

The Company strengthened its liquidity and financial position through two securities offerings completed in October 2013 and February 2014 which generated approximately \$172.6 million of cash proceeds for the Company. These cash proceeds secured the funding needed to advance both ARC-520 and ARC-AAT into clinical trials and will also assist as the Company expands its pipeline of other clinical candidates. The Company had \$81.2 million of cash and cash equivalents and \$132.3 million of total assets as of September 30, 2015 as compared to \$132.5 million and \$182.8 million as of September 30, 2014, respectively.

The increased operating expenses and net losses and decrease in cash and cash equivalents and total assets reflects expenditures associated with the Company's research and development efforts for its clinical candidates and pipeline, as well as cash paid for the Novartis RNAi assets acquired. Based upon the Company's current cash resources and operating plan, the Company expects to have sufficient liquidity to fund operations for at least the next twelve months.

#### Critical Accounting Policies and Estimates

Management makes certain judgments and uses certain estimates and assumptions when applying GAAP in the preparation of our Consolidated Financial Statements. We evaluate our estimates and judgments on an ongoing basis and base our estimates on historical experience and on assumptions that we believe to be reasonable under the circumstances. Our experience and assumptions form the basis for our judgments about the carrying value of assets and liabilities that are not readily apparent from other sources. Actual results may vary from what we anticipate and different assumptions or estimates about the future could change our reported results. We believe the following accounting policies are the most critical to us, in that they require our most difficult, subjective or complex judgments in the preparation of our consolidated financial statements. For further information, see Note 1, Organization and Significant Accounting Policies, to our Consolidated Financial Statements, which outlines our application of significant accounting policies.

#### Revenue Recognition

Revenue from product sales is recorded when persuasive evidence of an arrangement exists, title has passed and delivery has occurred, a price is fixed and determinable, and collection is reasonably assured.

We may generate revenue from technology licenses, collaborative research and development arrangements, research grants and product sales. Revenue under technology licenses and collaborative agreements typically consists of nonrefundable and/or guaranteed technology license fees, collaborative research funding, and various milestone and future product royalty or profit-sharing payments.

Revenue associated with research and development funding payments under collaborative agreements is recognized ratably over the relevant periods specified in the agreement, generally the research and development period. Revenue from up-front license fees, milestones and product royalties are recognized as earned based on the completion of the milestones and product sales, as defined in the respective agreements. Payments received in advance of recognition as revenue are recorded as deferred revenue.

#### Asset Acquisition

On March 3, 2015, the Company entered into an Asset Purchase and Exclusive License Agreement (the "RNAi Purchase Agreement") with Novartis Institutes for BioMedical Research, Inc., a Delaware corporation ("Novartis"), pursuant to which the Company acquired Novartis' RNAi assets and rights thereunder. Pursuant to the Agreement, the



Company acquired or licensed certain patents and patent applications owned or controlled by Novartis related to RNAi therapeutics, assignment of a third-party license, rights to three pre-clinical RNAi candidates, and other related assets (collectively, the “Purchased Assets”). The acquisition of the Purchased Assets closed on March 3, 2015, concurrent with execution of the Agreement (the “Closing”). The Company accounted for this transaction as an acquisition of RNAi assets, including patents, a third-party license and in process research and development for the pre-clinical candidates. The allocation of the purchase price to each asset was determined by estimating the relative fair value of each asset acquired and applying that to the total cost of the acquisition for the Company. The Company capitalized the patents and license acquired as Intangible Assets as they require no future development and will have alternative future uses as the Company expands its RNAi capabilities. The Company expensed the portion of the purchase consideration allocated to the pre-clinical candidates as they will require future development in order to be commercialized. This expense is recorded in the “Acquired in-process research and development” line item of the Consolidated Statements of Operations.

### Impairment of Long-lived Assets

We review long-lived assets for impairment whenever events or changes in business circumstances indicate that the carrying amount of assets may not be fully recoverable or that our assumptions about the useful lives of these assets are no longer appropriate. If impairment is indicated, recoverability is measured by a comparison of the carrying amount of an asset to the estimated undiscounted future cash flows expected to be generated by the asset. If the carrying amount of an asset exceeds its estimated future cash flows, an impairment charge is recognized in the amount by which the carrying amount of the asset exceeds the fair value of the asset.

### Impairment of Intangible assets

Intangible assets consist of in-process research and development, license agreements and patents acquired in conjunction with a business or asset acquisition. Intangible assets are monitored for potential impairment whenever events or circumstances indicate that the carrying amount may not be recoverable, and are also reviewed annually to determine whether any impairment is necessary. Based on ASU 2012-02, the annual review of intangible assets is performed via a two-step process. First, a qualitative assessment is performed to determine if it is more likely than not that the intangible asset is impaired. If required, a quantitative assessment is performed and, if necessary, impairment is recorded.

### Stock-Based Compensation

We recognize stock-based compensation expense for stock options based on the grant date fair value using the Black-Scholes options pricing model, which requires us to make assumptions regarding certain variables including the risk-free interest rate, expected stock price volatility, assumed forfeitures, and the expected life of the award. The grant date fair value of restricted stock units granted is based upon the quoted closing market price per share on the date of grant, adjusted for assumed forfeitures. For performance-based stock awards, the value of the award is measured at the grant date. Expense for stock options and restricted stock units is recognized over the requisite service period. The assumptions used in calculating stock-based compensation expense represent management's best estimates, but these estimates involve inherent uncertainties, and if factors change or the Company used different assumptions, its stock-based compensation expense could be materially different in the future.

### Derivative Assets and Liabilities

We account for warrants and other derivative financial instruments as either equity or assets/liabilities based upon the characteristics and provisions of each instrument. Warrants classified as equity are recorded as additional paid-in capital on our Consolidated Balance Sheet and no further adjustments to their valuation are made. Some of our warrants were determined to be ineligible for equity classification because of provisions that may result in an adjustment to their exercise price. Warrants classified as derivative liabilities and other derivative financial instruments that require separate accounting as assets or liabilities are recorded on our Consolidated Balance Sheet at their fair value on the date of issuance and are revalued on each subsequent balance sheet date until such instruments are exercised or expire, with any changes in the fair value between reporting periods recorded as other income or expense. We estimate the fair value of these assets/liabilities using option pricing models that are based on the individual characteristics of the warrants or instruments on the valuation date, as well as assumptions for expected volatility, expected life and risk-free interest rate. Changes in the assumptions used could have a material impact on the resulting fair value. The primary input affecting the value of our derivatives liabilities is the Company's stock price.

### Contingent Consideration

The consideration for our acquisitions often includes future payments that are contingent upon the occurrence of a particular event. For example, milestone payments might be based on progress of clinical development, the

achievement of various regulatory approvals or future sales milestones, and royalty payments might be based on drug product sales levels. The Company records a contingent consideration obligation for such contingent payments at fair value on the acquisition date. The Company estimates the fair value of contingent consideration obligations through valuation models designed to estimate the probability of the occurrence of such contingent payments based on various assumptions and incorporating estimated success rates. Estimated payments are discounted using present value techniques to arrive at estimated fair value at the balance sheet date. Changes in the fair value of our contingent consideration obligations are recognized within our Consolidated Statements of Operations. Changes in the fair value of the contingent consideration obligations can result from changes to one or multiple inputs, including adjustments to the discount rates, changes in the amount or timing of expected expenditures associated with product development, changes in the amount or timing of cash flows from products upon commercialization, changes in the assumed achievement or timing of any development milestones, changes in the probability of certain clinical events and changes in the assumed probability associated with regulatory approval. These fair value measurements are based on significant inputs not observable in the market. Substantial judgment is employed in determining the appropriateness of these assumptions as of the acquisition date and for each subsequent period. Accordingly, changes in assumptions could have a material impact on the amount of contingent consideration expense the Company records in any given period.

## Results of Operations

The following data summarizes our results of operations for the following periods indicated:

	Year ended September 30,		
	2015	2014	2013
Revenue	\$382,000	\$175,000	\$290,266
Operating Loss	(95,973,976)	(53,276,286)	(24,589,276)
Loss from Continuing Operations	(91,940,882)	(58,725,412)	(31,703,079)
Net Loss	(91,940,882)	(58,725,412)	(31,703,433)
Earnings per Share (Basic and Diluted)	\$(1.60 )	\$(1.25 )	\$(1.30 )

The increase in our Total Operating Expenses during the year ended September 30, 2015 is primarily due to the progress achieved on our lead clinical candidate for HBV, ARC-520. The primary costs incurred during fiscal year 2015 related to manufacturing of clinical supplies for the ARC-520 phase 2b clinical trial, toxicology studies, and the cost associated with the administration of the clinical trials. Additionally, the Company incurred a \$10.1 million expense related to the acquisition of in-process research and development from Novartis in March 2015.

## Results of Operations Comparison for 2015 and 2014

## Revenues

Total revenue was \$382,000 for the year ended September 30, 2015 and \$175,000 for the year ended September 30, 2014. Revenue is primarily related to licensed technology. In addition, the Company had collaboration revenue of \$160,000 during the year ended September 30, 2015.

## Operating Expenses

The analysis below details the operating expenses and discusses the expenditures of the Company within the major expense categories. Certain reclassifications have been made to prior-period operating expense categories to conform to the current period presentation. For purposes of comparison, the amounts for the years ended September 30, 2015 and 2014 are shown in the tables below.

## Research and Development Expenses

R&D expenses are related to the Company's on-going research and development efforts, primarily related to program costs, composed primarily of outsourced costs related to the manufacturing of clinical supplies, toxicity/efficacy studies and clinical trial expenses. Internal costs primarily relate to operations at our research and development facility in Madison, Wisconsin, including facility costs and laboratory-related expenses. The following table provides details of research and development expense for the periods indicated:

(in thousands)

Twelve

Twelve

	Months Ended September 30, 2015	% of Total		Months Ended September 30, 2014	% of Total		Increase (Decrease)	
Laboratory supplies & services	\$ 2,531	5 %		\$ 2,071	9 %		\$460	22 %
In vivo studies	556	1 %		224	1 %		332	148 %
Outside labs & contract services	489	1 %		691	3 %		(202 )	-29 %
Toxicity/efficacy studies	6,572	14 %		6,306	27 %		266	4 %
Drug manufacturing	21,431	46 %		9,142	40 %		12,289	134 %
Clinical trials	13,329	28 %		2,627	11 %		10,702	407 %
License, royalty & milestones	1,065	2 %		1,096	5 %		(31 )	-3 %
Facilities and related	977	2 %		881	4 %		96	11 %
Other research expenses	317	1 %		100	0 %		217	217 %
Total	\$ 47,267	100 %		\$ 23,138	100 %		\$24,129	104 %

Laboratory supplies and services expense increased \$460,000 from \$2,071,000 during the year ended September 30, 2014 to \$2,531,000 during the current period. The increase in laboratory supplies and services is a result of additional supplies necessary to

support increased efforts in pre-clinical research as the Company supports ongoing clinical efforts and accelerates efforts to identify new clinical candidates.

In vivo studies expense increased \$332,000 from \$224,000 during the year ended September 30, 2014 to \$556,000 during the current period. In vivo expense can vary depending on the stage of preclinical candidates, the nature and amount of testing required and the varying costs of different in vivo testing models. The expense in both periods relates to studies in connection with the development of new clinical candidates. During fiscal year 2015, the Company expanded its candidate pipeline which resulted in additional studies conducted.

Outside labs and contract services expense decreased \$202,000 from \$691,000 during the year ended September 30, 2014 to \$489,000 during the current period. The decrease in the current period primarily relates to a one-time fee paid in the prior year related to access to a certain animal study.

Toxicity/efficacy studies expense increased \$266,000 from \$6,306,000 during the year ended September 30, 2014 to \$6,572,000 during the current period. This category includes IND-enabling toxicology studies, post-IND toxicology studies, such as long-term toxicology studies, and other efficacy studies. The full-year expense primarily relates to IND-enabling toxicology studies related to ARC-AAT, on-going long-term toxicology studies to support later clinical trials, and studies related to ARC-520 to support our anticipated phase 2b clinical trial. These amounts can vary quarter to quarter based on stage of development.

Drug manufacturing expense increased \$12,289,000 from \$9,142,000 during the year ended September 30, 2014 to \$21,431,000 during the current period. The current period expense primarily relates to drug manufacturing to supply toxicology studies for our ARC-520 Phase 2b clinical trials and clinical supplies for the ARC-520 Phase 2b clinical trial. The manufacturing campaign for the Phase 2b clinical trial for ARC-520 is largely complete, however, as other clinical candidates are nominated, and as other clinical trials advance, further expenditures will be incurred.

Clinical trials expense increased \$10,702,000 from \$2,627,000 during the year ended September 30, 2014 to \$13,329,000 during the current period. The increase is primarily driven by costs incurred in preparation for our anticipated phase 2b clinical trial for ARC-520. We are also incurring costs in fiscal 2015 related to our clinical trial for our second clinical candidate ARC-AAT. We expect clinical trial expenses to increase further in fiscal year 2016 as enrollment in our clinical trials increases.

License, royalty and milestones expense was consistent at \$1,096,000 during the year ended September 30, 2014 and \$1,065,000 during the current period. This category can include milestone payments which can vary from period to period depending on the nature of our various license agreements, and the timing of reaching various development milestones requiring payment. We reached milestones related to our clinical candidates that required a \$1 million payment in each period.

Facilities expense increased \$96,000 from \$881,000 during the year ended September 30, 2014 to \$977,000 during the current period. The increase relates to higher rent in our Madison facility somewhat offset by lower repairs and maintenance costs on our lab equipment.

Other research expense increased \$217,000 from \$100,000 during the year ended September 30, 2014 to \$317,000 during the current period. The increase in the current period primarily relates to costs associated with a collaboration agreement to identify muscle targeting peptide molecules in fiscal 2015, for which the Company has been reimbursed from its collaboration partner.

#### Salary and Payroll-Related Expenses

The Company employs scientific, technical and administrative staff at its corporate offices and its research facilities. Salaries and payroll-related expense consists of salary, bonuses, payroll taxes and related benefits. Salary and

payroll-related expenses include two major categories: general and administrative (G&A) compensation expense, and research and development (R&D) compensation expense, based on the primary activities of each employee. The following table provides detail of salary and payroll-related expenses for the periods indicated:

(in thousands)

	Twelve months Ended September 30, 2015		Twelve months Ended September 30, 2014		Increase (Decrease)	
		% of Total		% of Total		
R&D - compensation-related	\$ 11,605	70 %	\$ 7,828	61 %	\$ 3,777	48 %
G&A - compensation-related	4,949	30 %	5,001	39 %	(52 )	-1 %
Total	\$ 16,554	100 %	\$ 12,829	100 %	\$ 3,725	29 %

R&D compensation expense increased \$3,777,000 from \$7,828,000 during the year ended September 30, 2014 to \$11,605,000 during the current period. An increase in headcount accounted for the majority of the change in compensation-related expense.

G&A compensation expense was consistent at \$5,001,000 during the year ended September 30, 2014 and \$4,949,000 during the current period. G&A headcount has remained consistent during the periods.

#### General & Administrative Expenses

The following table provides details of our general and administrative expenses for the periods indicated:

(in thousands)

	Twelve Months Ended September 30, 2015	% of Total		Twelve Months Ended September 30, 2014	% of Total		Increase (Decrease)	
Professional/outside services	\$ 3,989	50 %		\$ 2,465	42 %		\$ 1,524	62 %
Patent expense	950	12 %		632	11 %		318	50 %
Facilities and related	308	4 %		193	3 %		115	60 %
Travel	841	11 %		654	11 %		187	29 %
Business insurance	523	7 %		302	5 %		221	73 %
Communication and Technology	691	9 %		388	7 %		303	78 %
Office expenses	270	3 %		380	6 %		(110 )	-29 %
Other	359	4 %		880	15 %		(521 )	-59 %
Total	\$ 7,931	100 %		\$ 5,894	100 %		\$ 2,037	35 %

Professional/outside services include legal, accounting, consulting and other outside services retained by the Company. All periods include normally recurring legal and audit expenses related to SEC compliance and other corporate matters. Professional/outside services expense increased \$1,524,000 from \$2,465,000 during the year ended September 30, 2014 to \$3,989,000 during the current period. The increase in professional fees primarily related to higher legal fees related to recent litigation events. See Note 7 – Commitments and Contingencies for further discussion. Additionally, the Company incurred higher recruiting fees to fill new positions.

Patent expense increased \$318,000 from \$632,000 during the year ended September 30, 2014 to \$950,000 during the current period. Patent expense costs increase due to additional prosecution requirements associated with new patents acquired through the Novartis asset acquisition. The Company continues to invest in patent protection for its DPC™ technology, related product candidates and other RNAi technology through patent filings in multiple countries. The Company expects to extend and maintain protection for its current portfolios, as appropriate, and file new patent applications as technologies are developed and improved. Expenses can vary from period to period as patents proceed through their prosecution life cycle.



Facilities-related expense increased \$115,000 from \$193,000 during the year ended September 30, 2014 to \$308,000 in the current period. Facilities expense increased due to the expansion of our corporate headquarters in Pasadena.

Travel expense increased \$187,000 from \$654,000 during the year ended September 30, 2014 to \$841,000 during the current period. Travel expense increased due to travel in support of our R&D function, primarily our GMP manufacturing campaign and our clinical trials, as well as other corporate and business development related travel.

Business insurance expense increased \$221,000 from \$302,000 during the year ended September 30, 2014 to \$523,000 during the current period. Business insurance costs increased primarily due to added coverage related to the Company's clinical trials, as well as increases in other corporate liability insurance.

Communication and technology expense increased \$303,000 from \$388,000 during the year ended September 30, 2014 to \$691,000 during the current period. The increase was related to equipment purchases to replace outdated equipment and new equipment purchases related to new employees.

Office expense decreased \$110,000 from \$380,000 during the year ended September 30, 2014 to \$270,000 during the current period. These expenses relate to conferences/training, office supplies, miscellaneous administrative expenses, and expenses related to office expansions at our R&D facility in Madison and our corporate headquarters in Pasadena. During fiscal year 2014, the Company incurred certain charges related to its Madison office expansion which was not repeated in the current year.

Other expense decreased \$521,000 from \$880,000 during the year ended September 30, 2014 to \$359,000 during the current period. This category consists primarily of conference attendance fees, franchise and property tax expenses and marketing expenses. The decrease was related to a reduction in the provision for franchise taxes as well as an allowance recorded for certain other receivables during fiscal year 2014 that was not repeated in 2015.

#### Acquired in-process research and development – Novartis pre-clinical candidates

Acquired in-process research and development expense for the Novartis pre-clinical candidates was \$10,142,786 for fiscal year 2015 and zero for the previous periods. This expense pertains to the acquisition of the Novartis RNAi assets discussed above. The pre-clinical candidates were expensed during the period, while certain other patents and a third-party license were capitalized as intangible assets.

#### Stock-based compensation expense

Stock-based compensation expense, a noncash expense, increased \$4,536,724 from \$5,696,173 during the year ended September 30, 2014 to \$10,232,897 during the current period. Stock-based compensation expense is based upon the valuation of stock options and restricted stock units granted to employees, directors, and certain consultants. Many variables affect the amount expensed, including the Company's stock price on the date of the grant, as well as other assumptions. Based on the additional options and restricted stock units granted to new and existing employees in fiscal 2015, compensation expense has increased from the prior year.

#### Depreciation and amortization expense

Depreciation and amortization expense, a noncash expense, increased \$990,552 from \$1,345,655 during the year ended September 30, 2014 to \$2,336,207 during the current period. The majority of depreciation and amortization expense relates to depreciation on lab equipment obtained as part of the acquisition of Roche's RNAi business in 2011. In addition, the Company records depreciation on leasehold improvements at its Madison research facility and its Pasadena corporate headquarters. The increase in depreciation and amortization expense is primarily due to the amortization of the intangible assets acquired in the Novartis asset acquisition.

#### Impairment expense

Impairment expense, a noncash expense, decreased \$2,172,387 from \$2,172,387 during the year ended September 30, 2014 to \$0 during the current period. During the year ended September 30, 2014, the Company determined that the carrying value of the Alvus in-process research and development (IPR&D) may not be recoverable and should be fully impaired. During the current period, the Company did not find any of its intangible or long-lived assets to be impaired.

#### Contingent Consideration – Fair Value Adjustments

Contingent Consideration – Fair Value Adjustments increased \$484,125 from \$2,375,658 during the year ended September 30, 2014 to \$1,891,533 during the current period. Contingent consideration resulting from the acquisition of Roche's RNAi business is calculated by modeling research and development activities for clinical candidates, forecasting timelines to market, and using "peak sales" estimate modeling, cash flows and potential milestone and royalty payments. The modeling assumes certain success rates, and discount factors related to riskiness of projects and the time value of money to calculate a net present value of future consideration payments to Roche. Each reporting period, the Company re-evaluates its contingent consideration, and if material, makes adjustments to the recorded liability. The Company increased this liability by \$1.9 million and \$2.4 million during the years ended September 30, 2015 and 2014, respectively, for a total liability of \$5.9 million, which is recorded on the Company's Consolidated Balance Sheets.

Other Income / Expense

Other income / expense was expense of \$5,443,826 during the year ended September 30, 2014 as compared to income of \$4,035,494 during the current period. The largest component of this line item is related to the change in the value of derivative liabilities related to certain warrants with a price adjustment feature, which requires derivative accounting. The change in value of derivative liabilities was a reduction of approximately \$2.9 million in 2015 and an increase of approximately \$6.0 million in 2014. The fluctuations in each period were primarily driven by changes in the Company's stock price, which had a corresponding impact to the valuation of the underlying warrants.

## Results of Operations Comparison for 2014 and 2013

## Revenues

Total revenue was \$175,000 for the year ended September 30, 2014 and \$290,000 for the year ended September 30, 2013. Revenue is primarily related to licensed technology. In addition, the Company had collaboration revenue of \$115,000 during the year ended September 30, 2013.

## Operating Expenses

The analysis below details the operating expenses and discusses the expenditures of the Company within the major expense categories. Certain reclassifications have been made to prior period operating expense categories to conform to the current period presentation. For purposes of comparison, the amounts for the years ended September 30, 2014 and 2013 are shown in the tables below.

## Research and Development Expenses

R&D expenses are related to the Company's on-going research and development efforts, primarily related to program costs, composed primarily of outsourced costs related to the manufacturing of clinical supplies, toxicity/efficacy studies and clinical trial expenses. Internal costs primarily relate to operations at our research facility in Madison, Wisconsin, including facility costs and laboratory-related expenses. The following table provides details of research and development expense for the periods indicated:

(in thousands)

	Twelve Months Ended September 30, 2014	% of Total		Twelve Months Ended September 30, 2013	% of Total	Increase (Decrease)	
Laboratory supplies & services	\$ 2,071	9 %	\$	\$ 1,058	12 %	\$ 1,013	96 %
In vivo studies	224	1 %		232	3 %	(8 )	-3 %
Outside labs & contract services	691	3 %		533	6 %	158	30 %
Toxicity/efficacy studies	6,306	27 %		1,658	19 %	4,648	280 %
Drug manufacturing	9,142	40 %		2,625	30 %	6,517	248 %
Clinical trials	2,627	11 %		1,306	15 %	1,321	101 %
License, royalty & milestones	1,096	5 %		322	4 %	774	240 %
Facilities and related	881	4 %		732	8 %	149	20 %
Other research expenses	100	0 %		240	3 %	(140 )	-58 %
Total	\$ 23.138	100 %	\$	\$ 8,706	100 %	\$ 14.432	166 %

Laboratory supplies and services expense increased \$1,013,000 from \$1,058,000 during the year ended September 30, 2013 to \$2,071,000 during the year ended September 30, 2014. The Company expanded its laboratory facility and increased its R&D headcount during 2014. The increase in laboratory supplies and services is a result of additional supplies necessary to support increased efforts in pre-clinical research as the Company supports ongoing clinical efforts and accelerates efforts to identify new clinical candidates.

In vivo studies expense decreased \$8,000 from \$232,000 during the year ended September 30, 2013 to \$224,000 during the year ended September 30, 2014. In vivo expense can vary depending on the stage of preclinical candidates, the nature and amount of testing required and based on the varying costs of different in vivo testing models. The expense in both periods relates to studies related to development of new clinical candidates, including ARC-AAT.

Outside labs and contract services expense increased \$158,000 from \$533,000 during the year ended September 30, 2013 to \$691,000 during the year ended September 30, 2014. The increase was primarily related to oligonucleotide synthesis related to development of new clinical candidates.

Toxicity/efficacy studies expense increased \$4,648,000 from \$1,658,000 during the year ended September 30, 2013 to \$6,306,000 during the year ended September 30, 2014. This category includes IND-enabling toxicology studies as well as post-clinical toxicology studies, such as long-term toxicology studies, and other efficacy studies. The expense during the year ended September 30, 2014 primarily relates to toxicology studies related to ARC-520, our clinical candidate for HBV, specifically toxicology studies to support our anticipated phase 2b clinical trial. Additionally, during 2014 we began incurring costs related to IND-enabling toxicology studies related to ARC-AAT.

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Drug manufacturing expense increased \$6,517,000 from \$2,625,000 during the year ended September 30, 2013 to \$9,142,000 during the year ended September 30, 2014. The expense during the year ended September 30, 2014 relates to drug manufacturing to supply toxicology studies for our HBV Phase 2b clinical trial, clinical supplies for the HBV Phase 2b clinical trial, as well as clinical supplies for our clinical trial for ARC-AAT.

Clinical trials expense increased \$1,321,000 from \$1,306,000 during the year ended September 30, 2013 to \$2,627,000 during the year ended September 30, 2014. Clinical trial expenses increased as the Company advanced ARC-520 into its Phase 1 and Phase 2a clinical trial during 2014.

License, royalty and milestones expense increased \$774,000 from \$322,000 during year ended September 30, 2013 to \$1,096,000 during the year ended September 30, 2014. The increase during the year ended September 30, 2014 relates to a \$1 million milestone payment due pursuant to a license agreement based upon a milestone reached on one of its clinical candidates. Milestone payments can vary from period to period depending on the nature of our various license agreements, and the timing of reaching various development milestones requiring payment.

Facilities expense increased \$149,000 from \$732,000 during the year ended September 30, 2013 to \$881,000 during the year ended September 30, 2014. Facilities expenses were higher during the year ended September 30, 2014 primarily due to repairs and maintenance costs on lab equipment.

Other research expense decreased \$140,000 from \$240,000 during the year ended September 30, 2013 to \$100,000 during the year ended September 30, 2014. Other research expense in the prior period relates to work at the University of Cincinnati related to our obesity program, which studies have been completed, and no further studies are planned. The expenses during the year ended September 30, 2014 primarily relate to medical and hazardous waste removal costs.

### Salary and Payroll-Related Expenses

The following table provides detail of salary and payroll-related expenses for the periods indicated:

(in thousands)

	Twelve months Ended			Twelve months Ended			Increase	
	September 30, 2014	% of Total		September 30, 2013	% of Total		(Decrease)	
R&D - compensation-related	\$ 7,828	61 %		\$ 4,127	62 %		\$3,701	90%
G&A - compensation-related	5,001	39 %		2,541	38 %		2,460	97%
Total	\$ 12,829	100 %		\$ 6,668	100 %		\$6,161	92%

R&D compensation expense increased \$3,701,000 from \$4,127,000 during the year ended September 30, 2013 to \$7,828,000 during the year ended September 30, 2014. Increased headcount and salary increases accounted for the majority of the change in compensation-related expense. Additionally, expenses related to annual performance bonuses were accrued during the year ended September 30, 2014 totaling \$1,602,000 in expense; no performance bonuses were paid in the prior period.

G&A compensation expense increased \$2,460,000 from \$2,541,000 during the year ended September 30, 2013 to \$5,001,000 during the year ended September 30, 2014. The majority of this change relates to expense recorded for annual performance bonuses in the year ended September 30, 2014. Additionally, a portion of the increase is due to

salary increases. G&A headcount remained fairly consistent during the past twelve months.

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## General &amp; Administrative Expenses

The following table provides details of our general and administrative expenses for the periods indicated:

(in thousands)

	Twelve Months Ended September 30, 2014	% of Total	Twelve Months Ended September 30, 2013	% of Total	Increase (Decrease)	
Professional/outside services	\$ 2,465	42 %	\$ 1,319	38 %	\$ 1,146	87 %
Patent expense	632	11 %	941	27 %	(309 )	-33 %
Facilities and related	193	3 %	170	5 %	23	14 %
Travel	654	11 %	440	13 %	214	49 %
Business insurance	302	5 %	216	6 %	86	40 %
Communication and Technology	388	7 %	184	5 %	204	111 %
Office expenses	380	6 %	110	3 %	270	245 %
Other	880	15 %	109	3 %	771	707 %
Total	\$ 5,894	100 %	\$ 3,489	100 %	\$ 2,406	69 %

Professional/outside services include legal, accounting, consulting and other outside services retained by the Company. All periods include normally recurring legal and audit expenses related to SEC compliance and other corporate matters. Professional/outside services expense increased \$1,146,000 from \$1,319,000 during the year ended September 30, 2013 to \$2,465,000 during the year ended September 30, 2014. The increase in professional fees primarily related to professional recruiting fees for the hiring of additional R&D personnel to support and expand its clinical pipeline. Additionally, the Company incurred higher SEC filing fees associated with financing in February 2014 and higher NASDAQ fees based on a higher number of shares outstanding.

Patent expense decreased \$309,000 from \$941,000 during the year ended September 30, 2013 to \$632,000 during the year ended September 30, 2014. Patent expenses related to Calando declined by \$215,000 in the current period as Calando terminated its license agreement with Caltech in August 2013, which had obligated Calando to pay certain related patent costs, and by curtailing prosecution of other non-strategic patents. During the year ended September 30, 2014, Arrowhead deconsolidated Calando, thus no further Calando patent expense will be incurred.

Facilities-related expense increased \$23,000 from \$170,000 during the year ended September 30, 2013 to \$193,000 in the year ended September 30, 2014. Facilities expense increased due to the expansion of our corporate headquarters in Pasadena as well as routine increases in ancillary lease charges.

Travel expense increased \$214,000 from \$440,000 during the year ended September 30, 2013 to \$654,000 during the year ended September 30, 2014. Travel expense increased due to travel in support of our R&D function, primarily our GMP manufacturing campaign and our clinical trials.

Business insurance expense increased \$86,000 from \$216,000 during the year ended September 30, 2013 to \$302,000 during the year ended September 30, 2014. Business insurance costs increased primarily related to added coverage related to the Company's clinical trials.



Communication and technology expense increased \$204,000 from \$184,000 during the year ended September 30, 2013 to \$388,000 during the year ended September 30, 2014. The increase was related to equipment purchases to replace outdated equipment and to cost associated with new equipment related to new employees.

Office expense increased \$270,000 from \$110,000 during the year ended September 30, 2013 to \$380,000 during the year ended September 30, 2014. The increase was related to conferences/training, office supplies, miscellaneous administrative expenses, and expenses related to an office expansions at our R&D facility in Madison and our corporate headquarters in Pasadena.

Other expense increased \$771,000 from \$109,000 during the year ended September 30, 2013 to \$880,000 during the year ended September 30, 2014. The increase was related to an increase in estimated franchise taxes accrued as well as an allowance recorded for certain other receivables.

### Stock-based compensation expense

Stock-based compensation expense, a noncash expense, increased \$4,160,000 from \$1,536,000 during the year ended September 30, 2013 to \$5,696,000 during the year ended September 30, 2014. Based on the additional options and restricted stock units granted to new and existing employees in fiscal 2014, compensation expense increased from the prior year.

### Depreciation and amortization expense

Depreciation and amortization expense, a noncash expense, decreased \$405,000 from \$1,751,000 during the year ended September 30, 2013, to \$1,346,000 during the year ended September 30, 2014. The majority of depreciation and amortization expense relates to depreciation on lab equipment obtained as part of the acquisition of the Roche RNAi business in 2011. In addition, the Company records depreciation on leasehold improvements at its Madison research facility. Amortization expense decreased in 2014 as compared to 2013 as capitalized patents related to Calando were fully written off in 2013, accordingly there was no expense recorded in 2014.

### Impairment expense

Impairment expense, a noncash expense, increased \$864,000 from \$1,308,000 during the year ended September 30, 2013 to \$2,172,000 during the year ended September 30, 2014. During the year ended September 30, 2014, the Company determined that the carrying value of the Alvus IPR&D may not be recoverable and should be fully impaired. The Company recorded an impairment charge of \$2.2 million. During the year ended September 30, 2013, management determined that the value of the Calando patents was impaired, and the Company recorded a \$1.3 million impairment charge.

### Contingent Consideration – Fair Value Adjustments

Contingent Consideration – Fair Value Adjustments increased \$954,000 from \$1,422,000 during the year ended September 30, 2013 to \$2,376,000 during the year ended September 30, 2014. Contingent consideration resulting from the acquisition of Roche's RNAi business is calculated by modeling research and development activities for clinical candidates, forecasting timelines to market, and using "peak sales" estimate modeling, cash flows and potential milestone and royalty payments. The modeling assumes certain success rates, and discount factors related to riskiness of projects and the time value of money to calculate a net present value of future consideration payments to Roche. Each reporting period, the Company re-evaluates its contingent consideration, and if material, makes adjustments to the recorded liability. The Company increased this liability by \$2.5 million and \$1.4 million during the years ended September 30, 2014 and 2013, respectively, for a total liability of \$4.0 million, which is recorded on the Company's Consolidated Balance Sheets.

### Other Income / Expense

Other income / expense decreased \$1,670,000 from expense of \$7,114,000 during the year ended September 30, 2013 to expense of \$5,444,000 during the year ended September 30, 2014. The decrease in expense is primarily due to a \$1.0 million write down of a note receivable related to the sale of our former subsidiary, Unidym, in 2013, which was not repeated in the current year. Additionally, the Company received increased interest income during 2014 as it has invested its excess cash balances in short and long-term corporate bonds. The largest component of this line item is related to the change in the value of derivative liabilities related to certain warrants with a price adjustment feature, which requires derivative accounting. The change in value of derivative liabilities was approximately \$6.0 million in 2014 and \$5.3 million in 2013.

### Liquidity and Cash Resources

Arrowhead has historically financed its operations through the sale of securities of Arrowhead and its Subsidiaries. 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 fiscal year 2016, and beyond.

At September 30, 2015, the Company had cash on hand of approximately \$81.2 million as compared to \$132.5 million at September 30, 2014. Excess cash invested in fixed income securities was \$17.5 million at September 30, 2015, compared to \$44.7 million at September 30, 2014. The Company believes its current financial resources are sufficient to fund its operations through at least the next twelve months.

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A summary of cash flows for the years ended September 30, 2015, 2014, and 2013 is as follows:

	Year ended September 30,		
	2015	2014	2013
Cash Flow from Continuing Operations:			
Operating Activities	\$(65,707,615 )	\$(35,416,373 )	\$(19,032,826 )
Investing Activities	14,120,838	(36,481,770 )	(9,520,867 )
Financing Activities	290,521	185,294,309	44,291,203
Cash Flow from Discontinued Operations:			
Operating Activities	-	-	(354 )
Investing Activities	-	-	-
Financing Activities	-	-	-
Net increase (decrease) in cash	(51,296,256 )	113,396,166	15,737,156
Cash at beginning of period	132,510,610	19,114,444	3,377,288
Cash at end of period	\$81,214,354	\$132,510,610	\$19,114,444

During the year ended September 30, 2015, the Company used \$65.7 million in cash from operating activities, which represents the on-going expenses of its research and development programs and corporate overhead. Cash outlays were primarily composed of the following: research and development costs were \$41.2 million, salary and payroll-related expenses were \$16.6 million, and general and administrative costs were \$7.9 million. Cash provided by investing activities was \$14.1 million, primarily related to the maturity of certain marketable securities partially offset by \$10.0 million of cash used to acquire the Novartis assets discussed above. Capital expenditures were \$2.0 million. Cash provided by financing activities of \$0.3 million primarily includes the exercise of warrants and stock options during the year ended September 30, 2015.

During the year ended September 30, 2014, the Company used \$35.4 million in cash from operating activities, which represents the on-going expenses of its research and development programs and corporate overhead. Cash outlays were primarily composed of the following: research and development costs were \$21.7 million, salary and payroll-related expenses were \$9.1 million, and general and administrative costs were \$4.6 million. Cash used by investing activities was \$36.5 million, primarily related to net cash investments in fixed income securities of \$34.8 million. Capital expenditures were \$1.7 million. Cash provided by financing activities of \$185.3 million includes \$172.6 million of cash received from equity financings by the Company in October 2013 and February 2014. The exercise of warrants and stock options during fiscal 2014 resulted in additional cash inflow of \$12.9 million.

During the year ended September 30, 2013, the Company used \$19.0 million in cash from operating activities, which represents the on-going expenses of its research and development programs and corporate overhead. Cash outlays were primarily composed of the following: research and development costs were \$8.7 million, salary and payroll-related expenses were \$6.7 million, and general and administrative costs were \$3.5 million. Cash used by investing activities was \$9.5 million, primarily related to net cash investments in fixed income securities of \$9.3 million. Capital expenditures were \$0.3 million. Cash provided by financing activities of \$44.3 million includes \$42.4 million of cash received from equity financings by the Company during 2013. The exercise of warrants and stock options during fiscal 2013 resulted in additional cash inflow of \$2.1 million.

#### Contractual Obligations

In the table below, we set forth our enforceable and legally binding obligations and future commitments at September 30, 2015 for the categories shown, as well as obligations related to contracts in such categories that we are likely to continue. Some of the figures that we include in this table are based on management's estimates and assumptions about

these obligations, including their duration, the possibility of renewal, anticipated actions by third parties and other factors. Because these estimates and assumptions are necessarily subjective, the obligations we will actually pay in future periods may vary from those reflected in the table. The following table does not include any future obligations that may be owed under existing license agreements, as the certainty of achieving the relevant milestones that would trigger these payments is currently unknown.

	Payments due by Period				
	Total	Less than 1 Year	1-3 Years	3-5 Years	More than 5 Years
Debt	-	-	-	-	-
Capital Leases	758,340	217,548	446,007	94,785	-
Operating Leases	2,343,075	631,881	1,251,561	459,633	-
Purchase Obligations	49,300,000	35,500,000	13,800,000	-	-
Other Long-Term Liabilities	6,204,917	-	-	342,453	5,862,464
Total	\$58,606,332	\$36,349,429	\$15,497,568	\$896,871	\$5,862,464

#### Off-Balance Sheet Arrangements

As of September 30, 2015, we did not have any off-balance sheet arrangements, as defined in Item 303(a)(4)(ii) of SEC Regulation S-K.

#### Recent Accounting Pronouncements

See Note 1 to our Consolidated Financial Statements of this annual report on Form 10-K for a description of recent accounting pronouncements applicable to our business.

## ITEM 7A. QUANTITATIVE AND QUALITATIVE DISCLOSURES ABOUT MARKET RISK

We are exposed to market risk related to changes in interest rates, which could adversely affect the value of our interest rate-sensitive assets and liabilities. We do not hold any instruments for trading purposes and investment criteria are governed by the Company's Investment Policy. As of September 30, 2015 and 2014, we had cash and cash equivalents of \$81.2 million and \$132.5 million, respectively. We invest our cash reserves in corporate bonds typically with maturities of less than 2 years, and we classify these investments as held-to-maturity. Due to the relatively short-term nature of the investments that we hold, we do not believe that the results of operations or cash flows would be affected to any significant degree by a sudden change in market interest rates relative to our investment portfolio. Our liability instrument sensitive to changes in interest rates is our derivative liability with its fair value determined using an option pricing model, which uses interest rate as an input. However, any change associated with this valuation would result in a noncash expense and would not significantly impact our operations.

## ITEM 8. FINANCIAL STATEMENTS AND SUPPLEMENTARY DATA

The information required by this item is included in Item 15 of this Annual Report Form 10-K.

## ITEM 9. CHANGES IN AND DISAGREEMENTS WITH ACCOUNTANTS ON ACCOUNTING AND FINANCIAL DISCLOSURE.

None.

## ITEM 9A. CONTROLS AND PROCEDURES.

Our Chief Executive Officer and our Chief Financial Officer, after evaluating our "disclosure controls and procedures" (as defined in Securities Exchange Act of 1934 (the "Exchange Act") Rules 13a-15(e) and 15d-15(e)) as of the end of the period covered by this Annual Report on Form 10-K (the "Evaluation Date") have concluded that as of the Evaluation Date, our disclosure controls and procedures are effective to ensure that information we are required to disclose in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms, and to ensure that information required to be disclosed by us in such reports is accumulated and communicated to our management, including our Chief Executive Officer and Chief Financial Officer, where appropriate, to allow timely decisions regarding required disclosure.

No change in the Company's internal controls over financial reporting (as defined in Rule 13a-15(f) and 15d-15(f) of the Exchange Act) occurred during the Company's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

Management's Annual Report on Internal Control over Financial Reporting

Internal Control over Financial Reporting

Our management is responsible for establishing and maintaining adequate internal control over financial reporting as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act. Our internal control over financial reporting is designed 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 in the United States. This process includes those policies and procedures that (i) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of our assets; (ii) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures are being made only in accordance with authorizations of our management and directors; and (iii) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use or disposition of our assets that could have a material effect on our financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of the internal control over financial reporting to future periods are subject to risk that the internal control may become inadequate because of changes in conditions, or that the degree of compliance with policies or procedures may deteriorate.

#### Management's Assessment of the Effectiveness of our Internal Control over Financial Reporting

The Company's management is responsible for establishing and maintaining adequate internal control over financial reporting (as defined in Rule 13a-15(f) under the Exchange Act). Management conducted an assessment of the effectiveness of the Company's internal control over financial reporting based on the criteria set forth in Internal Control – Integrated Framework issued by the



Committee of Sponsoring Organizations of the Treadway Commission (2013 framework). Based on the Company's assessment, management has concluded that its internal control over financial reporting was effective as of September 30, 2015 to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements in accordance with GAAP. The Company's independent registered public accounting firm, Rose, Snyder and Jacobs LLP, has issued an audit report on the Company's internal control over financial reporting, which appears in Item 15 of this Form 10-K.

#### Changes in Internal Control Over Financial Reporting

There was no change in our internal control over financial reporting that occurred during the fourth quarter of the year ended September 30, 2015 that has materially affected, or is reasonably likely to materially affect, our internal control over financial reporting.

#### ITEM 9B. OTHER INFORMATION

None.

### PART III

#### ITEM 10. DIRECTORS, EXECUTIVE OFFICERS AND CORPORATE GOVERNANCE.

The information called for by this Item will be incorporated by reference from our Definitive Proxy Statement to be filed for our 2016 Annual Meeting of Stockholders, which proxy statement will be filed no later than January 28, 2016.

#### ITEM 11. EXECUTIVE COMPENSATION

The information called for by this Item will be incorporated by reference from our Definitive Proxy Statement to be filed for our 2016 Annual Meeting of Stockholders, which proxy statement will be filed no later than January 28, 2016.

#### ITEM 12. SECURITY OWNERSHIP OF CERTAIN BENEFICIAL OWNERS AND MANAGEMENT AND RELATED STOCKHOLDER MATTERS.

The information called for by this Item will be incorporated by reference from our Definitive Proxy Statement to be filed for our 2016 Annual Meeting of Stockholders, which proxy statement will be filed no later than January 28, 2016.

#### ITEM 13. CERTAIN RELATIONSHIPS AND RELATED TRANSACTIONS, AND DIRECTOR INDEPENDENCE.

The information called for by this Item will be incorporated by reference from our Definitive Proxy Statement to be filed for our 2016 Annual Meeting of Stockholders, which proxy statement will be filed no later than January 28, 2016.

**ITEM 14. PRINCIPAL ACCOUNTANT FEES AND SERVICES**

The information called for by this Item will be incorporated by reference from our Definitive Proxy Statement to be filed for our 2016 Annual Meeting of Stockholders, which proxy statement will be filed no later than January 28, 2016.

**PART IV**

**ITEM 15. EXHIBITS AND FINANCIAL STATEMENT SCHEDULES**

The following documents are filed as part of this Annual Report on Form 10-K:

(1) Financial Statements.

See Index to Financial Statements and Schedule on page F-1.

(2) Financial Statement Schedules.

See Index to Financial Statements and Schedule on page F-1. All other schedules are omitted as the required information is not present or is not present in amounts sufficient to require submission of the schedule, or because the information required is included in the consolidated financial statements or notes thereto.

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(3)Exhibits.

The following exhibits are filed (or incorporated by reference herein) as part of this Annual Report on Form 10-K:

Exhibit Number	Description	Incorporated by Reference Herein Form	Date
2.1	Stock and Asset Purchase Agreement between Arrowhead Research Corporation and Roche entities, dated October 21, 2011†	Annual Report on Form 10-K for the fiscal year ended September 30, 2011, as Exhibit 2.1	December 20, 2011
2.2	Asset Purchase and Exclusive License Agreement between Arrowhead Research Corporation and Novartis Institutes for BioMedical Research, Inc., dated March 3, 2015†	Quarterly Report on Form 10-Q, as Exhibit 2.1	May 11, 2015
3.1	Certificate of Incorporation of InterActive Group, Inc., a Delaware corporation, filed with the Secretary of State of the State of Delaware on February 13, 2001	Schedule 14C, as Exhibit A	December 22, 2000
3.2	Certificate of Amendment to Certificate of Incorporation of InterActive Group, Inc. (effecting, among other things a change in the corporation's name to "Arrowhead Research Corporation"), filed with the Secretary of State of the State of Delaware on January 12, 2004	Schedule 14C, as Exhibit 1	December 22, 2003
3.3	Certificate of Amendment to Certificate of Incorporation of Arrowhead Research Corporation, filed with the Secretary of State of the State of Delaware on January 26, 2005	Form 10-QSB for the quarter ended December 31, 2004, as Exhibit 3.4	February 11, 2005
3.4	Certificate of Amendment to Certificate of Incorporation of Arrowhead Research Corporation, filed with the Secretary of State of the State of Delaware on dated October 14, 2009	Annual Report on Form 10-K for the fiscal year ended September 30, 2009, as Exhibit 3.4	December 22, 2009
3.5	Series A Certificate of Designations, filed with the Secretary of State of the State of Delaware on October 25, 2011	Current Report on Form 8-K, as Exhibit 3.1	October 26, 2011
3.6	Certificate of Amendment to Certificate of Incorporation of Arrowhead Research Corporation, filed with the Secretary of State of the State of Delaware on November 15, 2011	Current Report on Form 8-K, as Exhibit 3.1	November 17, 2011
3.7	Bylaws	Schedule 14C, as Exhibit B	December 22, 2000
3.8	Amendment No. 1 to the Bylaws of Arrowhead Research Corporation	Current Report on Form 8-K, as Exhibit 3.1	April 27, 2010
3.9			May 1, 2013

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	Series B Certificate of Designations, filed with the Secretary of State of the State of Delaware on May 1, 2013	Current Report on Form 8-K, as Exhibit 3.1	
3.10	Series C Certificate of Designations, filed with the Secretary of State of the State of Delaware on October 10, 2013	Current Report on Form 8-K, as Exhibit 3.1	October 10, 2013
4.1	Form of Warrant to Purchase Capital Stock expiring June 2014	Current Report on Form 8-K, as Exhibit 4.1	July 17, 2009
4.2	Form of Warrant to Purchase Capital Stock expiring December 2014	Annual Report on Form 10-K for the fiscal year ended September 30, 2009, as Exhibit 4.7	December 22, 2009
4.3	Form of Warrant to Purchase Common Stock expiring May 2017	Current Report on Form 8-K, as Exhibit 4.1	May 30, 2007
4.4	Form of Warrant to Purchase Common Stock expiring December 2015	Current Report on Form 8-K, as Exhibit 4.1	June 18, 2010

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Exhibit Number	Description	Incorporated by Reference Herein Form	Date
4.5	Form of Warrant to Purchase Shares of Capital Stock of Arrowhead Research Corporation expiring September 16, 2015	Current Report on Form 8-K, as Exhibit 4.1	September 22, 2010
4.6	Form of Warrant to Purchase Shares of Common Stock Expiring August 13, 2016	Current Report on Form 8-K, as Exhibit 4.1	August 13, 2012
4.7	Form of Common Stock Certificate	Amendment No. 2 to Registration Statement on Form S-1, as Exhibit 4.7	September 11, 2009
4.8	Form of Series B Preferred Stock Certificate	Annual Report on Form 10-K for the fiscal year ended September 30, 2013, as Exhibit 4.15	December 18, 2013
4.9	Form of Warrant to Purchase Shares of Common Stock expiring August 17, 2016	Current Report on Form 8-K, as exhibit 4.2	August 13, 2012
4.10	Form of Warrant to Purchase Shares of Common Stock expiring December 12, 2017	Current Report on Form 8-K, as exhibit 4.2	December 12, 2012
4.11	Form of Warrant to Purchase Shares of Common Stock expiring January 30, 2018	Current Report on Form 8-K, as exhibit 4.2	January 30, 2013
4.12	Form of Series C Preferred Stock Certificate	Annual Report on Form 10-K for the fiscal year ended September 30, 2013, as Exhibit 4.15	December 18, 2013
10.1**	Arrowhead Research Corporation (fka InterActive, Inc.) 2000 Stock Option Plan	Schedule 14C, as Exhibit D	December 22, 2000
10.2**	Arrowhead Research Corporation 2004 Equity Incentive Plan, as amended	Schedule 14C, as Annex A	January 12, 2012
10.3**	Arrowhead Research Corporation 2013 Incentive Plan	Schedule 14C, as Annex A	December 20, 2013
10.4**	Form of Stock Option Agreement for use with the 2013 Incentive Plan	Current Report on Form 8-K, as Exhibit 10.1	February 12, 2014
10.5**	Form of Restricted Stock Unit Agreement for use with the 2013 Incentive Plan	Current Report on Form 8-K, as Exhibit 10.2	February 12, 2014
10.6**	Executive Incentive Plan, adopted December 12, 2006	Annual Report on Form 10-K for the fiscal year ended September 30, 2006, as Exhibit 10.11	December 14, 2006
10.7**	Employment Agreement between Arrowhead and Dr. Christopher Anzalone, dated June 11, 2008	Current Report on Form 8-K, as Exhibit 10.1	June 13, 2008

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10.8**	Amendment to Employment Agreement between Arrowhead and Dr. Christopher Anzalone, effective May 12, 2009	Annual Report on Form 10-K for the fiscal year ended September 30, 2009, as Exhibit 10.8	December 22, 2009
10.9	Non-Exclusive License Agreement between Arrowhead Research Corporation and Roche entities, dated October 21, 2011†	Annual Report on Form 10-K for the fiscal year ended September 30, 2011, as Exhibit 10.33	December 20, 2011

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Exhibit Number	Description	Incorporated by Reference Herein Form	Date
10.10	License and Collaboration Agreement, dated July 8, 2007	†Annual Report on Form 10-K for the fiscal year ended September 30, 2011, as Exhibit 10.35	December 20, 2011
10.11	Collaboration Agreement by and among Alnylam Pharmaceuticals, Inc. and F. Hoffmann-La Roche Ltd and Hoffman-La Roche Inc., dated October 29, 2009 †	Annual Report on Form 10-K for the fiscal year ended September 30, 2011, as Exhibit 10.36	December 20, 2011
10.12	Office Lease Agreement between South Lake Avenue Investors LLC and the Company, dated April 12, 2012	Quarterly Report on Form 10-Q, as Exhibit 10.1	May 8, 2012
10.13	Form of Subscription Agreement between Arrowhead Research Corporation and certain Investors	Current Report on Form 8-K, as Exhibit 99.1	December 12, 2012
10.14	Form of Subscription Agreement between Arrowhead Research Corporation and certain Investors	Current Report on Form 8-K, as Exhibit 99.1	January 30, 2013
10.15	Form of Securities Purchase Agreement between Arrowhead Research Corporation and certain Investors	Current Report on Form 8-K, as Exhibit 10.1	April 30, 2013
10.16	Securities Purchase Agreement between the Company and the purchasers listed thereon.	Current Report on Form 8-K, as Exhibit 10.1	October 10, 2013
10.17	License Agreement by and between Alnylam Pharmaceuticals, Inc., Arrowhead Research Corporation and Arrowhead Madison, Inc.†	Quarterly Report on Form 10-Q, as Exhibit 10.1	August 12, 2014
21.1	List of Subsidiaries*		
23.1	Consent of Independent Public Registered Accounting Firm*		
24.1	Power of Attorney (contained on signature page)		
31.1	Certification of Chief Executive Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002*		
31.2	Certification of Chief Financial Officer pursuant to Section 302 of the Sarbanes-Oxley Act of 2002*		
32.1	Certification by Chief Executive Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002***		
32.2	Certification by Chief Financial Officer pursuant to Section 906 of the Sarbanes-Oxley Act of 2002***		
101.INS	XBRL Instance Document*		

101.SCH XBRL Schema Document\*

101.CAL XBRL Calculation Linkbase Document\*

101.LAB XBRL Label Linkbase Document\*

101.PRE XBRL Presentation Linkbase Document\*

101.DEF XBRL Definition Linkbase Document\*

\*Filed herewith

\*\*Indicates compensation plan, contract or arrangement.

\*\*\*Furnished herewith

Confidential treatment has been requested with respect to certain portions of this exhibit. Omitted portions have been filed separately with the Securities and Exchange Commission.

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SIGNATURE

Pursuant to the requirements of Section 13 or 15(d) of the Securities Exchange Act of 1934, the Registrant has duly caused this Report on Form 10-K to be signed on its behalf by the undersigned, thereunto duly authorized, on this 14th day of December 2015.

Dated: December 14, 2015

ARROWHEAD RESEARCH  
CORPORATION

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

Pursuant to the requirements of the Securities Exchange Act of 1934, this Report on Form 10-K has been signed below by the following persons on behalf of the Registrant and in the capacities and on the dates indicated:

Signature	Title	Date
/s/ Christopher Anzalone Christopher Anzalone	Chief Executive Officer, President and Director (Principal Executive Officer)	December 14, 2015
/s/ Kenneth A. Myszkowski Kenneth A. Myszkowski	Chief Financial Officer (Principal Financial and Accounting Officer)	December 14, 2015
/s/ Douglass Given Douglass Given	Director, Chairman of the Board of Directors	December 14, 2015
/s/ Mauro Ferrari Mauro Ferrari	Director	December 14, 2015
/s/ Edward W. Frykman Edward W. Frykman	Director	December 14, 2015
/s/ Michael S. Perry Michael S. Perry	Director	December 14, 2015



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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of Arrowhead Research Corporation

We have audited the accompanying consolidated balance sheets of Arrowhead Research Corporation and Subsidiaries (the “Company”) as of September 30, 2015 and 2014, and the related consolidated statements of operations and comprehensive loss, stockholders’ equity and cash flows for each of the three years in the period ended September 30, 2015. These consolidated financial statements are the responsibility of the Company’s management. Our responsibility is to express an opinion on these consolidated financial statements based on our audits.

We conducted our audits in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the consolidated financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the consolidated financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall consolidated financial statement presentation. We believe that our audits provide a reasonable basis for our opinion.

In our opinion, the consolidated financial statements referred to above present fairly, in all material respects, the consolidated financial position of Arrowhead Research Corporation and Subsidiaries at September 30, 2015 and 2014, and the consolidated results of their operations and their cash flows for each of the three years in the period ended September 30, 2015, in conformity with U.S. generally accepted accounting principles.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), Arrowhead Research Corporation and Subsidiaries’ internal control over financial reporting as of September 30, 2015, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) and our report dated December 11, 2015 expressed an unqualified opinion thereon.

Rose, Snyder & Jacobs LLP

Encino, California

December 11, 2015

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REPORT OF INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

To the Board of Directors and Stockholders of Arrowhead Research Corporation

We have audited Arrowhead Research Corporation and Subsidiaries' (the "Company") internal control over financial reporting as of September 30, 2015, based on criteria established in Internal Control – Integrated Framework issued by the Committee of Sponsoring Organizations of the Treadway Commission (2013 framework) ("the COSO criteria"). Arrowhead Research Corporation's management is responsible for maintaining effective internal control over financial reporting, and for its assessment of the effectiveness of internal control over financial reporting included in the accompanying Management's Annual Report on Internal Control Over Financial Reporting. Our responsibility is to express an opinion on the Company's internal control over financial reporting based on our audit.

We conducted our audit in accordance with the standards of the Public Company Accounting Oversight Board (United States). Those standards require that we plan and perform the audit to obtain reasonable assurance about whether effective internal control over financial reporting was maintained in all material respects. Our audit included obtaining an understanding of internal control over financial reporting, assessing the risk that a material weakness exists, testing and evaluating the design and operating effectiveness of internal control based on the assessed risk, and performing such other procedures as we considered necessary in the circumstances. We believe that our audit provides a reasonable basis for our opinion.

A company's internal control over financial reporting is a process designed 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. A company's internal control over financial reporting includes those policies and procedures that (1) pertain to the maintenance of records that, in reasonable detail, accurately and fairly reflect the transactions and dispositions of the assets of the company; (2) provide reasonable assurance that transactions are recorded as necessary to permit preparation of financial statements in accordance with generally accepted accounting principles, and that receipts and expenditures of the company are being made only in accordance with authorizations of management and directors of the company; and (3) provide reasonable assurance regarding prevention or timely detection of unauthorized acquisition, use, or disposition of the company's assets that could have a material effect on the financial statements.

Because of its inherent limitations, internal control over financial reporting may not prevent or detect misstatements. Also, projections of any evaluation of effectiveness to future periods are subject to the risk that controls may become inadequate because of changes in conditions, or that the degree of compliance with the policies or procedures may deteriorate.

In our opinion, Arrowhead Research Corporation and Subsidiaries maintained, in all material respects, effective internal control over financial reporting as of September 30, 2015, based on the COSO criteria.

We also have audited, in accordance with the standards of the Public Company Accounting Oversight Board (United States), the 2015 consolidated financial statements of Arrowhead Research Corporation and Subsidiaries and our report dated December 11, 2015 expressed an unqualified opinion thereon.

Rose, Snyder & Jacobs LLP

Encino, California

December 11, 2015

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## PART I. FINANCIAL INFORMATION

## ITEM 1. FINANCIAL STATEMENTS

## Arrowhead Research Corporation

## Consolidated Balance Sheets

	September 30, 2015	September 30, 2014
<b>ASSETS</b>		
<b>CURRENT ASSETS</b>		
Cash and cash equivalents	\$81,214,354	\$132,510,610
Prepaid expenses	3,293,285	588,626
Other current assets	823,620	48,502
Short term investments	17,539,902	21,653,032
<b>TOTAL CURRENT ASSETS</b>	<b>102,871,161</b>	<b>154,800,770</b>
Property and equipment, net	4,526,848	3,872,753
Intangible assets, net	24,824,116	1,013,473
Investments	-	23,088,346
Other assets	45,789	41,414
<b>TOTAL ASSETS</b>	<b>\$132,267,914</b>	<b>\$182,816,756</b>
<b>LIABILITIES AND STOCKHOLDERS' EQUITY</b>		
<b>CURRENT LIABILITIES</b>		
Accounts payable	\$5,031,706	\$2,579,478
Accrued expenses	5,376,119	1,399,486
Accrued payroll and benefits	3,824,062	3,268,506
Deferred revenue	103,125	103,125
Derivative liabilities	1,301,604	4,173,943
Capital lease obligation	217,548	213,991
Notes payable	-	50,000
Other current liabilities	46,407	58,495
<b>TOTAL CURRENT LIABILITIES</b>	<b>15,900,571</b>	<b>11,847,024</b>
<b>LONG-TERM LIABILITIES</b>		
Capital lease obligation, net of current portion	540,792	758,340
Contingent consideration obligations	5,862,464	3,970,931
Other non-current liabilities	342,453	255,206
<b>TOTAL LONG-TERM LIABILITIES</b>	<b>6,745,709</b>	<b>4,984,477</b>
<b>Commitments and contingencies</b>		
<b>STOCKHOLDERS' EQUITY</b>		
Arrowhead Research Corporation stockholders' equity:		
Preferred stock, \$0.001 par value; 5,000,000 shares authorized; 15,652 and 18,300 shares issued and		
outstanding as of September 30, 2015 and September 30, 2014, respectively	16	18
Common stock, \$0.001 par value; 145,000,000 shares authorized; 59,544,677 and 54,656,936 shares	151,914	147,026



issued and outstanding as of September 30, 2015 and September 30, 2014,  
respectively

Additional paid-in capital	426,873,358	391,164,558
Accumulated other comprehensive income (loss)	(136,425 )	-
Accumulated deficit	(316,712,041)	(224,771,159)
Total Arrowhead Research Corporation stockholders' equity	110,176,822	166,540,443
Noncontrolling interest	(555,188 )	(555,188 )
<b>TOTAL STOCKHOLDERS' EQUITY</b>	<b>109,621,634</b>	<b>165,985,255</b>
<b>TOTAL LIABILITIES AND STOCKHOLDERS' EQUITY</b>	<b>\$132,267,914</b>	<b>\$182,816,756</b>

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

## Arrowhead Research Corporation

## Consolidated Statements of Operations and Comprehensive Loss

	Year Ended September 30,		
	2015	2014	2013
REVENUE	\$382,000	\$175,000	\$290,266
OPERATING EXPENSES			
Research and development	47,267,361	23,138,050	8,705,627
Acquired in-process research and development	10,142,786	-	-
Salaries and payroll-related costs	16,554,008	12,829,355	6,667,669
General and administrative expenses	7,931,184	5,894,008	3,488,864
Stock-based compensation	10,232,897	5,696,173	1,536,271
Depreciation and amortization	2,336,207	1,345,655	1,751,412
Impairment expense	-	2,172,387	1,308,047
Contingent consideration - Fair Value Adjustments	1,891,533	2,375,658	1,421,652
TOTAL OPERATING EXPENSES	96,355,976	53,451,286	24,879,542
OPERATING LOSS	(95,973,976)	(53,276,286)	(24,589,276)
OTHER INCOME (EXPENSE)			
Equity in income (loss) of unconsolidated affiliates	-	(78,874 )	(641,141 )
Gain (loss) on sale of fixed assets, net	19,195	(58,878 )	(76,388 )
Interest income (expense), net	729,158	645,493	(97,910 )
Change in value of derivatives	2,869,267	(6,033,659 )	(5,300,389 )
Other income (expense)	417,874	82,092	(997,975 )
TOTAL OTHER INCOME (EXPENSE)	4,035,494	(5,443,826 )	(7,113,803 )
LOSS BEFORE INCOME TAXES	(91,938,482)	(58,720,112)	(31,703,079)
Provision for income taxes	(2,400 )	(5,300 )	-
LOSS FROM CONTINUING OPERATIONS	(91,940,882)	(58,725,412)	(31,703,079)
Loss from discontinued operations	-	-	(354 )
NET LOSS FROM DISCONTINUED OPERATIONS	-	-	(354 )
NET LOSS	(91,940,882)	(58,725,412)	(31,703,433)
Net loss attributable to non-controlling interests	-	95,222	560,144
NET LOSS ATTRIBUTABLE TO ARROWHEAD	\$(91,940,882)	\$(58,630,190)	\$(31,143,289)
NET LOSS PER SHARE ATTRIBUTABLE TO ARROWHEAD			
SHAREHOLDERS - BASIC & DILUTED:	\$(1.60 )	\$(1.25 )	\$(1.30 )
Weighted average shares outstanding - basic and diluted	57,358,442	46,933,030	24,002,224
OTHER COMPREHENSIVE INCOME (LOSS), NET OF TAX			
Foreign Currency Translation Adjustments	(136,425 )	-	-
COMPREHENSIVE LOSS ATTRIBUTABLE TO			
ARROWHEAD	\$(92,077,307)	\$(58,630,190)	\$(31,143,289)

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



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Arrowhead Research Corporation - Consolidated Statement of Stockholders' Equity

	Preferred Stock	Amount (\$)	Common Stock	Amount (\$)	Additional Paid-In Capital	Subscription Receivable	Accumulated Other Comprehensive Income (loss)	Accumulated Deficit	Non-controlling Interest	Totals
at per 30,	-	\$-	13,579,185	\$108,354	\$145,917,968	\$(1,016,000)	\$-	\$(134,997,680)	\$(1,203,733)	\$8,808
e of	-	-	1,182,451	1,183	2,053,416	-	-	-	-	2,054
e of stock	-	-	675	1	2,578	-	-	-	-	2,579
ased	-	-	-	-	1,536,271	-	-	-	-	1,536
sation	-	-	-	-	-	16,000	-	-	-	16,000
otion	-	-	(267,444 )	(2,674 )	(997,326 )	1,000,000	-	-	-	-
on stock	-	-	239,894	240	985,809	-	-	-	-	986,0
@ \$4.49	-	-	1,825,079	1,825	3,814,643	-	-	-	-	3,816
e	-	-	1,667,051	1,667	3,255,192	-	-	-	-	3,256
n stock	-	-	14,262,553	14,263	25,445,236	-	-	-	-	25,45
trants	-	-	-	-	1,600,989	-	-	-	-	1,600
@ \$2.26	9,900	10	-	-	9,899,990	-	-	-	-	9,900
n stock	-	-	-	-	-	-	-	(31,143,289 )	(560,144 )	(31,70
trants	-	-	-	-	-	-	-	-	-	-
@ \$2.12	-	-	-	-	-	-	-	-	-	-
n stock	-	-	-	-	-	-	-	-	-	-
trants	-	-	-	-	-	-	-	-	-	-
@ \$1.83	-	-	-	-	-	-	-	-	-	-
h and	-	-	-	-	-	-	-	-	-	-
ents	-	-	-	-	-	-	-	-	-	-
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ve	-	-	-	-	-	-	-	-	-	-
d stock	-	-	-	-	-	-	-	-	-	-
@ 1,000	-	-	-	-	-	-	-	-	-	-
e	-	-	-	-	-	-	-	-	-	-
for the	-	-	-	-	-	-	-	-	-	-
led	-	-	-	-	-	-	-	-	-	-
per 30,	-	-	-	-	-	-	-	-	-	-
at	-	-	-	-	-	-	-	-	-	-
per 30,	-	-	-	-	-	-	-	-	-	-
e of	-	-	-	-	-	-	-	-	-	-
s	-	-	-	-	-	-	-	-	-	-

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Number of stock	-	-	454,863	455	2,729,545	-	-	-	-	2,730
Weighted average	-	-	-	-	5,696,173	-	-	-	-	5,696
Number of stock	-	-	3,071,672	3,072	14,057,040	-	-	-	-	14,06
Weighted average	-	-	6,325,000	6,325	112,575,234	-	-	-	-	112,5
Number of stock	46,000	46	-	-	45,999,954	-	-	-	-	46,00
Weighted average	-	-	131,579	132	499,868	-	-	-	-	500,0
Number of stock	-	-	-	-	5,956,079	-	-	-	-	5,956
Weighted average	(37,600)	(38)	9,272,459	9,272	(9,234 )	-	-	-	-	-
Number of stock	-	-	-	-	-	-	-	-	1,303,911	1,303
Weighted average	-	-	-	-	-	-	-	(58,630,190 )	(95,222 )	(58,72
Number of stock	18,300	\$18	54,656,936	\$147,026	\$391,164,558	\$-	\$-	\$(224,771,159)	\$(555,188 )	\$165,9
Weighted average	-	-	79,828	81	401,795	-	-	-	-	401,8
Number of stock	-	-	28,758	29	101,841	-	-	-	-	101,8
Weighted average	-	-	-	-	10,232,897	-	-	-	-	10,23
Number of stock	-	-	5,250	5	3,067	-	-	-	-	3,072
Weighted average	(2,648 )	(2 )	1,316,215	1,316	(1,314 )	-	-	-	-	-
Number of stock	-	-	136,307	136	(26,165 )	-	-	-	-	(26,02
Weighted average	-	-	3,321,383	3,321	24,996,679	-	-	-	-	25,00
Number of stock	-	-	-	-	-	-	(136,425)	-	-	(136,4

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## Arrowhead Research Corporation

## Consolidated Statements of Cash Flows

	Year ended September 30,		
	2015	2014	2013
<b>CASH FLOWS FROM OPERATING ACTIVITIES:</b>			
Net loss	\$(91,940,882 )	\$(58,725,412 )	\$(31,703,433 )
Net loss attributable to non-controlling interests	-	95,222	560,144
Net loss attributable to Arrowhead	(91,940,882 )	(58,630,190 )	(31,143,289 )
Loss from discontinued operations	-	-	354
(Gain) loss on disposal of fixed assets	(19,195 )	58,878	76,388
Change in value of derivatives	(2,869,267 )	6,033,659	5,300,389
Contingent consideration - fair value adjustments	1,891,533	2,375,658	1,421,652
Acquired in-process research and development	10,142,786	-	-
Stock-based compensation	10,232,897	5,696,173	1,536,271
Depreciation and amortization	2,336,207	1,345,655	1,751,412
Amortization of note premiums	1,110,524	793,887	128,406
Gain on debt extinguishment	-	(84,721 )	-
Noncash gain in equity investment	-	(87,197 )	-
Noncash impairment expense	-	2,172,387	2,315,721
Non-controlling interest	-	(95,222 )	(560,144 )
<b>Changes in operating assets and liabilities:</b>			
Receivables	-	75,000	(65,625 )
Other receivables	(789,090 )	(25,867 )	1,080
Prepaid expenses	(2,693,839 )	(15,812 )	44,713
Other current assets	(2,492 )	(13,287 )	(1,811 )
Accounts payable	2,497,804	1,412,275	321,647
Accrued expenses	4,435,784	3,478,094	27,920
Other	(40,385 )	94,257	(187,910 )
<b>NET CASH USED IN OPERATING ACTIVITIES</b>	<b>(65,707,615 )</b>	<b>(35,416,373 )</b>	<b>(19,032,826 )</b>
<b>CASH FLOWS FROM INVESTING ACTIVITIES:</b>			
Cash paid for acquisitions	(10,000,000 )	-	-
Purchases of property and equipment	(1,970,612 )	(1,717,362 )	(296,880 )
Proceeds from sale of fixed assets	500	10,000	89,505
Purchase of marketable securities	-	(46,365,528 )	(10,732,571 )
Proceeds from sale of marketable securities	26,090,950	11,591,120	1,419,079
<b>NET CASH PROVIDED BY (USED IN) INVESTING ACTIVITIES</b>	<b>14,120,838</b>	<b>(36,481,770 )</b>	<b>(9,520,867 )</b>
<b>CASH FLOWS FROM FINANCING ACTIVITIES:</b>			
Principal payments on capital leases	(213,991 )	(225,406 )	(214,801 )
Proceeds from issuance of common stock and preferred stock, net	-	172,641,671	42,448,826
Proceeds from the exercise of warrants and stock options	504,512	12,878,044	2,057,178
<b>NET CASH PROVIDED BY FINANCING ACTIVITIES</b>	<b>290,521</b>	<b>185,294,309</b>	<b>44,291,203</b>
<b>Cash flows from discontinued operations:</b>			
Operating cash flows	-	-	(354 )
Investing cash flows	-	-	-
Financing cash flows	-	-	-

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Net cash used in discontinued operations:	-	-	(354 )
NET INCREASE (DECREASE) IN CASH	(51,296,256 )	113,396,166	15,737,156
CASH AT BEGINNING OF PERIOD	132,510,610	19,114,444	3,377,288
CASH AT END OF PERIOD	\$81,214,354	\$132,510,610	\$19,114,444
Supplementary disclosures:			
Interest paid	\$14,429	\$25,635	\$42,044
3,321,383 shares of Common stock issued to Novartis for asset acquisition	\$25,000,000	\$-	\$-
131,579 shares of Common stock issued to Galloway Limited in settlement of services agreement	\$-	\$500,000	\$-
239,894 shares of Common stock issued to Roche for stock and asset acquisition	\$-	\$-	\$986,049

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



Arrowhead Research Corporation

Notes to Consolidated Financial Statements

Unless otherwise noted, (1) the term “Arrowhead” refers to Arrowhead Research Corporation, a Delaware corporation, (2) the terms the “Company,” “we,” “us,” and “our,” refer to the ongoing business operations of Arrowhead and its Subsidiaries, whether conducted through Arrowhead or a subsidiary of Arrowhead, (3) the term “Subsidiaries” refers collectively to Arrowhead Madison Inc. (“Arrowhead Madison”), Arrowhead Australia Pty Ltd (“Arrowhead Australia”) and Ablaris Therapeutics, Inc. (“Ablaris”), (4) the term “Common Stock” refers to Arrowhead’s Common Stock, (5) the term “Preferred Stock” refers to Arrowhead’s Preferred Stock and the term “Stockholder(s)” refers to the holders of Arrowhead Common Stock.

NOTE 1. ORGANIZATION AND SIGNIFICANT ACCOUNTING POLICIES

Nature of Business

Arrowhead Research develops novel drugs to treat intractable diseases by silencing the genes that cause them. Using the industry’s broadest portfolio of RNA chemistries and efficient modes of delivery, Arrowhead therapies trigger the RNA interference mechanism to induce rapid, deep and durable knockdown of target genes. RNA interference (RNAi) is a mechanism present in living cells that inhibits the expression of a specific gene, thereby affecting the production of a specific protein. Deemed to be one of the most important recent discoveries in life science with the potential to transform medicine, the discoverers of RNAi were awarded a Nobel Prize in 2006 for their work. Arrowhead’s RNAi-based therapeutics leverage this natural pathway of gene silencing to target and shut down specific disease causing genes.

Liquidity

Historically, the Company’s primary source of financing has been through the sale of its securities. Research and development activities have required significant capital investment since the Company’s inception. We expect our operations to continue to require cash investment to pursue our research and development goals, including clinical trials and related drug manufacturing. Based upon the Company’s current cash resources and operating plan, the Company expects to have sufficient liquidity to fund operations for at least the next twelve months.

At September 30, 2015, the Company had \$81.2 million in cash to fund operations. In addition to its cash resources, the Company has invested excess cash in investment grade commercial bonds maturing in less than 12 months. These bonds provide a source of liquidity, though the Company plans to hold them until maturity. At September 30, 2015, the Company had invested \$17.5 million in bonds. During the year ended September 30, 2015, the Company’s cash position decreased by \$51.3 million which was primarily the result of cash outflows related to operating activities of \$65.7 million, cash paid for the acquisition of certain RNAi assets from Novartis of \$10.0 million (see footnote 2) and capital expenditures of \$2.0 million, partially offset by maturities of fixed income investments totaling \$26.1 million and proceeds from the exercise of warrants and options of \$0.5 million.

Summary of Significant Accounting Policies

Principles of Consolidation—The consolidated financial statements include the accounts of Arrowhead and its Subsidiaries. Arrowhead’s primary operating subsidiary is Arrowhead Madison, which is located in Madison, Wisconsin, where the Company’s research and development facilities are located. All significant intercompany accounts and transactions are eliminated in consolidation.

**Basis of Presentation and Use of Estimates**—The preparation of financial statements in conformity with accounting principles generally accepted in the United States requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. In the opinion of management, all adjustments, consisting of normal recurring accruals, considered necessary for a fair presentation have been included. Actual results could materially differ from those estimates. Additionally, certain reclassifications have been made to prior period financial statements to conform to the current period presentation.

**Cash and Cash Equivalents**—The Company considers all liquid debt instruments purchased with a maturity of three months or less to be cash equivalents. The Company had no restricted cash at September 30, 2015 and September 30, 2014.

**Concentration of Credit Risk**—The Company maintains several bank accounts for its operations at two financial institutions. These accounts are insured by the Federal Deposit Insurance Corporation (FDIC) for up to \$250,000 per institution. Management believes the Company is not exposed to significant credit risk due to the financial position of the depository institutions in which these deposits are held.

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**Investments**—The Company may invest excess cash balances in short-term and long-term marketable debt securities. Investments may consist of certificates of deposits, money market accounts, government-sponsored enterprise securities, corporate bonds and/or commercial paper. The Company accounts for its investment in marketable securities in accordance with FASB ASC 320, Investments – Debt and Equity Securities. This statement requires certain securities to be classified into three categories:

**Held-to-maturity**—Debt securities that the entity has the positive intent and ability to hold to maturity are reported at amortized cost.

**Trading Securities**—Debt and equity securities that are bought and held primarily for the purpose of selling in the near term are reported at fair value, with unrealized gains and losses included in earnings.

**Available-for-Sale**—Debt and equity securities not classified as either securities held-to-maturity or trading securities are reported at fair value with unrealized gains or losses excluded from earnings and reported as a separate component of shareholders' equity.

The Company classifies its investments in marketable debt securities based on the facts and circumstances present at the time of purchase of the securities. At September 30, 2015, the Company classified all of its investments as held-to-maturity.

Held-to-maturity investments are measured and recorded at amortized cost on the Company's Consolidated Balance Sheet. Discounts and premiums to par value of the debt securities are amortized to interest income/expense over the term of the security. No gains or losses on investment securities are realized until they are sold or a decline in fair value is determined to be other-than-temporary.

**Property and Equipment**—Property and equipment are recorded at cost, which may equal fair market value in the case of property and equipment acquired in conjunction with a business acquisition. Depreciation of property and equipment is recorded using the straight-line method over the respective useful lives of the assets ranging from three to seven years. Leasehold improvements are amortized over the lesser of the expected useful life or the remaining lease term. Long-lived assets, including property and equipment are reviewed for impairment whenever events or circumstances indicate that the carrying amount of these assets may not be recoverable.

**Intangible Assets Subject to Amortization**—At September 30, 2015, intangible assets subject to amortization include certain patents and license agreements. Intangible assets subject to amortization are reviewed for impairment whenever events or circumstances indicate that the carrying amount of these assets may not be recoverable.

**In-Process Research & Development (IPR&D)**—IPR&D assets represent capitalized on-going research projects that were acquired through business combinations. Such assets are initially measured at their acquisition date fair values. The amounts capitalized are being accounted for as indefinite-lived intangible assets, subject to impairment testing until completion or abandonment of R&D efforts associated with the project. Upon successful completion of a project, Arrowhead will make a determination as to the then remaining useful life of the intangible asset and begin amortization. Arrowhead tests its indefinite-lived assets for impairment at least annually, through a two-step process. The first step is a qualitative assessment to determine if it is more likely than not that the indefinite lived assets are impaired. Arrowhead considers relevant events and circumstances that could affect the inputs used to determine the fair value of the intangible assets. If the qualitative assessment indicates that it is more likely than not that the intangible assets are impaired, a second step is performed which is a quantitative test to determine the fair value of the intangible asset. If the carrying amount of the intangible assets exceeds its fair value, an impairment loss is recorded in the amount of that excess. If circumstances determine that it is appropriate, the Company may also elect to bypass step one, and proceed directly to the second step.



**Contingent Consideration**—The consideration for the Company's acquisitions often includes future payments that are contingent upon the occurrence of a particular event. For example, milestone payments might be based on the achievement of various regulatory approvals or future sales milestones, and royalty payments might be based on drug product sales levels. The Company records a contingent consideration obligation for such contingent payments at fair value on the acquisition date. The Company estimates the fair value of contingent consideration obligations through valuation models designed to estimate the probability of such contingent payments based on various assumptions and incorporating estimated success rates. Estimated payments are discounted using present value techniques to arrive at estimated fair value at the balance sheet date. Changes in the fair value of the contingent consideration obligations are recognized within the Company's Consolidated Statements of Operations. Changes in the fair value of the contingent consideration obligations can result from changes to one or multiple inputs, including adjustments to the discount rates, changes in the amount or timing of expected expenditures associated with product development, changes in the amount or timing of cash flows from products upon commercialization, changes in the assumed achievement or timing of any development milestones, changes in the probability of certain clinical events and changes in the assumed probability associated with regulatory approval. These fair value measurements are based on significant inputs not observable in the market. Substantial judgment is employed in determining the appropriateness of these assumptions as of the acquisition date and for each subsequent period. Accordingly, changes in assumptions could have a material impact on the amount of contingent consideration expense the Company records in any given period.

**Revenue Recognition**—Revenue from license fees are recorded when persuasive evidence of an arrangement exists, title has passed or services have been rendered, a price is fixed and determinable, and collection is reasonably assured. The Company may generate revenue from product sales, technology licenses, collaborative research and development arrangements, and research grants. Revenue under technology licenses and collaborative agreements typically consists of nonrefundable and/or guaranteed technology license fees, collaborative research funding and various milestone and future product royalty or profit-sharing payments.

Payments under collaborative research and development agreements are recognized as revenue ratably over the relevant periods specified in the agreement, generally the period during which research and development is conducted. Revenue from up-front license fees, milestones and product royalties are recognized as earned based on the completion of the milestones and product sales, as defined in the respective agreements. Payments received in advance of recognition as revenue are recorded as deferred revenue.

**Allowance for Doubtful Accounts**—The Company accrues an allowance for doubtful accounts based on estimates of uncollectible revenues by analyzing historical collections, accounts receivable aging and other factors. Accounts receivable are written off when all collection attempts have failed.

**Research and Development**—Costs and expenses that can be clearly identified as research and development are charged to expense as incurred in accordance with FASB ASC 730-10. Included in research and development costs are operating costs, facilities, supplies, external services, clinical trial and manufacturing costs, overhead directly related to the Company's research and development operations, and costs to acquire technology licenses.

**Earnings (Loss) per Share**—Basic earnings (loss) per share is computed using the weighted-average number of common shares outstanding during the period. Diluted earnings (loss) per share are computed using the weighted-average number of common shares and dilutive potential common shares outstanding during the period. Dilutive potential common shares primarily consist of stock options and restricted stock units issued to employees and warrants to purchase Common Stock of the Company. All outstanding stock options, restricted stock units and warrants for the years ended September 30, 2015, 2014 and 2013 have been excluded from the calculation of Diluted earnings (loss) per share due to their anti-dilutive effect.

**Stock-Based Compensation**—The Company accounts for share-based compensation arrangements in accordance with FASB ASC 718, which requires the measurement and recognition of compensation expense for all share-based payment awards to be based on estimated fair values. The Company uses the Black-Scholes option valuation model to

estimate the fair value of its stock options at the date of grant. The Black-Scholes option valuation model requires the input of subjective assumptions to calculate the value of stock options. For restricted stock units, the value of the award is based on the Company's stock price at the grant date. For performance-based stock awards, the value of the award is measured at the grant date. The Company uses historical data and other information to estimate the expected price volatility and the expected forfeiture rate. Expense is recognized over the vesting period, commencing at the time the Company determines the achievement of performance conditions is probable. This determination requires significant judgment by management.

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**Derivative Assets and Liabilities**—The Company accounts for warrants and other derivative financial instruments as either equity or assets/liabilities based upon the characteristics and provisions of each instrument. Warrants classified as equity are recorded as additional paid-in capital on the Company’s Consolidated Balance Sheet. Some of the Company’s warrants were determined to be ineligible for equity classification because of provisions that may result in an adjustment to their exercise price. Warrants classified as derivative liabilities and other derivative financial instruments that require separate accounting as assets or liabilities are recorded on the Company’s Consolidated Balance Sheet at their fair value on the date of issuance and are revalued on each subsequent balance sheet date until such instruments are exercised or expire, with any changes in the fair value between reporting periods recorded as other income or expense. The Company estimates the fair value of these assets/liabilities using option pricing models that are based on the individual characteristics of the warrants or instruments on the valuation date, as well as assumptions for expected volatility, expected life and risk-free interest rate.

**Income Taxes**—The Company accounts for income taxes under the liability method, which requires the recognition of deferred income tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements or tax returns. Under this method, deferred income taxes are recognized for the tax consequences in future years of differences between the tax bases of assets and liabilities and their financial reporting amounts at each period end based on enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income. Valuation allowances are established, when necessary, to reduce deferred income tax assets to the amount expected to be realized. The provision for income taxes, if any, represents the tax payable for the period and the change in deferred income tax assets and liabilities during the period.

#### Recent Accounting Pronouncements

In November 2015, the FASB issued ASU 2015-17, Balance Sheet Classification of Deferred Taxes, which simplifies the presentation of deferred income taxes by eliminating the need for entities to separate deferred income tax liabilities and assets into current and noncurrent amounts in a classified statement of financial position. The adoption of this update is not expected to have a material effect on our financial statements.

In August 2014, the FASB issued ASU 2014-15, Presentation of Financial Statements – Going Concern (Topic 915): Disclosure of Uncertainties about an Entity’s Ability to Continue as a Going Concern, which states that in connection with preparing financial statements for each annual and interim reporting period, an entity’s management should evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the entity’s ability to continue as a going concern within one year after the date that the financial statements are issued (or within one year after the date that the financial statements are available to be issued when applicable). The adoption of this update did not have a material effect on our financial statements.

In May 2014, the FASB issued ASU No. 2014-09 Revenue from Contracts with Customers (Topic 606), which will supersede nearly all existing revenue recognition guidance under GAAP. ASU No. 2014-09 provides that an entity recognize revenue when it transfers promised goods or services to customers in an amount that reflects the consideration to which the entity expects to be entitled in exchange for those goods or services. This update also requires additional disclosure about the nature, amount, timing and uncertainty of revenue and cash flows arising from customer contracts, including significant judgments and changes in judgments, and assets recognized from costs incurred to obtain or fulfill a contract. ASU No. 2014-09 allows for either full retrospective or modified retrospective adoption and will become effective for the Company in the first quarter of 2018. The Company is evaluating the potential effects of the adoption of this update on its financial statements.

#### NOTE 2. ACQUISITIONS

On March 3, 2015, the Company entered into an Asset Purchase and Exclusive License Agreement (the “RNAi Purchase Agreement”) with Novartis Institutes for BioMedical Research, Inc., a Delaware corporation (“Novartis”), pursuant to which the Company acquired Novartis’ RNAi assets and rights thereunder. Pursuant to the RNAi Purchase

Agreement, the Company acquired or licensed certain patents and patent applications owned or controlled by Novartis related to RNAi therapeutics, assignment of a third-party license, rights to three pre-clinical RNAi candidates, and other related assets (collectively, the “Purchased Assets”). The acquisition of the Purchased Assets closed on March 3, 2015, concurrent with execution of the RNAi Purchase Agreement (the “Closing”).

In consideration for the Purchased Assets, the Company made certain payments to Novartis, including: (a) a payment of \$10,000,000 in cash, and 3,321,383 shares of the Company’s common stock (the “Shares”); (b) escalating royalties in the single digits based upon annual net sales thresholds for certain RNAi products sold by the Company; and (c) milestone payments tied to the achievement of certain development and sales milestones for each target being developed by the Company.

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Pursuant to the RNAi Purchase Agreement, prior to initiation of a phase 2 Clinical Trial (as defined, along with all other italicized terms in this section, in the RNAi Purchase Agreement) for a given RNAi Product or Arrowhead RNAi Product directed to an Initial Target, Novartis has an exclusive right to negotiate a license under any Intellectual Property Rights owned or exclusively licensed to the Company to make, sell or otherwise commercially exploit such RNAi Product or Arrowhead RNAi Product. After initiation of a phase 2 Clinical Trial for a given Arrowhead RNAi Product (“ROFN Candidate”), Novartis shall have a right of first negotiation on the ROFN Candidate developed by the Company and its affiliates relating to the purchased assets. If the Company proposes to out-license, or enters into substantive negotiations to out-license, any ROFN Candidate, the Company must give notice of the ROFN Candidate it proposes to out-license and negotiate exclusively and in good faith with Novartis for a period of time regarding the applicable out-license.

In addition to the consideration paid by the Company at the closing of the Transaction, the Company is obligated to make certain royalty and milestone payments to Novartis upon the occurrence of certain events. For sales of any RNAi Products for which Novartis and the Company do not enter into a licensing arrangement, the Company will be obligated to pay royalty rates ranging in the low to mid-single digits on Net Sales depending upon the type of RNAi Product provided that the royalty rate may be reduced or offset in certain circumstances. The obligation to pay royalties on such candidates will last until the later of (i) the expiration of the last Valid Claim Covering such RNAi Product in such country and (ii) 11 years after the first commercial sale of such RNAi Product (as such italicized terms are defined in the RNAi Purchase Agreement).

The Company will also be obligated to make cash payments to Novartis upon the achievement of various milestones for any RNAi Products for which Novartis and the Company do not enter into a licensing arrangement. These milestones include the initiation of phase 2 and 3 clinical trials, U.S. and other regulatory approvals, and annual sales milestones. These milestone payments could total an amount in the mid to upper double digit millions of dollars.

The following table summarizes the estimated relative fair values of the assets acquired at the date of acquisition:

Intangible assets - patents	\$21,728,334
Intangible assets – license	3,128,880
Acquired in-process research and development - Pre-Clinical Candidates	10,142,786
Total purchase consideration	\$ 35,000,000

The purchase consideration was composed of the following:

Cash Paid	\$10,000,000
Value of Shares Issued	25,000,000
Total purchase consideration	\$35,000,000

The Company accounted for this transaction as an acquisition of RNAi assets, including patents, a third-party license and in process research and development for the pre-clinical candidates. The allocation of the purchase price to each asset was determined by estimating the relative fair value of each asset acquired and applying that to the total cost of the acquisition for the Company. The Company capitalized the patents and license acquired as Intangible Assets as they require no future development and will have alternative future uses as the Company expands its RNAi capabilities (see footnote 5 for additional discussion of the useful lives and amortization of these Intangible Assets). The Company expensed the portion of the purchase consideration allocated to the pre-clinical candidates as they will require future development in order to be commercialized. This expense is recorded in the “Acquired in-process research and development” line item of the Consolidated Statements of Operations.

## NOTE 3. PROPERTY AND EQUIPMENT

The following table summarizes our major classes of property and equipment:

	September 30, 2015	September 30, 2014
Computers, office equipment and furniture	\$404,964	\$334,162
Research equipment	6,354,584	4,614,176
Software	110,428	69,623
Leasehold improvements	3,117,537	3,045,022
Total gross fixed assets	9,987,513	8,062,983
Less: Accumulated depreciation and amortization	(5,460,665)	(4,190,230)
Property and equipment, net	\$4,526,848	\$3,872,753

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## NOTE 4. INVESTMENTS

The Company invests a portion of its excess cash balances in short-term and long-term debt securities. Investments at September 30, 2015 consisted of corporate bonds with maturities remaining of less than one year. The Company may also invest excess cash balances in certificates of deposit, money market accounts, U.S. Treasuries, U.S. government agency obligations, corporate debt securities, and/or commercial paper. The Company accounts for its investments in accordance with FASB ASC 320, Investments – Debt and Equity Securities. At September 30, 2015, all investments were classified as held-to-maturity securities.

The following tables summarize the Company's short- and long-term investments as of September 30, 2015, and September 30, 2014:

	As of September 30, 2015			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Commercial notes (due within one year)	\$17,539,902	\$ —	\$ (304,942 )	\$17,234,960
Commercial notes (due after one year through two years)	\$—	—	\$—	\$—
Total	\$17,539,902	\$ —	\$ (304,942 )	\$17,234,960

	As of September 30, 2014			
	Amortized Cost	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
Commercial notes (due within one year)	\$21,653,032	\$ —	\$ (189,830 )	\$21,463,202
Commercial notes (due after one year through two years)	\$23,088,346	—	\$ (217,693 )	\$22,870,653
Total	\$44,741,378	\$ —	\$ (407,523 )	\$44,333,855

## NOTE 5. INTANGIBLE ASSETS

Intangible assets consist of in-process research and development ("IPR&D") not subject to amortization, and patents and license agreements subject to amortization, which were capitalized as a part of an asset acquisition or business combination.

IPR&D represents projects that have not yet received regulatory approval and are required to be classified as indefinite assets until the successful completion or the abandonment of the associated R&D efforts. Accordingly, during the development period after the date of acquisition, these assets will not be amortized until approval is obtained in one or more jurisdictions which, individually or combined, are expected to generate a significant portion of the total revenue expected to be earned by an IPR&D project. At that time, the Company will determine the useful life of the asset, reclassify the asset out of IPR&D and begin amortization. If the associated R&D effort is abandoned the related IPR&D assets will likely be written off and the Company would record an impairment loss. Intangible assets not subject to amortization include IPR&D capitalized as part of a business combination from the acquisition of the Roche RNAi business.

Intangible assets subject to amortization include patents and a license agreement capitalized as part of the Novartis RNAi asset acquisition and license agreements capitalized from the acquisition of the Roche RNAi business. The license agreement associated with the Novartis RNAi asset acquisition is being amortized over the estimated life

remaining at the time of acquisition which was 21 years, and the accumulated amortization of the asset is approximately \$86,570. The license agreements associated with the acquisition of the Roche RNAi business are being amortized over the estimated life remaining at the time of acquisition, which was 4 years, and the accumulated amortization of the assets is approximately \$216,116. The patents associated with the Novartis RNAi asset acquisition are being amortized over the estimated life remaining at the time of acquisition, which was 14 years, and the accumulated amortization of the assets is approximately \$905,347. Amortization expense for the years ended September 30, 2015, 2014 and 2013 was \$1,046,571, \$54,653 and \$236,009, respectively. Amortization expense is expected to be approximately \$1,714,313 in 2016, \$1,700,429 in 2017, \$1,700,429 in 2018, \$1,700,429 in 2019, \$1,700,429 in 2020, \$1,700,429 in 2021 and \$13,662,723 thereafter.

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The following table provides details on the Company's intangible asset balances:

	Intangible assets not subject to amortization	Intangible assets subject to amortization	Total Intangible assets
Balance at September 30, 2013	\$ 3,117,322	\$ 123,191	\$ 3,240,513
Impairment	(2,172,387 )	-	(2,172,387 )
Amortization	-	(54,653 )	(54,653 )
Balance at September 30, 2014	\$ 944,935	\$ 68,538	\$ 1,013,473
Acquisition of Novartis RNAi Assets	-	24,857,214	24,857,214
Amortization	-	(1,046,571 )	(1,046,571 )
Balance at September 30, 2015	\$ 944,935	\$ 23,879,181	\$ 24,824,116

#### NOTE 6. STOCKHOLDERS' EQUITY

At September 30, 2015, the Company had a total of 150,000,000 shares of capital stock authorized for issuance, consisting of 145,000,000 shares of Common Stock, par value \$0.001 per share, and 5,000,000 shares of Preferred Stock, par value \$0.001 per share.

At September 30, 2015, 59,544,677 shares of Common Stock were outstanding. Additionally, 15,652 shares of Series C Preferred Stock were outstanding, which are convertible into 2,670,990 shares of Common Stock. At September 30, 2015, 8,099,777 shares of Common Stock were reserved for issuance upon exercise of options and vesting of restricted stock units granted or available for grant under Arrowhead's 2004 Equity Incentive Plan and 2013 Incentive Plan, as well as for inducement grants made to new employees.

The Preferred Stock is convertible to Common Stock by its holder at its stated conversion price, though it is not convertible to the extent the holder would beneficially own more than 9.99% of the number of shares of outstanding Common Stock immediately after the conversion. The holders of Preferred Stock are eligible to vote with the Common Stock of the Company on an as-converted basis, but only to the extent they are eligible for conversion without exceeding the 9.99% ownership limitation. The Preferred Stock does not carry a coupon, but it is entitled to receive dividends on a pari passu basis with Common Stock, when and if declared. In any liquidation or dissolution of the Company, the holders of Preferred Stock are entitled to participate in the distribution of the assets, to the extent legally available for distribution, on a pari passu basis with the Common Stock.

On October 11, 2013, the Company sold 3,071,672 shares of Common Stock, at a price of \$5.86 per share, and 46,000 shares of Series C Preferred Stock, at a price of \$1,000 per share. The Preferred Stock is convertible into shares of common stock at a conversion price of \$5.86. The aggregate purchase price paid by the purchasers for the Common Stock and Series C Preferred Stock was \$64,000,000 and the Company received net proceeds of approximately \$60,000,000, after advisory fees and offering expenses.

On February 24, 2014, the Company sold 6,325,000 shares of Common Stock, at a public offering price of \$18.95 per share. Net proceeds were approximately \$112.6 million after underwriting commissions and discounts and other offering expenses.

The following table summarizes information about warrants outstanding at September 30, 2015:

Exercise prices	Number of Warrants	Remaining Life in Years
\$ 70.60	94,897	1.6
\$ 5.00	364,375	0.8
\$ 5.09	239,534	0.8
\$ 1.38	24,324	0.2
\$ 4.16	1,000	1.2
\$ 3.25	334,347	0.9
\$ 2.12	75,000	2.2
\$ 1.83	277,284	2.2
\$ 7.14	80,000	2.7
Total warrants outstanding	1,490,761	

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## NOTE 7. COMMITMENTS AND CONTINGENCIES

## Leases

The Company leases office space for its corporate headquarters in Pasadena, California. In March 2014, the Company signed a lease addendum to expand its corporate headquarters, and the new space became available in September 2014. The leases for the expansion space and the current space will expire in September 2019. Rental costs, including the expansion space, are approximately \$24,000 per month, increasing approximately 3% annually.

The Company's research facility in Madison, Wisconsin is leased through February 2019. Monthly rental expense is approximately \$26,000. Other monthly rental expenses include common area maintenance and real estate taxes totaling approximately \$18,000 per month. Utilities costs are approximately \$16,000 per month. Total monthly costs are approximately \$79,000 per month, including monthly payments recorded under a capital lease of approximately \$19,000.

In May 2015, the Company signed a lease for additional research facility space in Middleton, Wisconsin, and this space is leased through May 2016. Monthly rental expense for the additional space is approximately \$4,000. Other monthly rental expenses include common area maintenance and real estate taxes totaling approximately \$2,000 per month.

Facility rent expense for the years ended September 30, 2015, 2014 and 2013 was \$744,000, \$554,000 and \$534,000, respectively.

As of September 30, 2015, future minimum lease payments due in fiscal years under capitalized leases are as follows:

2016	\$228,420
2017	228,420
2018	228,420
2019	95,175
2020	-
2021 and thereafter	-
Less interest	(22,095 )
Principal	758,340
Less current portion	(217,548)
Noncurrent portion	\$540,792

As of September 30, 2015, future minimum lease payments due in fiscal years under operating leases are as follows:

2016	\$631,881
2017	613,664
2018	637,897
2019	459,633
2020	-
2021 and thereafter	-
Total	\$2,343,075

## Litigation

The Company and certain of its officers and directors have been named as defendants in a consolidated class action pending before the United States District Court for the Central District of California regarding certain public statements in connection with the Company's hepatitis B drug research. The consolidated class action, initially filed as Wang v. Arrowhead Research Corp., et al., No. 2:14-cv-07890 (C.D. Cal., filed Oct. 10, 2014), and Eskinazi v. Arrowhead Research Corp., et al., No. 2:14-cv-07911 (C.D. Cal., filed Oct. 13, 2014), asserts claims under Sections 10(b) and 20(a) of the Securities Exchange Act of 1934 and seeks damages in an unspecified amount. Additionally, three putative stockholder derivative actions captioned Weisman v. Anzalone et al., No. 2:14-cv-08982 (C.D. Cal., filed Nov. 20, 2014), Bernstein (Backus) v. Anzalone, et al., No. 2:14-cv-09247 (C.D. Cal., filed Dec. 2, 2014); and Johnson v. Anzalone, et al., No. 2:15-cv-00446 (C.D. Cal., filed Jan. 22, 2015), were filed in the United States District Court for the Central District of California, alleging breach of fiduciary duty by the Company's Board of Directors in connection with the facts underlying the securities claims. An additional consolidated derivative action asserting similar claims is pending in Los Angeles County Superior Court, initially filed as Bacchus v. Anzalone, et al., (L.A. Super., filed Mar. 5, 2015); and Jackson v. Anzalone, et al. (L.A. Super., filed Mar. 16, 2015). Each of these suits seeks damages in unspecified amounts and some seek various forms of injunctive relief.

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The Company and two of its former executives have been named as defendants in a complaint filed on November 11, 2014 and captioned William Marsh Rice University vs. Unidym, Inc. and Arrowhead Research Corporation, No. 2014-66088, currently pending in the United States District Court for the Southern District of Texas relating to alleged breaches of a license agreement between Rice University and the Company's former subsidiary, Unidym, Inc. The plaintiff has alleged that the Company and its former executives acted fraudulently with respect to Unidym's license from Rice University and seeks injunctive relief, damages, including unspecified compensatory and punitive damages, and attorneys' fees.

The Company believes it has meritorious defenses and intends to vigorously defend itself in each of the above matters. The Company makes provisions for liabilities when it is both probable that a liability has been incurred and the amount can be reasonably estimated. No such liability has been recorded related to these matters. The Company does not expect these matters to have any material effect on its Consolidated Financial Statements. With regard to legal fees, such as attorney fees related to these matters or any other legal matters, the Company's accounting policy is to recognize such costs as incurred.

#### Purchase Commitments

In the normal course of business, we enter into various purchase commitments for the manufacture of drug components, toxicology studies, and for clinical studies. As of September 30, 2015, these future commitments were approximately \$49.3 million, of which approximately \$35.5 million is expected to be incurred in fiscal 2016, and \$13.8 million is expected to be incurred beyond fiscal 2016.

#### Technology License Commitments

The Company has licensed from third parties the rights to use certain technologies that it uses in its research and development activities, as well as in any products the Company 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 upon certain sales level milestones. These milestone payments could amount to the mid to upper double digit millions of dollars. In certain agreements, the Company may be required to make mid to high single digit percentage royalty payments based on a percentage of the sales of the relevant products.

#### NOTE 8. STOCK-BASED COMPENSATION

Arrowhead has two plans that provide for equity-based compensation. Under Arrowhead's 2004 Equity Incentive Plan and 2013 Incentive Plan, as of September 30, 2015, 2,537,018 and 5,088,971 shares, respectively, of Arrowhead's Common Stock are reserved for the grant of stock options, stock appreciation rights, restricted stock awards and performance unit/share award to employees, consultants and others. No further grants may be made under the 2004 Equity Incentive Plan. As of September 30, 2015, there were options granted and outstanding to purchase 2,537,018 and 2,354,000 shares of Common Stock under the 2004 Equity Incentive Plan and the 2013 Incentive Plan, respectively, and there were 877,500 restricted stock units granted and outstanding under the 2013 Incentive Plan. Also, as of September 30, 2015, there were 544,622 shares reserved for options and 56,667 restricted stock units issued as inducement grants to new employees outside of equity compensation plans. During the year ended September 30, 2015, no options or restricted stock units were granted under the 2004 Equity Incentive Plan, 1,609,000 options and 675,000 restricted stock units were granted under the 2013 Incentive Plan, and 120,000 options and 30,000 restricted stock units were granted as inducement awards to new employees outside of equity incentive plans. Additionally, the Company's 2000 Stock Option Plan and 38,000 stock options that were outstanding under the 2000 Stock Option Plan expired during the year ended September 30, 2015.

The following tables summarize information about stock options:

	Number of Options Outstanding	Weighted- Average Exercise Price Per Share	Weighted- Average Remaining Contractual Term	Aggregate Intrinsic Value
Balance At September 30, 2014	3,850,840	6.99		
Granted	1,729,000	6.35		
Cancelled	(115,442)	11.38		
Exercised	(28,758)	3.54		
Balance At September 30, 2015	5,435,640	\$ 6.71	7.9 years	\$5,520,448
Exercisable At September 30, 2015	2,683,856	\$ 6.07	7.0 years	\$3,554,184

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Stock-based compensation expense related to stock options for the years ended September 30, 2015, 2014 and 2013 was \$4,760,831, \$3,144,776, and \$1,536,271, respectively. The Company does not recognize an income tax benefit as the Company is currently operating at a loss and an actual income tax benefit may not be realized. For non-qualified stock options, the loss creates a timing difference, resulting in a deferred tax asset, which is fully reserved by a valuation allowance.

The fair value of the options granted by Arrowhead for the years ended September 30, 2015, 2014 and 2013 was \$7,338,395, \$9,267,048, and \$2,843,575, respectively.

The intrinsic value of the options exercised during the years ended September 30, 2015, 2014 and 2013 was \$128,391, \$4,360,850 and \$554, respectively.

As of September 30, 2015, the pre-tax compensation expense for all outstanding unvested stock options in the amount of approximately \$11,961,288 will be recognized in the Company's results of operations over a weighted average period of 2.7 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 our 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, in management's opinion, the existing models do not necessarily provide a reliable single measure of the fair value of its employee stock options.

The assumptions used to value stock options are as follows:

	Year ended September 30,		
	2015	2014	2013
Dividend yield	—	—	—
Risk-free interest rate	1.46 – 1.89%	1.8 – 2.4%	0.7 – 2.3%
Volatility	75%	69%	69%
Expected life (in years)	6 - 6.25	6.25 – 9.47	5.5 – 6.25
Weighted average grant date fair value per share of options granted	\$4.24	\$8.92	\$1.88

The dividend yield is zero as the Company currently does not pay a dividend.

The risk-free interest rate is based on that of the U.S. Treasury bond.

Volatility is estimated based on volatility average of the Company's Common Stock price.

#### Restricted Stock Units

Restricted Stock Units (RSUs) were granted in fiscal year 2015 under the Company's 2013 Incentive Plan and as inducement grants granted outside of the Plan. Of the restricted stock units granted during the years ended September 30, 2015, 2014 and, 2013, 30,000, 40,000 and 0 shares, respectively, were granted outside of the Plan as inducement grants to new employees. At vesting, each RSU will be exchanged for one share of the Company's Common Stock. Restricted stock unit 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 Restricted Stock Units:

	Number of RSUs	Weighted- Average Grant Date Fair Value
Unvested at September 30, 2014	510,000	\$ 14.58
Granted	705,000	7.41
Vested	(280,833)	14.56
Forfeited	—	—
Unvested at September 30, 2015	934,167	\$ 9.18

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The Company recorded \$4,489,931, \$2,551,397 and \$0 of expense relating to restricted stock units during the years ended September 30, 2015, 2014, and 2013, respectively. Such expense is included in stock-based compensation expense in the Company's Consolidated Statement of Operations and Comprehensive Loss.

As of September 30, 2015, the pre-tax compensation expense for all unvested restricted stock units in the amount of approximately \$3,739,892 will be recognized in the Company's results of operations over a weighted average period of 1.6 years.

#### NOTE 9. FAIR VALUE MEASUREMENTS

The Company measures its financial assets and liabilities at fair value. Fair value is defined as the price that would be received to sell an asset or paid to transfer a liability (i.e., exit price) in an orderly transaction between market participants at the measurement date. Additionally, the Company is required to provide disclosure and categorize assets and liabilities measured at fair value into one of three different levels depending on the assumptions (i.e., inputs) used in the valuation. Level 1 provides the most reliable measure of fair value while Level 3 generally requires significant management judgment. Financial assets and liabilities are classified in their entirety based on the lowest level of input significant to the fair value measurement. The fair value hierarchy is defined as follows:

Level 1—Valuations are based on unadjusted quoted prices in active markets for identical assets or liabilities.

Level 2—Valuations are based on quoted prices for similar assets or liabilities in active markets, or quoted prices in markets that are not active for which significant inputs are observable, either directly or indirectly.

Level 3—Valuations are based on prices or valuation techniques that require inputs that are both unobservable and significant to the overall fair value measurement. Inputs reflect management's best estimate of what market participants would use in valuing the asset or liability at the measurement date.

The following table summarizes fair value measurements at September 30, 2015 and September 30, 2014 for assets and liabilities measured at fair value on a recurring basis:

September 30, 2015:

	Level 1	Level 2	Level 3	Total
Cash and cash equivalents	\$81,214,354	\$ —	\$ —	\$81,214,354
Derivative liabilities	\$ —	\$ —	\$1,301,604	\$1,301,604
Acquisition-related contingent consideration obligations	\$ —	\$ —	\$5,862,464	\$5,862,464

September 30, 2014:

	Level 1	Level 2	Level 3	Total
Cash and cash equivalents	\$132,510,610	\$ —	\$ —	\$132,510,610
Derivative liabilities	\$ —	\$ —	\$4,173,943	\$4,173,943
Acquisition-related contingent consideration obligations	\$ —	\$ —	\$3,970,931	\$3,970,931

The Company invests its excess cash balances in short- and long-term corporate bonds, generally with remaining maturities of less than two years. At September 30, 2015, the Company had short-term investments of \$17,539,902. The fair value of its investment at September 30, 2015 was \$17,234,960. The Company expects to hold such investments until maturity, and thus unrealized gains and losses from the fluctuations in the fair value of the securities are not likely to be realized.

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As part of an equity financing in June 2010, Arrowhead issued warrants to purchase up to 329,649 shares of Common Stock (the “2010 Warrants”), of which 24,324 warrants were outstanding at September 30, 2015. Similarly, as part of a financing in December 2012, Arrowhead issued warrants to purchase up to 912,543 shares of Common Stock (the “2012 Warrants”) of which 265,161 warrants were outstanding at September 30, 2015. Further, as part of a financing in January 2013, Arrowhead issued warrants to purchase up to 833,530 shares of Common Stock (the “2013 Warrants”) and, together with the 2010 Warrants and the 2012 Warrants, the “Warrants”) of which 12,123 warrants were outstanding at September 30, 2015. Each of the Warrants contains a mechanism to adjust the strike price upon the issuance of certain dilutive equity securities. If during the terms of the Warrants, the Company issues Common Stock at a price lower than the exercise price for the Warrants, the exercise price would be reduced to the amount equal to the issuance price of the Common Stock. As a result of these features, the Warrants are subject to derivative accounting as prescribed under ASC 815. Accordingly, the fair value of the Warrants on the date of issuance was estimated using an option pricing model and recorded on the Company’s Consolidated Balance Sheet as a derivative liability. The fair value of the Warrants is estimated at the end of each reporting period and the change in the fair value of the Warrants is recorded as a non-operating gain or loss as change in value of derivatives in the Company’s Consolidated Statement of Operations and Comprehensive Loss. During the years ended September 30, 2015, 2014 and 2013, the Company recorded a non-cash gain/(loss) from the change in fair value of the derivative liability of \$2,684,712, \$(5,821,796), and \$5,066,591, respectively.

The assumptions used in valuing the derivative liability were as follows:

2010 Warrants	September 30, 2015	September 30, 2014	September 30, 2013
Risk-free interest rate	0.1%	0.13%	0.33%
Expected life	0.2 Years	1.2 Years	2.2 Years
Dividend yield	-	-	-
Volatility	75%	69%	69%
2012 Warrants	September 30, 2015	September 30, 2014	September 30, 2013
Risk-free interest rate	0.6%	1.07%	1.39%
Expected life	2.2 Years	3.2 Years	4.2 Years
Dividend yield	-	-	-
Volatility	75%	69%	69%
2013 Warrants	September 30, 2015	September 30, 2014	September 30, 2013
Risk-free interest rate	0.6%	1.07%	1.39%
Expected life	2.3 Years	3.3 Years	4.3 Years
Dividend yield	-	-	-
Volatility	75%	69%	69%

The following is a reconciliation of the derivative liability related to these warrants:

Value at September 30, 2013	\$4,091,797
Issuance of instruments	—
Change in value	5,821,796
Net settlements	(5,956,079 )
Value at September 30, 2014	\$3,957,514
Issuance of instruments	—
Change in value	(2,684,712)
Net settlements	—

Value at September 30, 2015 \$1,272,802

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In conjunction with the financing of Ablaris in fiscal 2011, Arrowhead sold exchange rights to certain investors whereby the investors have the right to exchange their shares of Ablaris for a prescribed number of Arrowhead shares of Common Stock based upon a predefined ratio. The exchange rights have a seven-year term. During the first year, the exchange right allows the holder to exchange one Ablaris share for 0.06 Arrowhead shares. This ratio declines to 0.04 in the second year, 0.03 in the third year and 0.02 in the fourth year. In the fifth year and beyond the exchange ratio is 0.01. Exchange rights for 675,000 Ablaris shares were sold in fiscal 2011, and 500,000 remain outstanding at September 30, 2015. The exchange rights are subject to derivative accounting as prescribed under ASC 815.

Accordingly, the fair value of the exchange rights on the date of issuance was estimated using an option pricing model and recorded on the Company's Consolidated Balance Sheet as a derivative liability. The fair value of the exchange rights is estimated at the end of each reporting period and the change in the fair value of the exchange rights is recorded as a non-operating gain or loss in the Company's Consolidated Statement of Operations and Comprehensive Loss. During the years ended September 30, 2015, 2014 and 2013, the Company recorded a non-cash gain/(loss) from the change in fair value of the derivative liability of \$184,555, \$(211,860) and \$5,806, respectively.

The assumptions used in valuing the derivative liability were as follows:

	September 30, 2015	September 30, 2014	September 30, 2013
Risk-free interest rate	1.00%	1.07%	1.39%
Expected life	2.5 Years	3.3 Years	4.3 Years
Dividend yield	-	-	-
Volatility	75%	100%	100%

The following is a reconciliation of the derivative liability related to these exchange rights:

Value at September 30, 2013	\$4,569
Issuance of instruments	—
Change in value	211,860
Net settlements	—
Value at September 30, 2014	\$216,429
Issuance of instruments	—
Change in value	(184,555)
Net settlements	(3,072)
Value at September 30, 2015	\$28,802

The derivative assets/liabilities are estimated using option pricing models that are based on the individual characteristics of the warrants or instruments on the valuation date, as well as assumptions for expected volatility, expected life and risk-free interest rate. Changes in the assumptions used could have a material impact on the resulting fair value. The primary input affecting the value of our derivatives liabilities is the Company's stock price. Other inputs have a comparatively insignificant effect.

As of September 30, 2015, the Company has liabilities for contingent consideration related to its acquisition of the Roche RNAi business and the Novartis asset acquisition discussed in footnote 2. The fair value measurement of the contingent consideration obligations is determined using Level 3 inputs. The fair value of contingent consideration obligations is based on a discounted cash flow model using a probability-weighted income approach. The measurement is based upon unobservable inputs supported by little or no market activity based on the Company's assumptions and experience. Estimating timing to complete the development and obtain approval of products is

difficult, and there are inherent uncertainties in developing a product candidate, such as obtaining U.S. Food and Drug Administration (FDA) and other regulatory approvals. In determining the probability of regulatory approval and commercial success, the Company utilizes data regarding similar milestone events from several sources, including industry studies and its own experience. These fair value measurements represent Level 3 measurements as they are based on significant inputs not observable in the market. Significant judgment is employed in determining the appropriateness of these assumptions as of the acquisition date and for each subsequent period. Accordingly, changes in assumptions could have a material impact on the amount of contingent consideration expense the Company records in any given period. Changes in the fair value of the contingent consideration obligations are recorded in the Company's Consolidated Statement of Operations and Comprehensive Loss.

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The following is a reconciliation of contingent consideration fair value:

Value at September 30, 2013	\$1,595,273
Purchase price contingent consideration	—
Contingent consideration payments	—
Change in fair value of contingent consideration	2,375,658
Value at September 30, 2014	\$3,970,931
Purchase price contingent consideration	—
Contingent consideration payments	—
Change in fair value of contingent consideration	1,891,533
Value at September 30, 2015	\$5,862,464

The fair value of contingent consideration obligations is estimated through valuation models designed to estimate the probability of such contingent payments based on various assumptions and incorporating estimated success rates. Estimated payments are discounted using present value techniques to arrive at estimated fair value at the balance sheet date. Changes in the fair value of the contingent consideration obligations can result from changes to one or multiple inputs, including adjustments to the discount rates, changes in the amount or timing of expected expenditures associated with product development, changes in the amount or timing of cash flows from products upon commercialization, changes in the assumed achievement or timing of any development milestones, changes in the probability of certain clinical events and changes in the assumed probability associated with regulatory approval. Each of these assumptions can have a significant impact on the calculation of contingent consideration.

The carrying amounts of the Company's other financial instruments, which include accounts receivable, accounts payable, and accrued expenses approximate their respective fair values due to the relatively short-term nature of these instruments. The carrying value of the Company's debt obligations approximates fair value based on market interest rates.

#### NOTE 10. - INCOME TAXES

The Company utilizes the guidance issued by the FASB for accounting for income taxes which requires the recognition of deferred tax assets and liabilities for the expected future tax consequences of events that have been included in the financial statements or tax returns.

Under this method, deferred income taxes are recognized for the tax consequences in future years of differences between the tax bases of assets and liabilities and their financial reporting amounts at each year-end based on enacted tax laws and statutory tax rates applicable to the periods in which the differences are expected to affect taxable income. Valuation allowances are established, when necessary, to reduce deferred tax assets to the amount expected to be realized. The provision for income taxes represents the tax payable for the period and the change during the period in deferred tax assets and liabilities.

Components of the net deferred tax asset (liability) at September 30, 2015 and 2014 are as follows:

	2015	2014
Deferred tax assets:		

Reserve for other receivables	\$-	\$233,014
Accrued compensation	1,513,021	1,313,354
Stock compensation	6,571,774	3,011,369
Capitalized research and development	-	13,536,745
Fair value adjustments	2,850,125	1,864,364
Net operating losses	88,965,968	42,268,526
Intangible Assets	5,551,705	-
Total deferred tax assets	105,452,593	62,227,372
Valuation allowance	(95,085,045 )	(55,224,802)
Deferred tax liabilities:		
State taxes	(10,282,834 )	(6,277,587 )
Equity investments	-	(7,675 )
Intangible assets	-	(475,829 )
Fixed assets	(84,714 )	(241,479 )
Total deferred tax liability	(10,367,548 )	(7,002,570 )
Net deferred tax assets	\$—	\$—

The Company's book losses and other timing differences result in a net deferred income tax benefit which is offset by a valuation allowance for a net deferred asset of zero. The Company has concluded, in accordance with the applicable accounting

standards, that it is more likely than not that the Company may not realize the benefit of all of its deferred tax assets. Accordingly, management has provided a 100% valuation allowance against its deferred tax assets until such time as management believes that its projections of future profits as well as expected future tax rates make the realization of these deferred tax assets more-likely-than-not. Significant judgment is required in the evaluation of deferred tax benefits and differences in future results from our estimates could result in material differences in the realization of these assets. As of September 30, 2015 and 2014, federal deferred tax assets were \$105.5 million and \$62.2 million, respectively. The Company has recorded a full valuation allowance related to all of its deferred tax assets. The Company has performed an assessment of positive and negative evidence regarding the realization of the net deferred tax asset in accordance with FASB ASC 740-10, "Accounting for Income Taxes." This assessment included the evaluation of scheduled reversals of deferred tax liabilities, the availability of carry forwards and estimates of projected future taxable income.

As of September 30, 2014, the Company had available gross federal net operating loss (NOL) carry forwards of \$115.8 million and gross state NOL carry forwards of \$170.8 million which expire at various dates through 2034. Gross federal NOL carry forwards for 2015 are estimated at \$70.5 million, and gross state NOL carry forwards for 2015 are estimated at \$124.1 million.

The provision for income taxes for the years ended September 30, 2015 and 2014 are as follows:

	2015	2014
Federal:		
Current	—	—
Deferred	—	—
Total Federal	—	—
State:		
Current	\$2,400	5,300
Deferred	—	—
Total State	\$2,400	5,300
Provision from income taxes	\$2,400	5,300

The Company's effective income tax rate differs from the statutory federal income tax rate as follows for the years ended September 30, 2015 and 2014:

	2015	2014
At U.S. federal statutory rate	34.0 %	34.0 %
State taxes, net of federal effect	9.3	7.6
Stock compensation	(0.7 )	(0.1 )
Mark-to-market adjustments	0.7	(3.5
Write-off of net operating losses	0.0	(32.7)
Valuation allowance	(43.4)	(5.2 )
Other	0.1	(0.1 )
Effective income tax rate	0.0 %	0.0 %

The Company has adopted guidance issued by the FASB that clarifies the accounting for uncertainty in income taxes recognized in an enterprise's financial statements and prescribes a recognition threshold of more likely than not and a measurement process for financial statement recognition and measurement of a tax position taken or expected to be taken in a tax return. In making this assessment, a company must determine whether it is more likely than not that a

tax position will be sustained upon examination, based solely on the technical merits of the position and must assume that the tax position will be examined by taxing authorities. The Company's policy is to include interest and penalties related to unrecognized tax benefits in income tax expense. The Company has not recognized any unrecognized tax benefits and does not have any interest or penalties related to uncertain tax positions as of September 30, 2015 and 2014.

The Company files income tax returns with the Internal Revenue Service ("IRS"), the state of California and certain other taxing jurisdictions. The Company is subject to income tax examinations by the IRS and by state tax authorities until the net operating losses are settled.

## NOTE 11. EMPLOYEE BENEFIT PLANS

In January 2005, the Company adopted a defined contribution 401(k) retirement savings plan covering substantially all of its employees. The Plan is administered under the “safe harbor” provision of ERISA. Under the terms of the plan, an eligible employee may elect to contribute a portion of their salary on a pre-tax basis, subject to federal statutory limitations. The plan allows for a discretionary match in an amount up to 100% of each participant’s first 3% of compensation contributed plus 50% of each participant’s next 2% of compensation contributed.

For the years ended September 30, 2015, 2014, and 2013, we recorded expenses under these plans of approximately \$407,603, \$264,193, and \$191,947, respectively.

In addition to the employee benefit plans described above, the Company provides certain employee benefit plans, including those which provide health and life insurance benefits to employees.

## NOTE 12. UNAUDITED QUARTERLY FINANCIAL DATA

The following table presents selected unaudited quarterly financial data for each full quarterly period of the years ended September 30, 2015 and 2014:

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Year ended September 30, 2015				
Revenues	\$170,750	\$43,750	\$123,750	\$43,750
Operating Losses	\$(25,115,276)	\$(29,632,743)	\$(15,993,706)	\$(25,232,251)
Net Loss	\$(22,575,282)	\$(28,683,993)	\$(15,936,053)	\$(24,745,554)
Net Loss Attributable to Arrowhead	\$(22,575,282)	\$(28,683,993)	\$(15,936,053)	\$(24,745,554)
Loss per share (Basic and Diluted)	\$(0.41)	\$(0.51)	\$(0.27)	\$(0.42)

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Year ended September 30, 2014				
Revenues	\$43,750	\$43,750	\$43,750	\$43,750
Operating Losses	\$(7,009,382)	\$(11,212,498)	\$(12,700,100)	\$(22,354,306)
Net Loss	\$(10,685,372)	\$(13,982,700)	\$(11,626,451)	\$(22,430,889)
Net Loss Attributable to Arrowhead	\$(10,628,312)	\$(13,942,521)	\$(11,626,919)	\$(22,432,438)
Loss per share (Basic and Diluted)	\$(0.28)	\$(0.31)	\$(0.22)	\$(0.42)