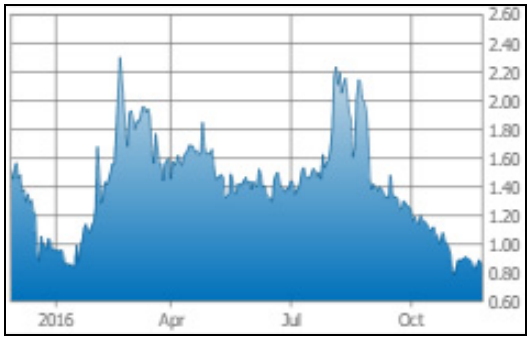
Hemispherx Biopharma, Inc.
1617 JFK Blvd., Suite 500
Philadelphia, PA 19103
Phone: (215) 988-0080
Fax: (215) 988-1739
www.hemispherx.net/

Ticker (Exchange)	HEB (NYSE)
Recent Price (11/25/2016)*	$0.85
52-week Range	$0.72 - $2.64
Shares Outstanding**	~24.1 million
Market Capitalization	~$20.5 million
Average 3-month Volume	110,574
Insider Ownership	~3.6 million
Institutional Ownership	~5%
EPS (Qtr. ended 09/30/2016)	($0.13)
Employees	32

*1-for-12 reverse stock split in August 2016.
**As of November 1, 2016.

HEB One-year Stock Chart



Company Description

Hemispherx Biopharma, Inc. (or "the Company") is a specialty pharmaceutical company addressing critical unmet medical needs. The Company has invested over two decades of R&D into safe, effective ways to modulate and amplify the immune system, and is now poised to enter a confirmatory Phase III U.S. trial with an **RNA† macromolecule** that could become the only FDA-approved therapy for chronic fatigue syndrome/**myalgic encephalomyelitis** (CFS/ME). This candidate, Ampligen®, was approved for CFS/ME in Argentina in August 2016 and is available to patients in Europe through an early access program (EAP). CFS/ME is a debilitating disease with no known treatment to date but very active patient advocacy groups. Hemispherx also holds rights to an FDA-approved product for genital warts, Alferon N Injection®, which is believed to be the world's only approved natural **interferon (IFN)**. Hemispherx has refined Alferon's manufacturing to drastically increase efficiencies and reduce costs, and now seeks FDA approval for the new production method before relaunching Alferon. Hemispherx is headquartered in Philadelphia with **GMP** manufacturing and research facilities in New Jersey.

Key Points

- The Ampligen® technology has also shown utility as a broad-spectrum antiviral that could help seasonal flu vaccines work against highly pathogenic pandemic viruses. Ampligen® holds orphan drug designation for Ebola in Europe and is in Phase II trials as an immuno-oncology immune driver against colorectal and ovarian cancers.
- Hemispherx holds 49 issued and 13 pending patents, which includes protections for Ampligen® through 2028.
- During 2016, Hemispherx appointed new leadership, including CEO Tom Equels, who have been focused on aggressive execution of corporate goals, including working closely with regulatory communities to bring candidates to market.
- Hemispherx seeks co-development partners to help accelerate commercialization of its pipeline. The Company already has several academic research collaborations in place as well as fill and finish contract manufacturers for Ampligen® and development agreements/licenses for Alferon in Latin America, the Middle East, and Australia/New Zealand.
- Hemispherx reports that it holds cash and cash equivalents of approximately $8 million, following an equity financing of $4.5 million in net proceeds during August 2016. The Company aims to raise roughly $15 million to complete its manufacturing upgrade for Alferon. Hemispherx has also recently implemented austerity measures to reduce costs and expenses.

Table of Contents

Executive Overview

Hemispherx Biopharma, Inc. ("Hemispherx" or "the Company") is a specialty pharmaceutical company focused on creating new treatments for seriously debilitating disorders. The Company's lead initiative at present is commencing a confirmatory Phase III clinical trial of Ampligen®, an investigational drug to treat chronic fatigue syndrome/myalgic encephalomyelitis (CFS/ME) and other oncology and antiviral **immunotherapy** indications. CFS/ME is a debilitating fatigue disorder affecting millions of people around the world, and it presently has no cure or approved treatment. Patients' only relief are options for palliative therapy with varying levels of success. Hemispherx's Ampligen® is stated to be the only treatment in advanced clinical development for CFS (Source: *Expert Review of Clinical Pharmacology*, June 2, 2016; 9[6]:755–770).

Ampligen® Represents a New Drug Class

Ampligen® belongs to a new class of large, synthetic, double-stranded RNA macromolecules, and may become the first drug candidate of its class to complete the FDA's New Drug Application (NDA) review. Ampligen® triggers both innate and adaptive immune responses, which work together in concert in a healthy individual to recognize general structural features of possible pathogens and automatically activate **natural killer (NK) cells**, neutrophils, granulocytes, and **macrophages** against the pathogen (innate immunity) and to eliminate or prevent disease through an acquired or learned immune response to a particular antigen (adaptive immunity). Ampligen® signals exclusively through a unique Toll-like receptor (TLR) pathway in the body that has shown to have reduced toxicity versus other TLR pathways used by other pharmaceuticals that also seek to leverage TLR immunity. The pathway Ampligen® uses minimizes systemic inflammatory **cytokine** induction and does not activate inflammatory **helicases**—benefits that researchers believe contribute to the safety record seen for Ampligen® in clinical trials to date.

Through 13 clinical studies, Hemispherx has administered over 90,000 doses of Ampligen® through intravenous infusion to more than 800 adults, and has reported the drug to be generally well tolerated based on its experiences. Nine studies have occurred in patients who were suffering from severely debilitating CFS/ME. Importantly, in the Phase III trial in CFS/ME, the Ampligen® cohort had an intra-patient mean increase of 36.5% versus the placebo cohort with 15.2% with regard to improvement in CFS/ME patients' ability to sustain duration in treadmill exercises (standard measures of fatigue). Ampligen® has also reduced patients' dependence on drugs to alleviate CFS/ME symptoms, and led to a decrease in the rate and duration of hospital/emergency room admissions versus placebo.

Development Status

As of August 2016, Ampligen® is approved for prescription sale in Argentina for treatment of severely disabled patients with CFS/myalgic encephalomyelitis (ME) who have been diagnosed for more than one year. The registered trademark for Ampligen® in Argentina is Rintamod®. The product candidate is still in development for U.S. and European markets for CFS/ME, several advanced cancers, and as a broad-spectrum antiviral with potential as an immune driver of vaccines (next generation **adjuvant)**.

Shipments of Ampligen® for CFS/ME patients began to Europe in July 2016 under the MyTomorrows Early Access Program (EAP). In the U.S., based on its discussions with the FDA, the next step is for Hemispherx to commence its confirmatory Phase III clinical trial of Ampligen® in a more narrowly defined patient population than past trials. Hemispherx met with the FDA most recently in October 2016 to discuss continued refinements to the Phase III trial protocol.

Ampligen® is also currently in Phase I/II studies sponsored by the University of Pittsburgh for ovarian and colorectal cancers. Prior studies in renal cell carcinoma and Stage IV melanoma showed that the candidate supported a significant survival benefit for these patients. Further development is ongoing of Ampligen® in combination with a new class of antibody drug called checkpoint inhibitors. Ampligen® is a driver of the immune system and its ability to stimulate greater immune activity appears to increase the effectiveness of checkpoint inhibitors' anticancer activity—leading to a synergistic impact at reducing tumor size in an animal model without evidence of the increase in toxicity that typically stems from using a combination of multiple checkpoint inhibitors to achieve the synergistic effect.

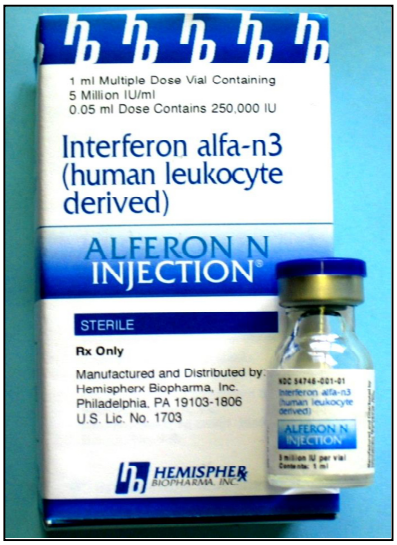
Finally, the immune impacts that the Ampligen® macromolecule creates may also position the candidate as a broad-spectrum antiviral for both **prophylactic** and early-onset use. Ampligen® is currently in a Phase I/II study to evaluate its safety when used in combination with FluMist®, a live, attenuated intranasal vaccine (LAIV). Initial trial data appear to support earlier findings that Ampligen® is capable of inducing cross-reactivity when used with intranasal flu vaccine. In preclinical studies, cross-protection enabled by Ampligen® in combination with a seasonal influenza vaccine has shown to extend the seasonal flu vaccine's effectiveness to highly pathogenic avian influenza (H5N1) pandemic virus as well. Further, cross-reactive antibody generation protects against antigenic drift, thereby circumventing the risk of specific vaccines losing efficacy as viruses mutate. This approach also enhances local and systemic immune responses in general, which fills an unmet need in populations for whom standard vaccines are less effective (e.g., the elderly, immuno-compromised).

Having already completed multiple preclinical studies in mouse and non-human primate models and the first stage of a Phase I/II clinical study in humans, Hemispherx next plans to initiate a proof-of-concept study of the efficacy of Ampligen® administered simultaneously to an inactivated intranasal vaccine. Ampligen® has also shown to be effective against the Ebola virus in a rodent trial at the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID). A rodent group with no treatment had a 100% mortality rate while Ampligen® administration was associated with a 90% to 100% survival rate, depending on the dose given. In April 2015, Ampligen® received orphan drug status in Europe for Ebola treatment.

Alferon N Injection® and Alferon® Low Dose Oral (LDO)

Figure 1

ALFERON N INJECTION® PACKAGING



Source: Hemispherx Biopharma, Inc.

Hemispherx's Alferon N Injection® is believed to be the only approved natural interferon (IFN) product. Alferon is approved in the U.S. and Argentina for the intralesional treatment of external, **refractory**, or recurring genital warts (i.e., HPV) in adults over age 18. The medicine also has an array of uses in oncology and immunology as a substitute therapy for people who are resistant to **recombinant** (synthetic) IFN products. It is already approved in Argentina for some of these uses, including to treat chronic, active hepatitis C infections. Alferon holds an orphan drug designation in the EU for **Middle East Respiratory Syndrome (MERS)** and is being developed in the Middle East for this condition by Scientific Products Pharmaceutical (SCIEN).

Alferon N Injection® is covered by nearly all of the major commercial insurance providers in the U.S., including Medicare Part B, and Hemispherx has put in place a U.S. marketing and distribution alliance with Asembia (www.asembia.com, previously Armada Health Care). At present, Alferon is not being marketed in the U.S. while Hemispherx makes manufacturing upgrades. Hemispherx has invested $8 million to install a more sophisticated and efficient manufacturing process using a 600-liter bioreactor (versus small flasks previously) for processing IFN. This is expected to open up new markets for Alferon as a substitute therapy for people currently on recombinant (man-made) IFN, including patients with certain cancers, warts, and hepatitis, among other conditions.

Hemispherx estimates that completing the process of bringing its bioreactor production process online with FDA approval could require roughly 15 to 16 months and approximately $15 million in funding. With improved affordability making it more cost-competitive, Alferon may be able to penetrate a number of markets where IFN therapy is used beyond genital warts. The product's future commercial opportunities may include indications in oncology, HCV, MS, MERS, and other indications where patients have shown to be resistant to recombinant IFN therapy.

To this end, studies have shown a number of advantages to using a natural IFN product over a synthetic version. Alferon, which is bio-identical to the natural IFN alpha the body produces in response to viral infections, is a multi-species product enabling a broader array of antiviral activity than single-species recombinant IFNs, and its composition does not trigger significant IFN-neutralizing antibodies, which are a major side effect and limitation on efficacy of recombinant IFNs. Hemispherx's data show that Alferon can be 10 to 100 times more effective than recombinant IFNs, has fewer adverse events than Merck's Intron A (also for genital warts), and has shown efficacy in 82% of patients who fail recombinant IFN therapy.

Figure 2 illustrates the major aspects of Hemispherx's drug development pipeline, with greater details of these products and indications on pages 16-36.

Figure 2

PRODUCT PIPELINE

Ampligen®			
Indication	**Format**	**Collaborations**	**Status**
Chronic Fatigue Syndrome* (CFS/ME)	Intravenous infusion		Approved in Argentina; Phase III in the U.S.
Influenza	Intranasal vaccine immune enhancer to induce cross-protection and epitope spreading	Research collaboration with the Japanese National Institute of Infectious Diseases and the University of Alabama	Phase II
Colorectal, Ovarian Cancers	An immunomodulatory regimen to modulate intratumoral chemokines to increase Teff/Treg ratio	Research collaboration with the University of Pittsburgh	Phase II
Renal Cell Carcinoma,* Melanoma*	Ampligen® as a single agent	Research collaboration with Hahnemann University	Phase II
Colorectal, Melanoma*	A combination therapy with checkpoint inhibitors	Research collaboration with Georgia Regents University	Preclinical

** Orphan Drug designations*

Alferon N Injection®	
Indication	**Status in the U.S.**
Refractory or recurring genital warts due to HPV infections	Approved; Sales anticipated to resume upon successful pre-approval inspection and supplemental approval by FDA
HIV, HCV	Phase III
Vulvar vestibulitis, MS	Phase II
MERS (Orphan Drug in the EU), SARS	Preclinical
Alferon® low dose oral (LDO)	Early-stage development with potential application in Ebola, HIV, influenza, and Zika virus infections

Indication	Status in Argentina
Genital HPV (condylomata acuminata)	Approved; Launch pending manufacturing approval
Refractory to Recombinant IFN	Approved; Launch pending manufacturing approval

Sources: Hemispherx Biopharma, Inc. and Crystal Research Associates, LLC.

Market Opportunities

In February 2016, Hemispherx appointed a new chief executive officer (CEO), Mr. Tom Equels (biography on page 12). Mr. Equels launched a period of aggressive execution for Hemispherx, focused on moving viable product candidates toward commercial launch, monetizing assets, and entering into strategic relationships that aid the Company in its mission. Along with his appointment, Hemispherx announced an intention to prioritize Ampligen® and conduct a confirmatory Phase III trial in CFS/ME. Over the past couple of years, the FDA, the U.S. National Institutes of Health (NIH), and other major healthcare agencies have taken a proactive stance at encouraging pharmaceutical development of a product to treat CFS/ME, due to the demands of vocal patient advocates amid the lack of any available therapy for this serious disease that is estimated to affect 1 million to 4 million people in the U.S. alone (Source: CDC). The FDA has sponsored workshops, webinars, and teleconferences specifically for CFS/ME drug development and issued guidance on CFS/ME drug development in March 2014 (Source: the FDA, http://www.fda.gov/Drugs/NewsEvents/ucm319188.htm). The Institute of Medicine of the National Academies has called for more urgent research into CFS/ME and a coalition of 55 members of Congress sent a letter to the NIH requesting increased funding for biomedical research into ME/CFS. Beyond the detrimental effects of CFS/ME on patients' daily lives, the disease is believed to have a total economic burden of $17 to $24 billion annually due to lost productivity and high medical costs (Source: Institute of Medicine of the National Academies). To the best of its knowledge, Hemispherx believes it has the only late-stage drug in the U.S. pipeline for CFS and the Company holds orphan drug status for CFS in the U.S.

The market for immunotherapies was valued at $40.3 billion in 2015, with an estimated compound annual growth rate (CAGR) through 2020 of 12.8%, driven by an increase in the immuno-oncology sector (immunotherapy approaches for cancer treatment), a focus on targeted therapies with fewer side effects, and more rapid drug approval processes. Within the immune-oncology field, checkpoint inhibitors are forecast to experience the highest growth rate due in part to technological advancements. Two of these products, Ono/Bristol-Myers Squibb's Opdivo and Schering Plough/Merck's Keytruda, are set to be the highest-selling immuno-oncology drugs, with expected multi-blockbuster sales of around $10 billion and $7 billion by 2024, respectively (Source: GlobalData Healthcare's *Immuno-Oncology Strategic Insight: Multi-Indication and Market Size Analysis*, May 2016).

Hemispherx's antiviral applications of its product platforms also target large markets, as the global antiviral market was valued at roughly $27.6 billion as of 2014. Future growth may come from population increases, greater disease awareness, and the launch of new drugs with better efficacy and fewer side effects (Source: Mordor Intelligence's *Global Antiviral Drugs Market Segmented by Therapeutics and Geography - Growth, Trends and Forecasts (2014-2019)*, August 2016).

Within the antiviral market is the human papillomavirus (HPV) sector, which is the underlying viral disease causing most genital wart infections. The global HPV therapeutics market was valued at approximately $1.4 billion in 2012 but is expected to reach $2.3 billion by 2020. HPV is the most common sexually transmitted infection in the U.S., with approximately 79 million people in the U.S. currently infected and an additional 14 million becoming newly infected each year. Of this population, it is estimated that up to 65% of people who have sexual relations with a person who has genital warts will become infected too. This virus cannot be eliminated once it is in the bloodstream, so patients often experience multiple outbreaks over the course of their lives. IFN therapy is one type of treatment for these individuals.

Growth in the interferon (IFN) market over the next few years will likely come from greater R&D, increasing global awareness of interferon therapy, and rising demand for specialized medicines for diseases, such as hepatitis B, hepatitis C, and cancer. At present, there are more than 15 IFNs available on the market and this number is expected to grow rapidly in the near future (Source: Transparency Market Research's *Interferon Market - Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2013 – 2019*, 2014). As of 2012, the market for IFN had been expected to exceed $10 billion by 2015 (Source: RNCOS' *Interferon Market Forecast to 2015*, 2012).

Corporate Information

Hemispherx was founded in the early 1970s in order to perform contract research for the U.S. National Institutes of Health (NIH). Today, the Company is headquartered in Philadelphia and trades on the NYSE under the "HEB" ticker. Hemispherx also owns a manufacturing and research facility in New Jersey, as pictured in Figure 3. The 43,000 sq. ft. facility adheres to Good Manufacturing Practice (GMP) and is designed to produce Alferon® and certain ingredients for Ampligen®. The compounding, fill, and finish of Ampligen® is performed at an offsite contract manufacturer, Avecia Biopharmaceuticals (previously Avrio Biopharmaceuticals).

Hemispherx presently employs 32 individuals.

Contact Information for Hemispherx's Manufacturing Facility
783 Jersey Avenue
New Brunswick, NJ 08901
Phone: (732) 249-3250
Fax: (732) 249-6895

Figure 3
43,000 SQ. FT. MANUFACTURING AND RESEARCH FACILITY IN NEW JERSEY

Source: Hemispherx Biopharma, Inc.

Business and Growth Strategies

As of early 2016, Hemispherx's business strategy has centered on the following components:

- seek outlicensing opportunities and/or co-development partnerships for product candidates in disease indications that have been in early- to late-stage *in vivo* testing to maximize overall value;
- use licensing fees to advance development of prioritized unlicensed indications;
- monetize underutilized assets, including international sales of clinical-grade materials; and
- implement and operate under recently adopted financial austerity measures.

Strategic Relationships

Partnering is a major focus of Hemispherx's new model. The Company looks for strategic relationships that further its value by enabling solid co-development, co-research, co-promotion, or co-marketing agreements as well as opportunities for outlicensing to partners that have the resources to bring Hemispherx's technologies to market in additional indications. Strategic relationships may include agreements with research institutes, pharmaceutical companies, and/or biotechnology companies around the world.

An added benefit to leveraging co-development agreements is access to financial resources as Hemispherx strives to raise funds in a non-dilutive manner.

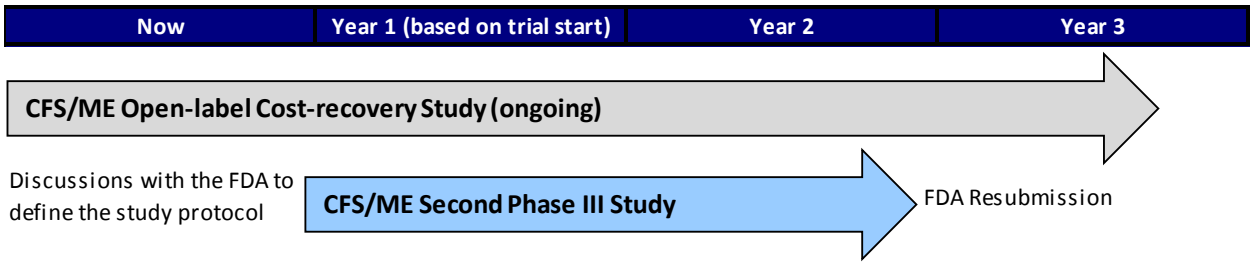
Ampligen® Strategies

Hemispherx is focused on moving Ampligen® through the end of its clinical development process for the CFS/ME indication and then pursuing an FDA approval. In order to finance Phase III development and support subsequent commercialization efforts for Ampligen® in CFS/ME, Hemispherx seeks strategic co-development partners. The Company's platform may represent a favorable value proposition for potential partners, as Hemispherx is believed to be developing the only treatment for CFS/ME in a market where there is no approved therapeutic. Moreover, the Company estimates that treatment for CFS/ME could cost roughly $60,000 to $70,000, creating a valuable opportunity for a strategic partner with the skill set to move Ampligen® into widespread commercial adoption.

The Company aims for approval within three years after the clinical study has started (as shown in Figure 4).

Figure 4

DEVELOPMENT AND REGULATORY TIMELINE FOR AMPLIGEN® IN CFS/ME



Source: Hemispherx Biopharma, Inc.

Commercial Readiness in CFS/ME

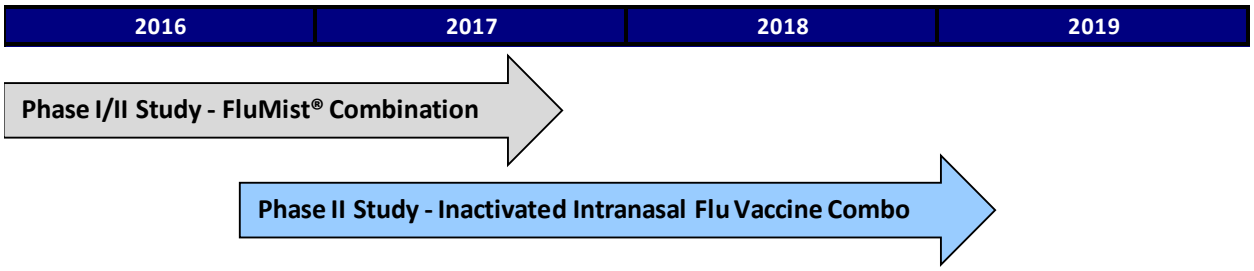
Importantly, the CFS/ME market is likely already primed for a launch of Ampligen®, and is characterized by a high level of patient support and advocacy. Through an extensive history of **open-label** clinical trials, many CFS/ME patients and key opinion leaders (KOLs) in the U.S. have already been exposed to the safety and efficacy of Ampligen®, with patient advocacy groups in existence that have been working to raise awareness for the candidate. In Europe, Hemispherx has engaged MyTomorrows to manage an early access program (EAP) administering Ampligen® to European patients. MyTomorrows has also been working with reimbursement authorities in European countries. Ampligen® shipments through the EAP began in the summer of 2016.

Partnerships to Advance Pipeline Indications for Ampligen®

For the candidate's opportunities in immune oncology as a combination treatment with existing checkpoint inhibitors (as detailed on page 24), Hemispherx seeks co-development partners that could benefit from adding an immune driver like Ampligen® to their treatment protocol. The Company also seeks strategic partners to advance development and support clinical proof-of-concept trials of Ampligen® combined with inactivated, intranasal flu vaccines. Figure 5 illustrates the anticipated development timeline for Ampligen® in influenza.

Figure 5

DEVELOPMENT AND REGULATORY TIMELINE FOR AMPLIGEN® IN INFLUENZA



Source: Hemispherx Biopharma, Inc.

Hemispherx believes Ampligen® is a competitive candidate for outlicensing and co-development agreements due in part to holding a form and substance patent with protection to 2028, orphan drug status for melanoma and renal cell carcinoma, and considerable amount of safety and tolerability evidence through years of CFS/ME trials totaling over 90,000 doses.

Alferon N Injection® Strategies

For Alferon, Hemispherx has already put in place a strategic commercialization agreement (marketing and distribution) in the U.S. as well as several global strategic partnerships, as detailed on page 31. At present, the emphasis is on completing the regulatory requirements for the upgraded manufacturing facility in New Jersey to enable product relaunch. The Company anticipates requiring approximately $15 million and 15 to 16 months to get the facility FDA approved and cover ongoing administrative and R&D expenses.

The new plant has one bioreactor, which can produce 50,000 vials of Alferon annually to start (based on one operating run). The Company expects to undertake an incremental investment in staffing for additional runs to increase future capacity. As well, to raise the $15 million, Hemispherx is considering multiple financing and partnering options, including the possibility of a transaction to capture Alferon's value with upfront and launch milestone payments. In August 2016, the Company announced a registered direct offering of approximately $5 million in gross proceeds with two healthcare-focused institutional investors.

Recent Milestones

Figure 6 summarizes Hemispherx's corporate chronology, highlighting the Company's recent product development milestones in 2015 and 2016.

Figure 6

CORPORATE HISTORY AND 2015-2016 MILESTONES

1989	FDA approves Alferon-N Injection for the treatment of genital warts
1991-93	Ampligen understood to be an IFN inducer, obtains FDA orphan drug designation in renal cell carcinoma, malignant melanoma, and CFS – Company chooses to pursue CFS as its development focus
1997-2011	Clinical development of CFS is hampered by vagaries of this new illness
	Ampligen mechanism of action as a selective TLR3 agonist is published, along with reports demonstrating potent immune modulation properties in cancer and infectious disease
2003	Alferon technology acquired from Interferon Sciences
2010	Hemispherx invests $8 million to upgrade its manufacturing facility, and licenses Alferon to GP Pharm Latinoamerica in Latin America
2013	Collaboration initiated with the University of Pittsburgh to conduct translational clinical trials with Ampligen in a chemokine-modulatory program for cancer
	FDA issues a Complete Response Letter for Ampligen in CFS
2014	Data on dsRNA/Ampligen's anti-tumor activity combined with immune checkpoint inhibitors in melanoma model reported from Georgia Regents University
2015	Ampligen obtains European orphan drug designation for Ebola virus
	Hemispherx enters into an agreement with myTomorrows for management of an Early Access Program for Ampligen for treatment of CFS in Europe
	Europe grants orphan drug designation to Alferon for treatment of MERS
	Hemispherx enters into a collaboration agreement with Emerge Health to seek regulatory approval for Alferon and Ampligen in Australia and New Zealand
	Manufacturing upgrade is completed
2016	Regulatory guidance received for further development of Ampligen in CFS with a second Phase III trial
	Ampligen obtains regulatory approval for CFS/ME in Argentina
	First shipments of Ampligen under the MyTomorrows EAP start to Europe
	Ampligen holds patent protection through 2028
	Completed the technology transfer of the Ampligen® manufacturing processes to Avrio Biopharmaceuticals, with the first cGMP lot expected to be produced for Europe in December 2016
	Entered into an agreement with Scientific Products Pharmaceutical for investigative use of Alferon for MERS in Middle Eastern countries
	Renewed an expired Sales, Marketing, Distribution, and Supply Agreement with GP Pharm Latino America, where GP Pharm is responsible for commercializing Ampligen® for CFS/ME in Argentina
	Formed a Scientific Advisory Board (SAB) to advise on clinical and regulatory development

Sources: Hemispherx Biopharma, Inc. and Crystal Research Associates, LLC.

Intellectual Property

Hemispherx's intellectual property (IP) strategy centers on establishing enforceable patents covering the use of Ampligen® and Alferon for existing and potentially new diseases, in order to obtain and preserve exclusive rights for the commercial sale of these therapeutic compounds. In addition, certain of the Company's know-how and technology is not patentable, particularly some of the manufacturing procedures, and Hemispherx relies on such trade secrets and expertise to secure a competitive advantage.

Hemispherx continually reviews its patent portfolio to determine whether the patents have continuing value. Such review includes an analysis of the patent's ultimate revenue and profitability potential as well as whether each patent continues to fit into the Company's strategic business plans for Ampligen®, Alferon N Injection®, and Alferon® LDO. As such, the Company has allowed some patents to expire or lapse for technologies that are no longer in use or that represent no value to Hemispherx.

Following the expiration of its original composition of matter patents, Hemispherx was granted a new composition of matter patent in the U.S. (#8,722,874) in 2014 and in Europe (#2,340,307) in 2015, covering Ampligen® formulations. Hemispherx believes that the issuance of U.S. Patent 8,722,874 helps ensure that the Company retains patent protection for novel formulations of Ampligen® products until at least 2028. Furthermore, the Company also obtained an omnibus assignment of all Ampligen® and Alferon® IP from Hemispherx's former CEO.

In addition to the Company's patent rights relating to Ampligen®, the FDA has granted orphan drug status to the drug for CFS, HIV/AIDS, renal cell carcinoma, and malignant melanoma. Orphan drug status grants protection against the potential subsequent approval of other sponsors' versions of the drug for these uses for a period of seven years following FDA approval for each of these designated uses. The first new drug application (NDA) approval for Ampligen® as a new chemical entity may also qualify for four or five years of non-patent exclusivity during which abbreviated new drug applications seeking approval to market generic versions cannot be submitted to the FDA.

As of September 30, 2016, the Company's IP portfolio included 49 patents issued and 13 patents pending.

Company Leadership

In addition to the expertise of the individuals described below, Hemispherx has retained Step Change Pharma to advise the Company on regulatory compliance and **cGMP** and has created a Scientific Advisory Board (SAB) to guide its drug development and regulatory applications. SAB members are listed on pages 14-15. Step Change Pharma specializes in process design, re-design, and development; process analytical technology; quality by design; regulatory innovation; establishing and advising regulatory process for interaction with regulatory bodies with the goal of helping companies maintain regulatory compliance; and preparation for FDA inspections and approvals.

Executive Management

Figure 7 summarizes the Company's executive leadership, followed by brief biographies.

Figure 7
EXECUTIVE MANAGEMENT

Thomas K. Equels, M.S., J.D.	Executive Vice Chairman, Chief Executive Officer, President, and Secretary
Peter W. Rodino III, Esq.	Executive Director of Governmental Relations and General Counsel
Adam Pascale, CPA	Chief Financial Officer
David R. Strayer, M.D.	Chief Scientific and Medical Officer
Wayne Springate	Senior Vice President of Operations

Source: Hemispherx Biopharma, Inc.

Thomas K. Equels, M.S., J.D., Executive Vice Chairman, Chief Executive Officer, President, and Secretary

Mr. Equels was named CEO in February 2016, served as president since August 2015, has been a director since 2008, and presently serves as the Company's executive vice chairman secretary and litigation counsel. Mr. Equels previously served as chief financial officer (CFO) from December 2013 to February 2016. While serving full-time at Hemispherx, Mr. Equels has been the president and managing director of the Equels Law Firm based in Miami, Florida, which focuses on litigation. For over a quarter-century, Mr. Equels has represented national and state governments as well as companies in the banking, insurance, aviation, pharmaceutical, and construction industries. On numerous occasions, Mr. Equels has been the court-appointed receiver to turn around distressed companies. Mr. Equels received a J.D. with high honors from Florida State University. He is a *summa cum laude* graduate of Troy University and also obtained an M.S. in management from Troy. He is a member of the Florida Bar Association and the American Bar Association.

Peter W. Rodino III, Esq., Executive Director of Governmental Relations and General Counsel

Mr. Rodino has broad legal, financial, and executive experience. In addition to being president of Rodino Consulting LLC and managing partner at several law firms during his many years as a practicing attorney, he served as chairman and CEO of Crossroads Health Plan, the first major health maintenance organization (HMO) in New Jersey. He has also had experience as an investment executive in the securities industry and acted as trustee in numerous Chapter 11 complex corporate reorganizations. For the past 17 years, as founder and president of Rodino Consulting, Mr. Rodino has provided business and government relations consulting services to smaller companies with a focus on helping them develop business plans, implement marketing strategies, and acquire investment capital. Mr. Rodino holds a B.S. in business administration from Georgetown University and a J.D. from Seton Hall University.

Adam Pascale, CPA, Chief Financial Officer

Mr. Pascale was named CFO in February 2016, in addition to his current responsibilities as chief accounting officer. Mr. Pascale has been employed with Hemispherx since 1996, with more than two decades of public accounting experience and prior public company experience. He earned a B.A. in accounting and finance from Rutgers University. Mr. Pascale served for several years as a certified public accountant (CPA) prior to joining Hemispherx, and is a member of both the American and the Pennsylvania Institutes of Certified Public Accountants.

David R. Strayer, M.D., Chief Scientific and Medical Officer

Dr. Strayer was appointed chief scientific officer (CSO) in February 2016 and has served as Hemispherx's medical director since 1986. Dr. Strayer, based upon this experience, is the foremost medical expert on Ampligen and Alferon in the world. He has served as professor of medicine at the Medical College of Pennsylvania and Hahnemann University from 1987 to 1998. Dr. Strayer is board certified in medical oncology and internal medicine, with research interests in the fields of cancer and immune system disorders. He has served as principal investigator in studies funded by the Leukemia Society of America, the American Cancer Society, and the National Institutes of Health. Dr. Strayer attended the School of Medicine at the University of California at Los Angeles (UCLA), where he received an M.D. in 1972.

Wayne Springate, Senior Vice President of Operations

Mr. Springate has served as senior vice president of operations since May 2011 after joining Hemispherx in 2002 as vice president of business development. Mr. Springate came on board when Hemispherx acquired Alferon N Injection® and its New Brunswick, New Jersey, manufacturing facility. He led the consolidation of the Company's Rockville facility to its New Brunswick location as well as coordinated the relocation of manufacturing polymers from South Africa to its production facility in New Brunswick. Currently, he is managing a capital improvement budget to enhance the Alferon® facility in accordance with current Good Manufacturing Practice (cGMP). Previously, Mr. Springate served as president for World Fashion Concepts in New York and oversaw operations at several locations throughout the U.S. and overseas. Mr. Springate assists the CEO in details of operations on a daily basis and is involved in all aspects of manufacturing, warehouse management, distribution, and logistics.

Board of Directors

The Board of Directors oversees the conduct of and supervises the Company's management. Figure 8 provides a summary of Board members, followed by brief biographies on page 14.

Figure 8
BOARD OF DIRECTORS

William M. Mitchell, M.D., Ph.D.	Chairman of the Board
Thomas K. Equels, M.S., J.D.	Executive Vice Chairman, Chief Executive Officer, President, and Secretary
Stewart L. Appelrouth	Director

Source: Hemispherx Biopharma, Inc.

William M. Mitchell, M.D., Ph.D., Chairman of the Board

Dr. Mitchell was appointed chairman of the Board in February 2016 after serving as a director since July 1998. Dr. Mitchell is a professor of pathology, microbiology, and immunology at Vanderbilt University School of Medicine and is a board-certified physician. Dr. Mitchell earned an M.D. from Vanderbilt and a Ph.D. from Johns Hopkins University, where he served as house officer in internal medicine (Osler Service), followed by a fellowship at its School of Medicine. Dr. Mitchell has published over 200 papers, reviews, and abstracts that relate to the pathogenesis of obligate intracellular pathogens, innate and adaptive immune responses, and liquid biopsy cancer (chromosomal instability) diagnostics. He is the inventor or co-inventor of 14 issued U.S. patents as well as derivative foreign patents. Dr. Mitchell has worked with many professional societies that have included the American Society of Investigative Pathology (ASIP), the International Society for Antiviral Research (ISAR), the American Society of Biochemistry and Molecular Biology (ASBMB), the American Society of Microbiology (ASM), and the American Society of Clinical Oncology (ASCO). Dr. Mitchell is a member of the American Medical Association (AMA). He has served on numerous review committees for the National Institutes of Health (NIH), the Centers for Disease Control and Prevention (CDC), the European Union (EU), and the College of American Pathology (CAP). He is an independent director of Chronix Biomedical, a genetics-based cancer diagnostic company.

Thomas K. Equels, M.S., J.D., Executive Vice Chairman, Chief Executive Officer, President, and Secretary

Biography on page 12.

Stewart L. Appelrouth, Director

Mr. Appelrouth has served as a member of the Board of Directors since August 2016. Mr. Appelrouth is a CPA and partner at Appelrouth Farah & Co., P.A., Certified Public Accountants and Advisors. Mr. Appelrouth is also a certified forensic accountant and possesses 40 years of experience in accounting and consulting. He is a member of or has affiliations with the AICPA, American College of Forensic Examiners, Association of Certified Fraud Examiners, Florida Bar Grievance Committee, Florida Institute of Certified Public Accountants, and InfraGard Member, a national information sharing program between the FBI and the private sector. Mr. Appelrouth graduated from Florida State University in 1975 and received a Master's degree in finance from Florida International University in 1980.

Scientific Advisory Board (SAB)

The purpose of Hemispherx's SAB is to leverage scientific and pharmaceutical expertise for the Company's drug development and pursuit of regulatory approvals. Figure 9 lists SAB members, followed by their brief biographies.

Figure 9
SCIENTIFIC ADVISORY BOARD (SAB)

William M. Mitchell, M.D., Ph.D.	Chairman of the Board of Directors
Ronald Brus, M.D.	Director, SAB
W. Neal Burnette, Ph.D.	Director, SAB
Christopher Nicodemus, M.D., F.A.C.P.	Director, SAB

Source: Hemispherx Biopharma, Inc.

William M. Mitchell, M.D., Ph.D., Chairman of the Board of Directors

Biography above.

Ronald Brus, M.D., Director, SAB

Dr. Brus is the founder and CEO of myTomorrows.com, a web-based early access program designed to assist seriously ill patients obtain the latest drug innovations. Hemispherx recently initiated an EAP through myTomorrows.com for Ampligen® in Europe. Dr. Brus has more than 25 years of experience in the industry. Prior to founding myTomorrows.com, he held several executive positions at Crucell, a vaccine company, including chief executive officer. Crucell was acquired by Johnson & Johnson (JNJ-NYSE) for $2.8 billion in 2011. He has served as director of Galapagos NV, a clinical-stage biotech focused on developing novel mode of action medicines and was the product planning physician at Forest Laboratories. Dr. Brus obtained an M.D. at the University of Groningen.

W. Neal Burnette, Ph.D., Director, SAB

Dr. Burnette is an experienced biomedical research scientist focused on molecular biology and vaccine development in academia, industry, and the military. He is the inventor of the "Western Blot" that remains one of the most used techniques in the medical and biological sciences. He was a senior scientist at Amgen (AMGN-NASDAQ), where he developed the first "genetic toxoids" for pertussis and cholera vaccines. Following 9/11, he returned to active U.S. Army duty and served as the deputy joint program executive officer for Chemical and Biological Defense and as a senior infectious disease consultant to the U.S. Army Medical Research and Materiel Command. Colonel Burnette was also a member of the President's Interagency Working Group for Weapons of Mass Destruction. He received a Ph.D. in retrovirology at Vanderbilt University School of Medicine, was a postdoctoral fellow in molecular biology and infectious diseases at Albert Einstein College of Medicine, and was on the research staffs of the Fred Hutchinson Cancer Research Center and the Salk Institute. Dr. Burnette has served as a consultant, acting senior executive, and board member for a wide variety of early-stage biomedical companies that ranged broadly in focus from vaccines and immunobiologics to the treatment of retinal diseases.

Christopher Nicodemus, M.D., F.A.C.P., Director, SAB

Dr. Nicodemus has been a collaborator and advisor to Hemispherx since 2008. He is founder, president, and chief scientific officer of AIT Strategies, a firm focusing on biomedical research and development with a special interest in immunotherapeutics. Prior to founding AIT Strategies, he served as chairman and chief scientific officer of Advanced Immune Therapeutics, Inc. Dr. Nicodemus's focus of interest is enhancing anti-tumor immunity and he is an expert on toll-like receptor 3 (TLR3). He has led teams working on three successful NDA registrations of Zyrteck®, Acutect®, and Neotect®. His work in ovarian cancer and immunology has resulted in multiple patent applications. He has extensive FDA and international regulatory experience and has published more than 40 papers, chapters, and reviews and numerous abstracts and is a fellow of the American College of Physicians. Dr. Nicodemus received undergraduate training at Harvard College and received an M.D. from Upstate Medical University in Syracuse, NY.

Core Story

Both of Hemispherx's lead product programs—Ampligen® and Alferon N Injection®—have novel mechanisms of action that serve to modulate and amplify human immunity, participating in broad immunotherapy healthcare sectors. Immunotherapy refers to treatments that use the immune system to combat diseases, and includes vaccines and pharmaceutical/biotechnology compounds to treat patients, among other products. Immuno-oncology is a type of immunotherapy that has the specific purpose of treating cancer.

AMPLIGEN®

Phase III Development for Chronic Fatigue Syndrome/Myalgic Encephalomyelitis (CFS/ME)

Hemispherx's lead developmental candidate is Ampligen® (rintatolimod), an experimental therapeutic intended to address a number of critical unmet medical needs. The most advanced indication for Ampligen® is treating severe and disabling chronic fatigue syndrome (CFS), for which the product candidate is in Phase III development. CFS, which is also known as myalgic encephalomyelitis ([ME] primarily in Europe), is estimated to affect over three million people around the world, though not everyone is affected with the same level of severity. To date, there is no approved treatment for CFS/ME, and Ampligen® is believed to be the only option in late-stage development for patients who suffer from a debilitating form of the disease. Importantly, an approval of Ampligen® in the U.S. could provide the first and only therapeutic to address CFS/ME.

It is notable that Ampligen® under the trade name "Rintamod®" was approved in August 2016 by Argentina's Administracion Nacional de Medicamentos, Alimentos y Tecnologia Medica (ANMAT) for treatment of severe CFS/ME. This approval lends credibility to the Ampligen® mechanism of action and safety record, and is generating positive momentum for Hemispherx that could be followed by additional global opportunities as the Company pursues completion of its clinical trial program. In addition to seeking approval from the U.S. FDA, the Company has opened up early access programs (EAPs) for Ampligen® throughout Europe, for which the first order of Ampligen® was shipped to Europe in July 2016.

Mechanism of Action

Ampligen® belongs to a new class of large, synthetic, double-stranded RNA macromolecules, and may become the first drug candidate of its class to complete the FDA's NDA review. There are some small, double-stranded RNA molecules known as "microRNAs" in development, but these are believed to still be early stage, unlike Ampligen®, which is late-stage and a much larger molecule.

Ampligen® is a Toll-like Receptor 3 (TLR3) Agonist (Activator)

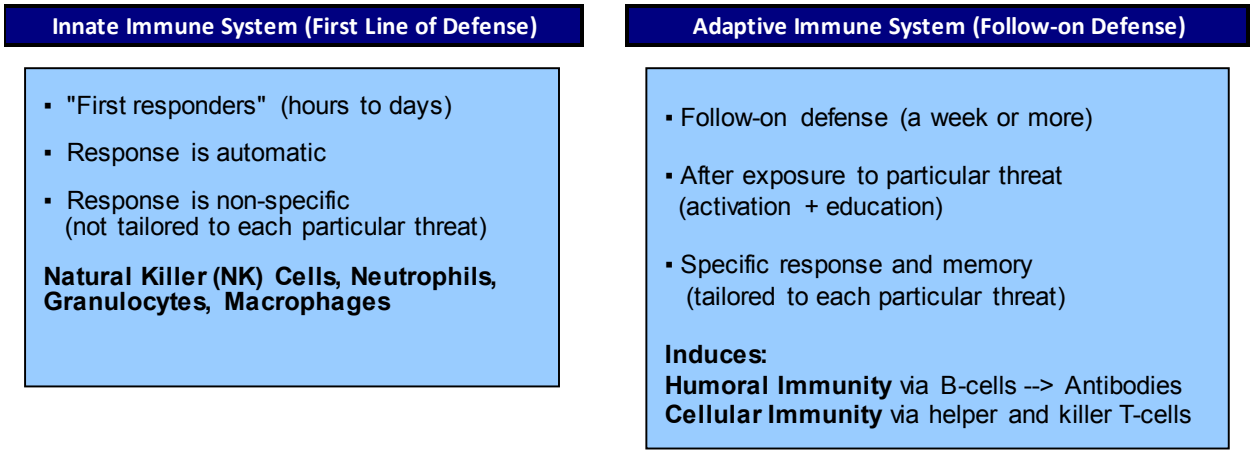
Ampligen® works in a novel manner by activating Toll-like receptor 3 (TLR3). The family of Toll-like receptors are critical to the body's immune responses, since the proteins encoded by these genes recognize pathogens expressed by infectious agents and then trigger the other immune cells that are necessary to develop immunity. TLR3 in particular also offers some specific advantages for drug development. It recognizes double-stranded RNA associated with viruses and may be beneficial to stimulating immunity against viruses (Source: the National Center for Biotechnology Information [NCBI]). It also induces activation and production of key immune cells, including type I interferons (IFNs).

Type I IFNs regulate innate immune responses and sculpt adaptive immunity (Source: *Immunology and Cell Biology* [2012] 90, 471–473). They interact with numerous disease-fighting cells, from regulating the activity of macrophages, natural killer (NK) cells, and **antigen-presenting cells (APCs)** to indirectly stimulating adaptive immune responses by upregulating the needed surface receptors and co-stimulatory molecules and affecting survival, proliferation, and differentiation of **T cells**. TLR3's impact on the production of IFNs often occurs in response to the presence of a viral infection in the body. IFNs then aim to prevent the growth, or replication, of that virus. Moreover, some IFNs may have utility in cancer therapies by preventing cell growth.

As a result of its mechanism of action, Ampligen® has the benefit of triggering both innate and adaptive immune responses. Figure 10 overviews innate and adaptive immunity, which work together in concert in a healthy individual. The innate immune system is the immunity an individual is born with that serves as the first line of defense against invading organisms. The innate immune system's response is non-specific and does not distinguish between various pathogen classes. Instead, it protects the body by recognizing general features of possible pathogens (e.g., the cell walls of bacteria) and automatically activates the body's NK cells, neutrophils, granulocytes, and macrophages. In contrast, the adaptive response is composed of highly specialized, systemic cells and processes that eliminate or prevent disease through an acquired or learned immune response to a particular antigen. Adaptive immunity is often primed through either vaccination or a previous exposure, wherein the immune system successfully attacked the pathogen.

Figure 10

INNATE VERSUS ADAPTIVE IMMUNITY



Source: Crystal Research Associates, LLC.

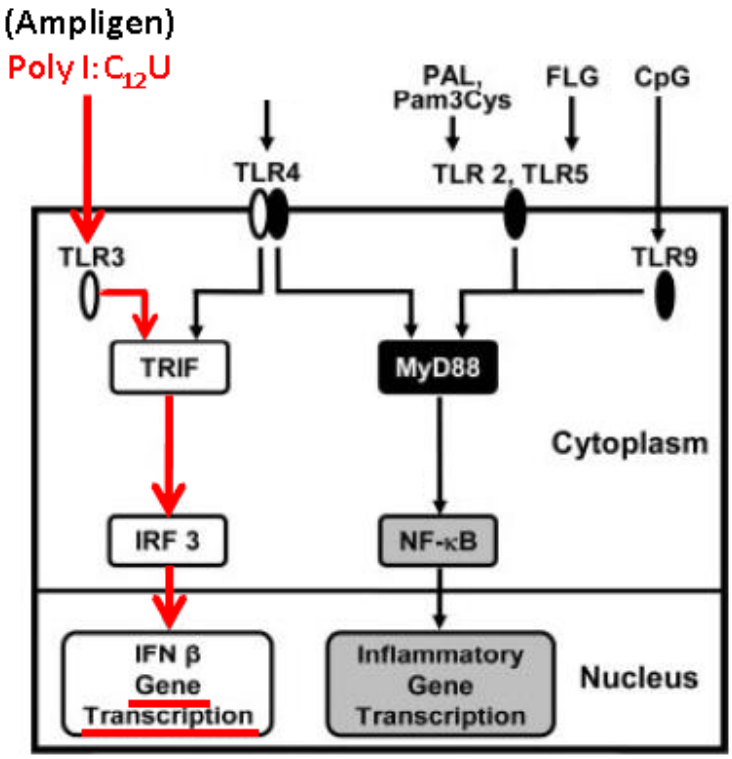
Diseases, such as those caused by viral or bacterial infections or by advanced cancer, have a tendency to lead to response deficiencies by the immune system. Accordingly, restoring the body's immunity to its effective levels and balancing the system are critical. It has been discovered that T cells and NK cells are the principal cells in the immune system that attack viruses and tumors.

Increased Selectivity and Shorter Half-Life Confers Efficacy and Safety Advantages

Ampligen® has shown to be selective for TLR3, in that this is the only Toll-like receptor that Ampligen® affects. This is beneficial because TLR3 is the only Toll-like receptor that signals exclusively through the TRIF pathway and does not use MyD88 (as shown in Figure 11 [page 18]). Researchers have shown that the MyD88 pathway induces increased toxicity versus TRIF (Source: the *American Journal of Pathology* [2014] 184:4, 1062–1072). Toxicity has been a limiting factor of other pharmaceuticals that seek to leverage TLR immunity. Hemispherx reports that Ampligen® has demonstrated an improved safety record in clinical trials compared to other forms of double-stranded RNA in large part because the TRIF pathway used by TLR3 minimizes systemic inflammatory cytokine induction and does not activate inflammatory helicases (Source: *Expert Review of Clinical Pharmacology*, June 2, 2016; 9[6]:755–770).

Figure 11

AMPLIGEN® ACTIVATES SIGNALING EXCLUSIVELY THROUGH THE LESS TOXIC TRIF PATHWAY



Source: Hemispherx Biopharma, Inc.

Additionally, Ampligen® has other advantages, including localized instability, which accelerates hydrolysis while preserving activity and results in a shorter half-life with both efficacy and safety/toxicity benefits.

Clinical Development Summary for Ampligen® in CFS/ME

In clinical trials to date, Hemispherx has administered over 90,000 doses of Ampligen® through an intravenous infusion to more than 800 adults, and has reported the drug to be generally well tolerated based on its experiences. The Company has conducted 13 studies of the product candidate, nine of which occurred in patients who were suffering from severely debilitating CFS/ME, often with a disease duration of six to nine years before trial enrollment (Source: *Expert Review of Clinical Pharmacology*, June 2, 2016; 9[6]:755–770). The clinical trial history has encompassed both placebo-controlled Phase II and III trials to measure efficacy and open-label trials (where both the patient and physician know which treatment is being administered) to measure safety, efficacy, and long-term effects.

In two pivotal trials (AMP-502 [Phase II] and AMP-516 [Phase III]), 162 patients were treated with Ampligen® versus 164 placebo patients. For the seven non-pivotal studies, the total number of patients treated with Ampligen® was 575 (Source: FDA Advisory Committee Meeting, December 2012).

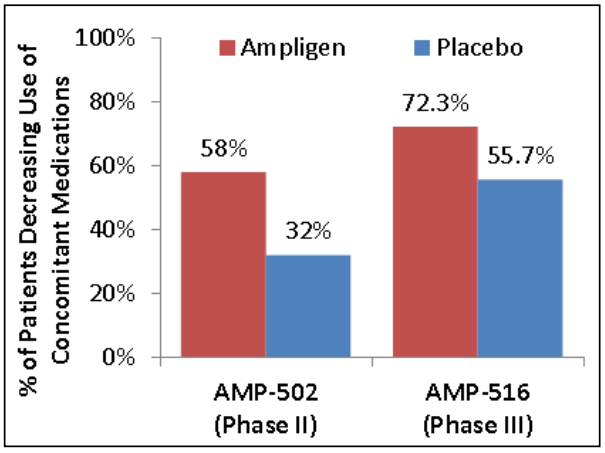
Both AMP-502 and AMP-516 were placebo-controlled studies and were double-blind (neither the patient nor the physician knew whether Ampligen® or a placebo was given) and were randomized at multiple trial locations. Both of these studies met their primary endpoints with statistical significance (Source: *Expert Review of Clinical Pharmacology*). Importantly, of the 234 patients who were enrolled in the Phase III trial (AMP-516), the group that received Ampligen® showed a 36.5% intra-patient improvement in mean exercise compared to 15.2% in the placebo cohort (Source: *PLoS ONE*, 2012, 7[3]). The treadmill test measures the total amount of time the patient can stay on a treadmill at 2 MPH, raised by a 3% incline every two minutes. Results at Week 40 are compared to those at the trial start.

In both Phase II and Phase III trials, concomitant medication use was decreased by the use of Ampligen®, indicating that Ampligen® appears to reduce dependence on the drugs commonly used to alleviate CFS/ME symptoms. As shown in Figure 12, 72% of Ampligen® patients in Phase III had decreased the use of other medications by week 40. The Phase II study measured the rate and duration of emergency room admissions as well, finding that patients who received Ampligen® required far fewer hospital stays during the study than patients receiving the placebo. In total, during the AMP-502 Phase II study, placebo patients were hospitalized or admitted to the emergency room for a total of 114 days versus only 19 days for the Ampligen® patients.

Figure 12

SECONDARY ENDPOINTS

Phase II and Phase III data showing Ampligen® reduces dependency on concomitant medications



Phase II data showing Ampligen® is associated with fewer emergency room (ER) visits

	Ampligen	Placebo	P-Value[1]
Mean # admissions per hospitalized / ER patient	1.0	3.4	P < 0.005
Mean # days per hospitalized/ER patient	2.7	16.3	P < 0.005

[1] Mann-Whitney Test

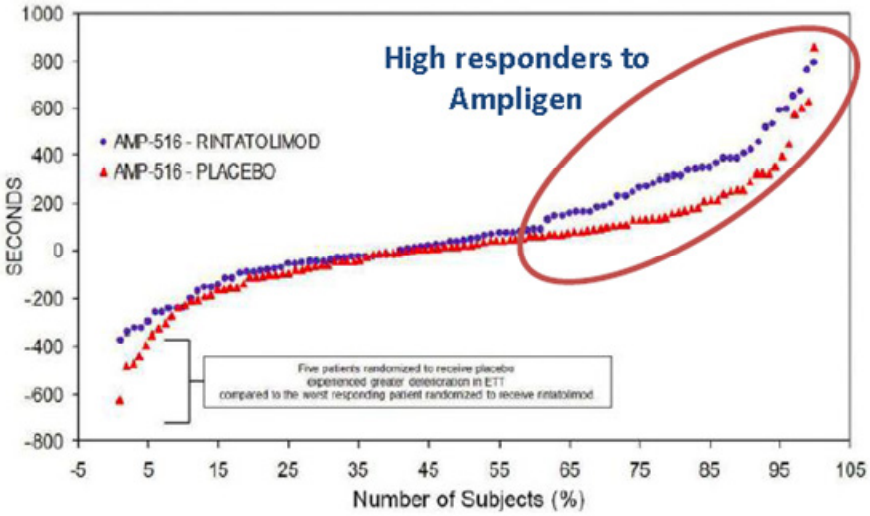
Source: Hemispherx FDA Arthritis Advisory Committee Meeting Briefing Document, December 20, 2012.

A Subset of High Responders to Ampligen® Treatment

Figure 13 illustrates the difference in exercise duration results seen in the Phase III trial, from baseline to 40 weeks of treatment, per patient. Analysis of the individual responses suggests that patients who were high responders to Ampligen® therapy may be a distinct cohort.

Figure 13

INDIVIDUAL RESPONSES IN PHASE III TRIAL



Source: Hemispherx FDA Arthritis Advisory Committee Meeting Briefing Document, Dec. 20, 2012, Expert Rev Clin Pharmacol. 2016 Jun;9(6):755-70.

U.S. Food and Drug Administration (FDA) Review

Hemispherx initially submitted its clinical data for Ampligen® to the FDA in 2009, but at that time, the FDA did not believe there was sufficient safety and efficacy data to warrant a commercial approval despite the Phase II and Phase III study in CFS/ME both having met their primary endpoints (Source: *BioWorld™ Today*). The FDA issued a **complete response letter (CRL)** to Hemispherx in 2009 that the New Drug Application (NDA) in its present form could not be approved. After conducting additional analyses of its existing data for a resubmitted NDA, the FDA in 2013 again reiterated that a larger, confirmatory Phase III trial for Ampligen® would be needed. It is likely that the upcoming Phase III trial will study multiple dose regimens of Ampligen® over 40 weeks of treatment, though the trial protocol design had not been finalized as of the date of this report.

Ampligen® Outlook

Since 2013, several important events have occurred that have improved the outlook for Ampligen® in CFS/ME. Most importantly, Hemispherx appointed a new chief executive officer (CEO), Mr. Tom Equels (biography on page 12), in February 2016. Mr. Equels launched a period of aggressive execution for Hemispherx, focused on moving viable product candidates toward commercial launch, monetizing assets, and entering into strategic relationships that aid the Company in its mission. Along with his appointment, Hemispherx announced an intention to prioritize Ampligen® and conduct the confirmatory Phase III trial that the FDA has requested. Secondly, the FDA has taken a proactive stance at encouraging pharmaceutical development of a product to treat CFS/ME, due to the demands of vocal patient advocates amid the lack of any available therapy for patients with this serious disease. The agency has sponsored workshops, webinars, and teleconferences specifically for CFS/ME drug development—exploring topics including the impact on the quality of life for ME and CFS patients, quantitative outcome measures or endpoints that determine if disease symptoms improve with intervention, and how drug efficacy should be clinically tested based on these endpoints or measurements. The FDA ultimately issued guidance on CFS/ME drug development in March 2014 (Source: the FDA, http://www.fda.gov/Drugs/NewsEvents/ucm319188.htm).

As evidenced by Hemispherx's new management's goals, the Company further added an additional contract manufacturer on July 27, 2016, when it reached an agreement with Avecia Biopharmaceutical (previously Avrio Biopharmaceuticals) to serve as a manufacturer of Ampligen®. Avecia, an FDA-inspected facility, has the capabilities for the compounding and fill/finish of sterile clinical- and commercial-grade Ampligen® to satisfy the Company's ongoing domestic clinical studies as well as the recently initiated Early Access Program (EAP) in Europe. Hemispherx believes that Avecia can meet its immediate requirements until the Company is able to amend its agreement with Jubilant HollisterStier and, moreover, will likely be a good source of manufactured product that is able to produce Ampligen® on the schedule needed to meet upcoming supply targets. Hemispherx states this is a good example of how the new management team is operating more aggressively.

Shipments of Ampligen® began to Europe in July 2016 under the MyTomorrows early access program (EAP), and validation is ongoing of GMP commercial batches for sale in Argentina, where Ampligen® was approved in August 2016. In the U.S., based on its discussions with the FDA, the next step is for Hemispherx to commence its confirmatory Phase III clinical trial of Ampligen® in a more narrowly defined patient population than past trials. The patient population expected to be enrolled in the next Phase III trial will likely be a subset of what has been previously studied, as the Company seeks to use a narrower patient selection criteria to better select for likely responders. Hemispherx met with the FDA most recently in October 2016 to discuss continued refinements to the Phase III trial protocol.

Search for a Strategic Co-development Partner

In order to finance Phase III development and support subsequent commercialization efforts for Ampligen® in CFS/ME, Hemispherx is seeking strategic co-development partners. The Company believes its platform represents a favorable value proposition for potential partners, as Hemispherx may be developing the only treatment for CFS/ME in a market where there is no approved therapeutic. Moreover, the Company estimates that a course of treatment for CFS/ME could cost roughly $60,000 to $70,000, creating a valuable opportunity for a strategic partner with the skill set to move Ampligen® into widespread commercial adoption.

Orphan Drug and Compassionate Use Designations

Over the course of the product development process, Hemispherx has received several beneficial regulatory designations for Ampligen®, including Orphan Drug status and expanded access (compassionate use) allowances with a cost recovery authorization from the FDA.

- An Orphan Drug is an FDA designation given to products intended to treat orphan diseases, which are diseases that either affect fewer than 200,000 people or are largely ignored due to being less prominent in the U.S. than in developing nations. Under the U.S. Orphan Drug Act of 1983, manufacturers of Orphan Drugs can receive tax incentives on clinical trials and seven years of market exclusivity in the U.S., among other benefits designed to expedite clinical development and time to market, such as federal grants, faster reviews, and filing fee waivers. The EU also incentivizes Orphan Drug development and offers 10 years of marketing exclusivity.

- The FDA's compassionate use program is a method of providing experimental therapeutics to humans before final FDA approval. It is intended to help individuals who are very sick and have no other treatment options. The FDA approves the compassionate use of a drug or therapy on a case-by-case basis. There are two clinics in the U.S., one in Lake Tahoe and one in North Carolina, where CFS/ME patients can receive Ampligen® via an open-label setup. Additional open-label uses are occurring in Europe under the supervision of the MyTomorrows EAP.

Figure 14 (page 22) summarizes the candidate's Orphan Drug designations, noting that these extend beyond just the CFS/ME indication. Ampligen® is also listed as an Orphan Drug for several immuno-oncology and antiviral indications where the drug is under development as well.

Figure 14

ORPHAN DRUG DESIGNATIONS

Product Candidate	Country	Indication
Ampligen®	U.S.	ME/CFS
Ampligen®	U.S.	AIDS
Ampligen®	U.S.	Invasive Metastatic Melanoma (Stage IIb, III, IV)
Ampligen®	U.S.	Renal Cell Carcinoma
Ampligen®	European Union	Ebola Virus Disease

Sources: the U.S. Food and Drug Administration's (FDA) Orphan Drug Database (https://www.accessdata.fda.gov/scripts/opdlisting/oopd/) and Hemispherx Biopharma, Inc.

Development in Advanced Cancers

In addition to its potential as a CFS/ME therapy, preclinical and clinical data suggest that Ampligen® may have broader antiviral and anticancer properties. The product candidate is currently in Phase I/II studies sponsored by the University of Pittsburgh for two cancers: (1) ovarian and (2) colorectal. Figure 15 summarizes two of Hemispherx's proof-of-concept clinical studies that are currently in progress for Ampligen® in oncology indications. Both of these studies are ongoing under a collaboration with the University of Pittsburgh.

Figure 15

ONGOING PROOF-OF-CONCEPT CLINICAL TRIALS FOR AMPLIGEN® IN THE TUMOR MICROENVIRONMENT

Tumor Type	Therapeutic Regimen	Planned Enrollment	Primary Completion	Primary Endpoints	Collaborator
Colorectal	Part of chemokine modulatory regimen (celecoxib + IFN)	50	August 2017	Change in number of tumor-infiltrating CD8+ cells	University of Pittsburgh
Ovarian	Combination with cisplatin and chemokine modulatory regimen	40	July 2017	Change in number of tumor-infiltrating CD8+ cells Safety / adverse events	University of Pittsburgh

Source: Hemispherx Biopharma, Inc.

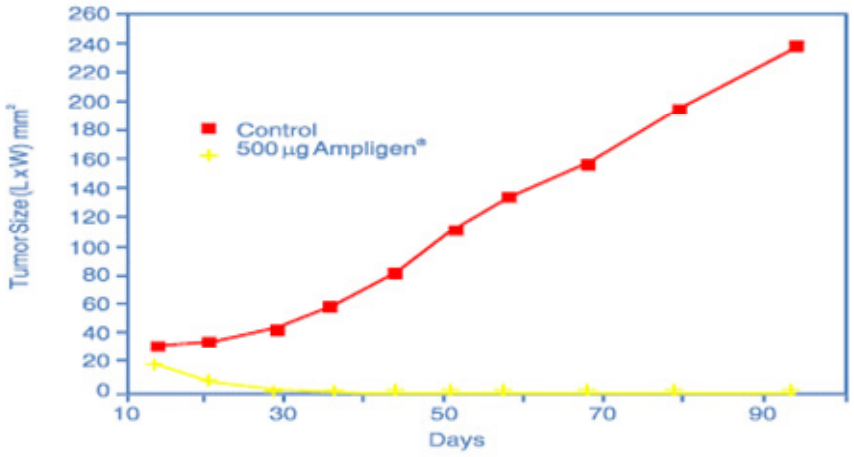
Additionally, Ampligen® may have activity against melanoma and renal cell carcinoma (kidney cancer). In prior studies of renal cancer and Stage IV melanoma, data suggested that Ampligen® administration was associated with a survival benefit in these patients, though larger studies are needed to confirm these findings.

Figure 16 (page 23) illustrates results of an animal study of Ampligen® given as a monotherapy, where the candidate demonstrated an ability to increase anti-tumor immune mechanisms and survival. Results indicate that Ampligen® has direct anti-tumor effects and its augmentation of innate immune responses (NK cells) could have a key role in tumor regression. As shown in the Figure, Ampligen® was effective at both inhibiting tumor growth (tumor regression was observed in each mouse model) and increasing survival, where 90% of mice given Ampligen® were free of residual tumor while 100% of the control group had died.

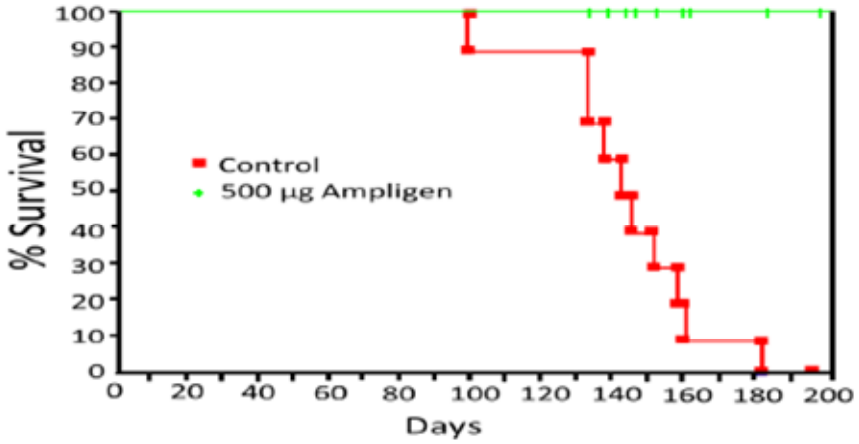
Figure 16

RESULTS OF AMPLIGEN® AS A MONOTHERAPY IN A RENAL CELL CARCINOMA ANIMAL MODEL

Tumor Growth



Survival



Source: Hemispherx Biopharma, Inc.

Combination Treatment with Checkpoint Inhibitors

Ultimately, Hemispherx believes that an opportunity exists for Ampligen® to be used in combination with other oncology drugs due to its activity as a driver of the immune response. Cancer cells are often able to avoid detection by the immune system, because they are protected by special molecules on the cell-surface that inhibit the function of immune cells that would otherwise seek to attack the cancer cell. There are a number of medical approaches that aim to target cancer's immune-evasion properties, with the goal of helping the body's immune system reject the growth or spread of cancer cells. Some people have reported long-term remissions using such medicines known as "checkpoint inhibitors" (greater details on page 29), though there are limitations to widespread use. Most patients do not show dramatic responses to this type of treatment, and though multiple checkpoint inhibitors can be combined to increase survival time, the combination is associated with a risk of toxicity from combining like anticancer drugs. Other limitations include the development of resistance to treatment or the presence of a dysfunctional immune system.

In animal models, the use of double-stranded RNA molecules (like Ampligen®) in combination with a checkpoint inhibitor have been associated with a significant improvement in effectiveness versus the checkpoint inhibitor alone. This is likely due to the molecules' function as a driver of the immune system, which stimulate greater immune activity. With the increase in immune activity in conjunction with the checkpoint inhibitor targeting the cancer cell, the body may have a better chance at marshaling an effective immune response. Data suggest that a lack of immune activity is a major reason for resistance to treatment with checkpoint inhibitors. Hemispherx believes that Ampligen® is ready for trials in advanced cancers. Another impact of combining Ampligen® with a checkpoint inhibitor regimen may be enabling lower doses of the checkpoint inhibitor, thereby reducing the toxicity that occurs at higher doses.

In combination with checkpoint inhibitors, Ampligen® has demonstrated a synergistic ability to improve reduction in tumor size, as shown in Figure 17. In this study of a melanoma mice model, Ampligen® was injected intravenously with an anti-PD-L1 monoclonal antibody (mAb) checkpoint inhibitor administered intraperitoneally after each Ampligen® dose. By Day 9, the total decrease in tumor size was significantly greater for the mice given Ampligen® and anti-PD-L1 versus just anti-PD-L1 alone, and as shown in Figure 17, the number of tumors that decreased in size was also significantly greater. The Company reports that data further showed tumor reductions for the Ampligen® and anti-PD-L1 group by Day 30 that were significant enough to measure as one complete response and two partial responses to therapy (out of only 10 subjects).

Figure 17

AMPLIGEN® AS A COMBINATION THERAPY WITH CHECKPOINT INHIBITORS

Melanoma Mouse Model: Ampligen® + Anti-PD-L1 (a checkpoint inhibitor)

	Number of tumors with a decrease in size at Day 9 versus Day 0*		
	Number of tumors		p-value
	Increased in size	Decreased in size	
No treatment control (n=10)	10	0	0.0025**
Anti-PD-L1 only (n=10)	8	2	
250 µg of Ampligen®* + Anti-PD-L1 (n=10)**	**3**	**7**	

*First tumor size measurement and first dose of Ampligen® occurred on Day 0

**Fisher's Exact Test (2 sided)

***No responses were seen with 250 µg of Ampligen® alone

Source: Hemispherx Biopharma, Inc.

A Broad-spectrum Antiviral

The third main area where Ampligen® has shown utility is as an antiviral, which is related to the drug's function as a driver of the immune system. Based on results of preclinical studies conducted thus far, Hemispherx believes Ampligen® may have efficacy as either a prophylactic or an early-onset therapeutic given after the subject has been infected.

Bioactivity against Highly Lethal Viruses

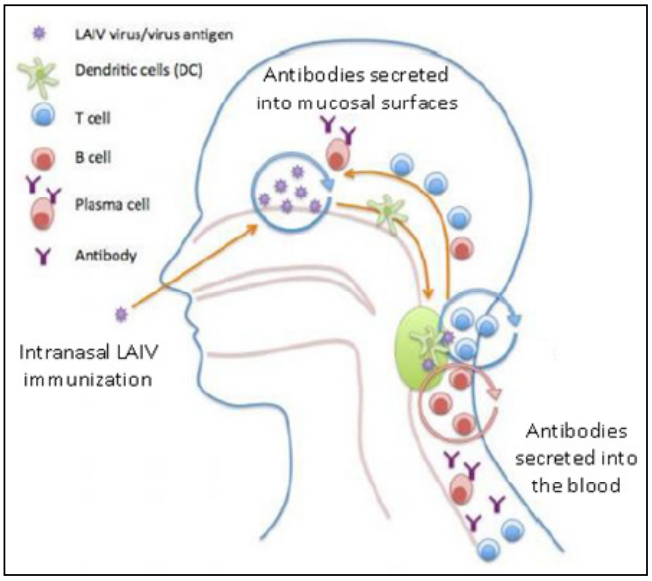
In preclinical studies (animal models), Ampligen® has shown activity against a number of highly contagious and/or lethal viruses, including Ebola, the mosquito-borne virus Venezuelan equine encephalitis, severe acute respiratory syndrome (SARS), and avian influenza ("bird flu").

Bioactivity as a Vaccine Enhancer for Influenza

Animal studies conducted by Dr. Hasegawa at the Japanese National Institute of Infectious Diseases have indicated that Ampligen® could function as an immune driver for viral vaccines, with cross-protection against differing forms of influenza (seasonal and avian). Hemispherx has designed an intranasal formulation of Ampligen® specifically to address this market opportunity in vaccines. When used as an enhancer of intranasal influenza vaccine, Ampligen® may improve its effectiveness and cross-protect against mutated strains of the virus.

Figure 18

INTRANASAL IMMUNIZATION



Inactivated, injected vaccines induce systemic IgG antibodies, but intranasal vaccines also elicit IgA antibodies in the respiratory tract, adding another line of defense to prevent virus entry at the usual site of infection.

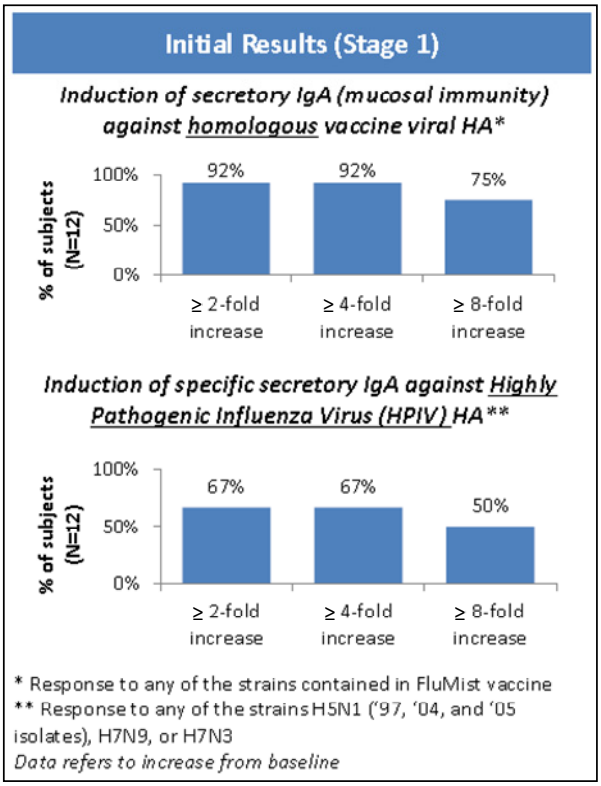
This mucosal immune response also offers cross-protection, but intranasal vaccines are generally either not effective without an immune-boosting adjuvant or have safety concerns (if a live, attenuated virus is used).

When Ampligen® is used with a seasonal intranasal vaccine, it may offer cross-protection against pandemic virus strains that the seasonal vaccine does not normally protect against as well as increase the immune response to homologous strains.

Source: Hemispherx Biopharma, Inc.

Figure 19

AMPLIGEN® PLUS FLUMIST® PHASE I/II INITIAL RESULTS (STAGE 1)



Source: Hemispherx Biopharma, Inc.

Seasonal influenza vaccines have historically only been effective against the specific strain of influenza virus from which they were developed, and have had no effect at preventing exposure to pandemic strains. However, the cross-protection enabled by Ampligen® in combination with a seasonal influenza vaccine has shown to be effective against pandemic virus as well in preclinical studies. Data suggests that cross-reactive antibody generation protects against antigenic drift, thereby circumventing the risk of specific vaccines losing efficacy as viruses mutate. This approach also enhances local and systemic immune responses in general, which fills an unmet need in populations for whom standard vaccines are less effective (e.g., the elderly, immuno-compromised). Use of Ampligen® as an immune-enhancing driver may further help expedite development of more intranasal seasonal flu vaccines, which is typically viewed as a more convenient route of administration than injections. With Ampligen®, unused seasonal flu vaccine inventories could potentially even be stored for use in subsequent pandemics.

To date, Ampligen® is in a Phase I/II study to evaluate its safety when used in combination with FluMist®, a live, attenuated intranasal vaccine (LAIV). Initial data from the Phase I/II study is presented in Figure 19, which thus far appears to confirm the candidate's ability to induce cross-reactivity in humans when used with intranasal flu vaccine.

Having already completed multiple preclinical studies in mouse and non-human primate models and the first stage of a Phase I/II clinical study in humans, Hemispherx next plans to initiate a proof-of-concept study of the efficacy of Ampligen® administered simultaneously to an inactivated intranasal vaccine.

Ebola Virus

In a study at the U.S. Army Medical Research Institute for Infectious Diseases (USAMRIID), Ampligen® was administered to rodents with Ebola virus. The study was structured with four cohorts: a control group of rodents that received no treatment and that had 100% mortality after seven days of Ebola exposure, and three groups that received either a low, medium, or high dose of Ampligen® shortly after infection with Ebola. The low-dose group showed 100% survival with virtually no weight loss. The medium- and high-dose groups had 90% survival with no weight loss in the surviving rodents.

In April 2015, Hemispherx received Orphan Drug status in Europe for Ampligen® as an Ebola treatment.

MARKET OPPORTUNITIES FOR AMPLIGEN®

Myalgic Encephalomyelitis/Chronic Fatigue Syndrome (CFS/ME)

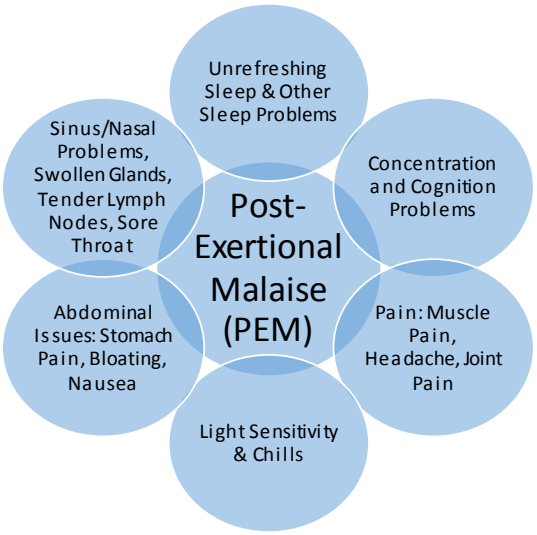
Chronic Fatigue Syndrome (CFS), also known as Myalgic Encephalomyelitis (ME), is a systemic neuroimmune disease that causes dysregulation of both the immune system and the nervous system, characterized by unexplained, persistent, and relapsing fatigue. The disease significantly limits an individual's ability to take on basic daily activities and compromises their quality of life.

Although the cause of the disorder is still unknown, biological, genetic, infectious, immune dysfunction, and psychological mechanisms have been proposed as the root of this syndrome. Thus, the pathogenic basis for CFS may be multifactorial, with a variety of microbes, hormonal, and immunological abnormalities linked to its pathogenesis. The disease also displays a significant rate of spontaneous remission during the first two years, indicating that in some cases the body slowly recovers, allowing the immune system to address the condition successfully over a period of time. This could indicate a genetic component to the disease, with a subset of people that are incapable or inefficient in clearing the pathogen, allowing the condition to progress (Source: *Expert Review of Clinical Pharmacology*, Vol. 9[6]: 755–770, 2016).

CFS symptoms may be triggered by a wide range of factors, including an infection; anesthetics; physical trauma; exposure to environmental pollutants, chemicals, and heavy metals; and blood transfusions (though rarely). Among adolescents, mononucleosis is a major trigger of CFS (Source: *The Washington Post's* "Chronic fatigue syndrome is a physical disorder, not a psychological illness, panel says," 2015).

CFS symptoms, which can affect several body systems, include severe fatigue or exhaustion, unrefreshing sleep, weakness, muscle and joint pain, impaired memory or mental concentration, tender lymph nodes, sore throat, headaches, and sleep dysfunction. As well, patients may experience post-exertional malaise, as listed in Figure 20, which may occur without warning and upon even minimal physical or cognitive exertion (and can be associated with acute exacerbation of these symptoms). The fatigue part of CFS is not due to ongoing exertion, is not typically relieved by rest, and diagnosis is based solely on an individual's symptoms.

Figure 20
SYMPTOMS OF CFS



Sources: CDC, Medscape, UpToDate, Expert Rev Clin Pharmacol. 2016 Jun;9(6):755-70, IOM "ME/CFS" (2015), Dyn Med. 2008; 7: 6.

Specifically, the Institute of Medicine of the National Academies has established five main symptoms of ME/CFS:

(1) Reduction or impairment in ability to carry out normal daily activities, accompanied by profound fatigue;

(2) Post-exertional malaise (worsening of symptoms/manifestations after physical, cognitive, or emotional effort);

(3) Unrefreshing sleep;

(4) Cognitive impairment; and

(5) Orthostatic intolerance (symptoms that worsen when a person stands upright and improve when the person lies back down).

CFS affects people's ability to function in daily activities of work, school, household management, and personal care. CFS symptoms can be particularly severe and disabling, with 25% of patients housebound or bedbound and an estimated 75% unable to work, resulting in decreased quality of family life, social isolation, and feelings of desperation (Source: Meaction.net).

Because there are no specific tests for the disease, diagnosing CFS can be difficult as it is based on fairly subjective criteria, such as the frequent occurrence of post-exertional malaise and unrefreshing sleep, as well as the exclusion of other potential causes for the symptoms. In addition, the nature and severity of symptoms vary from person to person, making diagnosis even more challenging. The Institute of Medicine of the National Academies estimated that between 84% and 91% of people with CFS have not yet been diagnosed. Such inexactitude, along with the fact that the CFS affects four times as many women than men, has meant that the condition has not been taken so seriously, where for example, when it was first recognized, it was termed the "yuppie flu" or it can, at times, be dismissed as an imaginary disease. People with CFS struggle sometimes for years before being correctly diagnosed, with 67% to 77% of patients reporting that it took longer than a year to receive a diagnosis, and approximately 29% saying it took longer than five years (Source: Institute of Medicine of the National Academies).

The lack of diagnostic markers have made attempts to estimate the prevalence and burden of disease difficult. The Institute of Medicine of the National Academies estimated CFS to affect up to 2.5 million people in the U.S. while the CDC estimates that between 1 million and 4 million people in the U.S. are afflicted by the disease, with the resulting loss of productivity and high medical costs contributing to a total economic burden of $17 to $24 billion annually (Source: Institute of Medicine of the National Academies).

However, diagnosing the disease is just the first hurdle. Remarkably, little research funding has been made available to study the cause of CFS, mechanisms associated with the development and progression of the disease, or effective treatment, especially given the number of people affected. With no approved drug therapy available, treatment is aimed at symptom relief and improved ambulatory function, with options including over-the-counter and off-label prescription drugs, behavioral modifications, and graded exercise therapies. Lack of a viable and effective treatment has led the disease to represents a significant public health concern. The Institute of Medicine of the National Academies believes that there is an urgent need for more research to discover what causes CFS, understand the mechanisms associated with the development and progression of the disease, and develop effective diagnostic markers and treatments. This sentiment is echoed by a letter signed by 55 members of Congress and sent to National Institutes of Health Director Francis Collins, urging increased funding for biomedical research into ME/CFS (Source: Meaction.net).

Over the years, a lack of unity and consensus with regard to the disease, its importance, and who it affects has led to inattention by the regulatory agencies and by the pharmaceutical industry in terms of pursuing a therapy. To the best of its knowledge, Hemispherx believes it has the only drug in the U.S. pipeline for CFS in extremely late-stage development. The Company has orphan drug status for CFS in the U.S.; worldwide, it has a final approval in Argentina. Furthermore, Hemispherx believes that it holds the only drug for this indication in any respected medical regulatory approval system in the world, suggesting the potential of an untapped market with little to no competition.

Immuno-oncology

Immuno-oncology is a method of using the body's immune system to boost natural defenses to fight cancer by recognizing and attacking cancer cells via a natural mechanism. Cancer cells are different from normal cells, most notably in that they do not undergo a normal, programmed cell death, and are more akin to an out-of-control copy machine that does not stop creating images. These abnormal cancer cells also frequently mutate, and in doing so, manage to evade the immune system. Immunotherapy drugs have been developed to alert the immune system about these mutated cells in order to locate and destroy them. The basic mechanics of cancer immunotherapy involves bringing down the "shield" that hides a cancer cell from the immune system—allowing the immune system to see it as a foreign body and attack it.

Immuno-oncology products are either made using natural substances from the body or made in a laboratory as a synthetic product. It can be used in combination with other cancer treatments, such as chemotherapy, radiation, and surgery, and has been able to improve or restore immune system function and ultimately inhibit growth of cancer cells, stop cancer from metastasizing to other parts of the body, and/or improve internal immune destruction of cancer cells. As a result, such therapies are becoming preferred additions to the standard of care.

Common types of immunotherapies may include the following: (1) monoclonal antibodies (mAbs), including checkpoint inhibitors; (2) non-specific immunotherapies, such as IFNs and interleukins; (3) oncolytic virus therapy, the first of which was approved by the FDA in October 2015 to treat melanoma; (4) T cell therapy; and (5) cancer vaccines.

Checkpoint Inhibitors

To date, researchers have identified the PD-1/PD-L1 and CTLA-4 pathways as being critical to the immune system's ability to control cancer growth, with these pathways sometimes referred to as "immune checkpoints." Various cancers use these pathways to evade the body's immune system. By blocking these pathways with specific antibodies (also called "checkpoint inhibitors"), the body's immune system can respond to the cancer, and once the immune system can recognize and respond to the cancer, it may be able to inhibit tumor growth and spread. Examples of marketed checkpoint inhibitors include Ipilimumab (Yervoy) and Nivolumab (Opdivo) from Bristol-Myers Squibb (BMS-NYSE) and Pembrolizumab (Keytruda) from Merck (MRK-NYSE).

Market Growth Drivers

The global oncology market is riding a steady growth trajectory, with the oncology market valued at $107 billion worldwide in 2015 and projected to reach $150 billion by 2020. Wider utilization of new products—especially immunotherapies—is expected to drive much of the growth, offset by reduced use of some existing treatments with inferior clinical outcomes (Source: QuintilesIMS' *Global Oncology Trend Report: A Review of 2015 and Outlook to 2020*, June 2016).

The overall immunotherapy drug market was valued at $40.3 billion in 2015, and is estimated to reach $73.5 billion by 2020, a CAGR of 12.8%. The major drivers for the growth of immunotherapy drugs are increasing incidence of different types of cancer since immuno-oncology is a key application of immunotherapy, a focus on targeted therapies with fewer side effects, and more rapid drug approval processes. In contrast, the high cost of novel cancer therapies and limited knowledge of cancer immunobiology are the major factors hindering the growth of immunotherapy drugs market.

Monoclonal antibodies are expected to account for the largest share of the immunotherapy drug product market, as there are many approved drugs for cancer treatment. However, checkpoint inhibitors are one of the newer segments in the immunotherapy sector and are estimated to experience the highest growth rate due in part to technological advancements in this particular field (Source: MarketsandMarkets' *Immunotherapy Drugs Market by Type of Drug (Monoclonal Antibodies, Interferon-Alpha, Interleukins, Vaccines, (Therapeutic Vaccines and Preventive Vaccines), Checkpoint Inhibitors), Epidemiology, Regulatory and Pipeline Analysis - Global Forecast to 2020*, November 2015).

The total immuno-oncology market is expected to reach $14 billion by 2019, rising to $34 billion by 2024, driven by increased recognition of the therapies' long and durable tumor responses, efficacy in a wide variety of indications, and lack of adverse side effects produced by traditional chemotherapy such as fatigue, neutropenia, or alopecia. Furthermore, as a group, immuno-oncology products have demonstrated comparable respective efficacy and safety profiles, so their commercial success could largely rest on the speed with which they enter the market, their clinical and commercial positioning, and their target patient populations.

Ono/Bristol-Myers Squibb's Opdivo and Schering Plough/Merck's Keytruda are set to be the highest-selling immuno-oncology drugs, with expected multi-blockbuster sales of around $10 billion and $7 billion by 2024, respectively (Source: GlobalData Healthcare's *Immuno-Oncology Strategic Insight: Multi-Indication and Market Size Analysis*, May 2016). As both of these therapeutic compounds are PD-1 (programmed cell death receptor-1)

inhibitors, their success has encouraged a number of companies to conduct research into the PD-1/L1 space, with at least 45 different agents in development for those targets. Yet, despite the activity seen with the PD-1 therapies, opportunity remains for companies developing the next generation of immuno-oncology products. Strategies include improving on efficacy over earlier products and targeting less competitive indications—such as solid tumor indications (e.g., gynecological cancers and many of the rarer cancers)—where current development activities are limited and leaders do not yet exist. In addition, smaller companies can also achieve differentiation through drug combinations, both combinations of PD-1/L1 with other agents and with targeted treatments. Even in indications with an active competitive field, novel combinations that show efficacy could find a profitable niche (Source: *Drug Discovery and Development's* "Time to be Savvy for Next-Generation Immuno-oncology," June 2016).

Broad-Spectrum Antivirals

In 2014, the global antiviral market was estimated at $27.6 billion and is expected to reach $36.4 billion by 2019. The growth is driven by increase in the diseased population, increase in disease awareness level, and launch of new drugs with better efficacy and fewer side effects (Source: Mordor Intelligence's *Global Antiviral Drugs Market Segmented by Therapeutics and Geography - Growth, Trends and Forecasts (2014-2019)*, August 2016).

However, despite advances in antiviral technology, a key opportunity for the antiviral market is the development of broad-spectrum drugs. During the last decades, human populations have been exposed to emerging viral pathogens such as Ebola, Marburg, West Nile virus, Dengue, Lassa fever, SARS, Zika, and others, often with disastrous consequences. While in several cases these represent sporadic outbreaks that wane over a period of a few weeks, the Ebola virus epidemic of 2014 has exposed vulnerability to such highly pathogenic agents, which tend to occur in developing countries but can expand their geographic reach through transportation pathways.

These naturally emerging infectious diseases are a constant threat and include some of the most serious viral disorders. However, since no selective inhibitors are available for the majority of these viruses and most of them display a high mutation rate that allows them to escape the immune response, development of individual antiviral agents is difficult and not commercially attractive (Source: Research and Markets' *Global Antiviral Therapeutics Technologies, Markets and Companies Analysis Report 2015-2020,* November 2015). In addition, in the case of an outbreak by a new viral pathogen, *de novo* vaccine preparation alone does not represent the best approach to avoid a health crisis and prevent human casualties, as the 2014 Ebola virus outbreak showed. Despite the fact that there were already existing vaccine candidates against the virus that were rushed into clinical evaluation under an extremely accelerated testing scheme, no vaccine had completed Phase II efficacy assessment more than a year after the first infected patients were reported (Source: *Journal of Human Virology & Retrovirology,* Vol. 2[2], 2015).

Thus, based on the experience and knowledge acquired through several viral outbreaks in the past, the creation of broad-spectrum antiviral molecules, with the capacity to target different viruses either within one family or even from different families, could represent a commercially viable and effective strategy in the field of antiviral drugs. The broad spectrum antiviral field is in its infancy. Some promising broad-spectrum molecules already exist but their full potential has not been explored. Ribavirin, perhaps the oldest and most known broad-spectrum antiviral, has been used for years as part of the traditional HCV treatment and in special situations where no other drugs were available. However, Ribavirin's many side effects and variable efficacy results in significant limitations. Other compounds with activity against more than one type of virus have been reported in recent years, and some of them have even been tested against the Ebola virus (Source: *Journal of Human Virology & Retrovirology,* Vol. 2[2], 2015). The discovery and development of broad-spectrum antiviral compounds is considered a key aim of antiviral research in the coming decades (Source: *Current Opinion in Infectious Diseases*, 28[6]:596-602, December 2015).

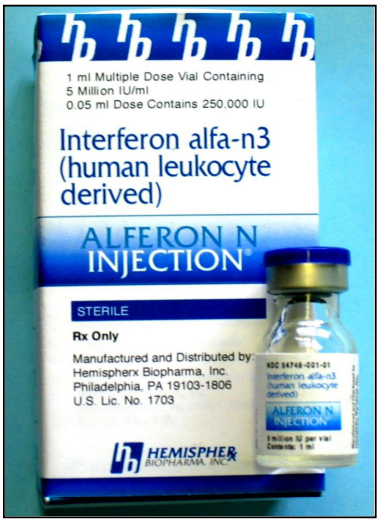
In particular, development of broad-spectrum antiviral options could represent an effective weapon against RNA viruses. RNA viruses—including West Nile, dengue virus, hepatitis C, influenza A, respiratory syncytial, Nipah, Lassa and Ebola, among others—are a frequent cause of emerging and re-emerging viral infections with lethal pandemic potential, and pose a significant public health problem worldwide because of their high mutation rate (Source: University of Washington Health Sciences/UW Medicine's *Progress toward creating broad-spectrum antiviral,* December 2015).

ALFERON N INJECTION®

Hemispherx's Alferon N Injection® is a natural interferon (IFN) that has been approved for use in the U.S. since 1989 (pictured in Figure 21). The Company acquired the product from Interferon Sciences in 2003. Alferon N Injection® is FDA approved as a treatment for refractory or recurrent, external genital warts in adults (patients over the age of 18). Refractory or recurrent genital warts are those that are resistant to other treatments or that recur after treatment. In Argentina, Alferon N Injection® is also approved for use in patients who have failed or become intolerant to recombinant IFN. Recombinant interferon therapy is a type of immunotherapy based on synthetic (or man-made) IFN that is used to treat multiple diseases, including certain cancers, warts, and hepatitis, among other conditions. Hemispherx's Alferon N Injection® is also approved in Argentina under the brand name "Naturaferon" to treat patients with chronic, active hepatitis C infections.

Figure 21

ALFERON N INJECTION® PACKAGING



Source: Hemispherx Biopharma, Inc.

Alferon N Injection® is covered by nearly all of the major commercial insurance providers in the U.S., including Medicare Part B, BCBS California, Cigna, Health Net, United Healthcare, Aetna, Anthem BCBS, and Humana, though some of these payors have restrictions on the use of Alferon, which typically includes the failure of at least one conventional therapy.

Hemispherx has a U.S. marketing and distribution alliance in place with Asembia (www.asembia.com, previously Armada Health Care), which is a specialty pharmaceutical channel management organization. Globally, Hemispherx is also continuing to pursue approvals and sales agreements for Alferon. The drug received an Orphan Drug designation in the EU for Middle East Respiratory Syndrome (MERS) in 2015, and Hemispherx has entered into license or collaboration agreements with firms in Latin America, Australia/New Zealand, and the Middle East, as summarized in Figure 22.

Figure 22

STRATEGIC GLOBAL RELATIONSHIPS FOR ALFERON N INJECTION®

U.S.	Latin America	Australia and New Zealand	Middle East
Marketing and distribution alliance with Asembia	License to GP Pharm Latinoamerica	Collaboration agreement with Emerge Health to seek regulatory approval for Alferon and Ampligen	Agreement with Scientific Products Pharmaceutical (SCIEN) for investigative use of Alferon for MERS

Sources: Hemispherx Biopharma, Inc. and Crystal Research Associates, LLC.

Hemispherx Needs FDA Approval for a New Alferon Production Process

At present, Alferon is not being marketed in the U.S. or Argentina. In 2010, Hemispherx ceased its Alferon production operations in order to focus on making certain manufacturing upgrades. Initially, Alferon production entailed a highly manually intensive process based on the use of six-liter flasks for processing the IFN—which was a time-consuming, labor-intensive process, making the drug too costly. Hemispherx has since begun to transition to a more sophisticated and more efficient manufacturing process using a 600-liter bioreactor for processing IFN. This move is expected to open up new markets for Alferon as a substitute therapy for people currently on recombinant IFN. With improved affordability to make the treatment more competitive to existing options, Alferon—believed to be the only approved natural IFN alpha product—may be able to penetrate a number of markets where IFN therapy is used, beyond genital warts (HPV). The product's future commercial opportunities may include indications in oncology, HCV, MS, MERS, and more where patients have shown to be resistant to recombinant IFN therapy.

Hemispherx has invested $8 million into a new production system for Alferon. The new equipment has been installed, and Hemispherx is working to raise the money needed to complete the process of obtaining FDA approval. The new manufacturing system will need to successfully pass a preapproval inspection by the FDA and gain supplemental approvals before Alferon can be reintroduced to the U.S. market. Hemispherx estimates that completing the process of bringing its bioreactor production process online with FDA approval could require roughly 15 to 16 months and approximately $15 million in funding.

Poised for Re-launch in the U.S. Following Manufacturing Approval

Hemispherx has already put in place a strategic relationship with Asembia once the new bioreactor manufacturing system is operational and FDA approved. Under the agreement with Asembia, Hemispherx expects to manufacture and supply Alferon N Injection® to Asembia's network of specialty pharmacies across the U.S., with Asembia providing ongoing sales and marketing to support the re-launch of Alferon.

Figure 23

UPGRADED NEW JERSEY MANUFACTURING PLANT FOR ALFERON

Previous Method:

6-liter volume flask produced 12 vials

New Method:

600-liter volume bioreactor produces 1,200 vials

Sources: Hemispherx Biopharma, Inc. and Crystal Research Associates, LLC.

A *Natural* IFN Product

To Hemispherx's knowledge, its Alferon N Injection® is the only natural, multi-species IFN alpha currently approved in the U.S. for intralesional treatment of refractory or recurring external genital warts in patients 18 years of age or older. As detailed on pages 16-17, IFNs are important immune components in the body. There are multiple classes of IFNs, with IFN alpha among those recognized for its commercial potential. Typically, IFN alpha products are produced through recombinant means in genetic engineering or cell cultures, or are derived directly from human white blood cells, which is the way Alferon is created.

There may be a number of advantages to using a natural IFN product over a synthetic version. A selection of the known benefits are outlined below, each of which stems from the fact that Alferon is bio-identical to the natural IFN alpha the body produces in response to viral infections.

- Molecular Composition. Hemispherx's natural IFN product is made from multiple molecular species of IFN alpha, versus commercial recombinant IFN alpha, which contains only a single species of IFN. Multi-species IFN taps into a broader array of antiviral activity that is believed to contribute to its higher activity in laboratory studies versus recombinant IFN.

- Glycosylation/Neutralizing Antibodies. Glycosylation entails the process of sugar molecules being chemically attached to proteins. Some natural IFN alpha species are glycosylated in that it is partially covered with sugar molecules, unlike recombinant IFN products that are not glycosylated. Hemispherx believes the lack of glycosylation on recombinant products may contribute to the adverse development of IFN-neutralizing antibodies—a side effect seen in patients. In contrast, significant neutralizing antibodies have not been observed against Alferon N Injection® to date, and the product has shown a relatively tolerable side effect profile.

- Efficacy. Hemispherx reports that recombinant DNA-derived IFN alpha formulations on the market begin to lose effectiveness after one year, which the Company believes is likely due to the formation of neutralizing antibodies—an outcome that has not been experienced with Alferon N Injection®. *In vitro* testing has shown that Alferon can be 10 to 100 times more effective than recombinant IFNs, according to Company reports.

Safety and Efficacy of Alferon N Injection® for Genital Warts (HPV)

Alferon is generally thought to have a high level acceptance among both patients and physicians in terms of its treatment effectiveness for genital warts. In a Phase III study, 54% of patients showed a complete response to this therapy and 73% of all treated warts were completely cleared. At a follow-up visit, 76% of those who had a complete response to the initial treatment still had no recurrence.

Receiving the Alferon treatment entails receiving intralesional injections as an outpatient. The injections only take a few minutes and most patients are able to return to work afterward. There is no scarring or ulcerations, and no surgery.

Altogether, the safety and efficacy of Alferon has been extensively studied in clinical trials, including the completed trials listed below:

- A comparative safety study with recombinant interferon alfa 2b (Intron A, Merck) in 30 normal male volunteers;

- A multicenter, randomized, double-blind, placebo-controlled efficacy and safety trial;

- An open-label clinical trial of efficacy; and

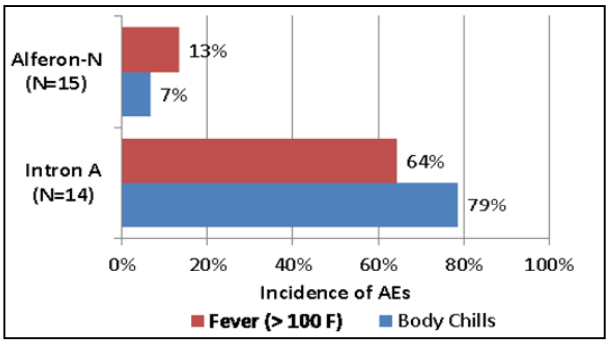
- Three confirmatory open clinical trials.

In one of the aforementioned trials, Alferon was compared to an existing product for genital warts, Intron A. As shown in Figure 24, Alferon was associated with far fewer adverse events (AEs) than Intron A. This included lower overall digestive and neurologic symptomatology and a lower severity of fatigue, diarrhea, loss of appetite, difficulty with concentration, and vomiting for the natural product versus the recombinant IFN.

Figure 24

NATURAL VERSUS RECOMBINANT IFN COMPARATIVE DATA

Results from a Phase I Safety Study versus Intron A (Merck)

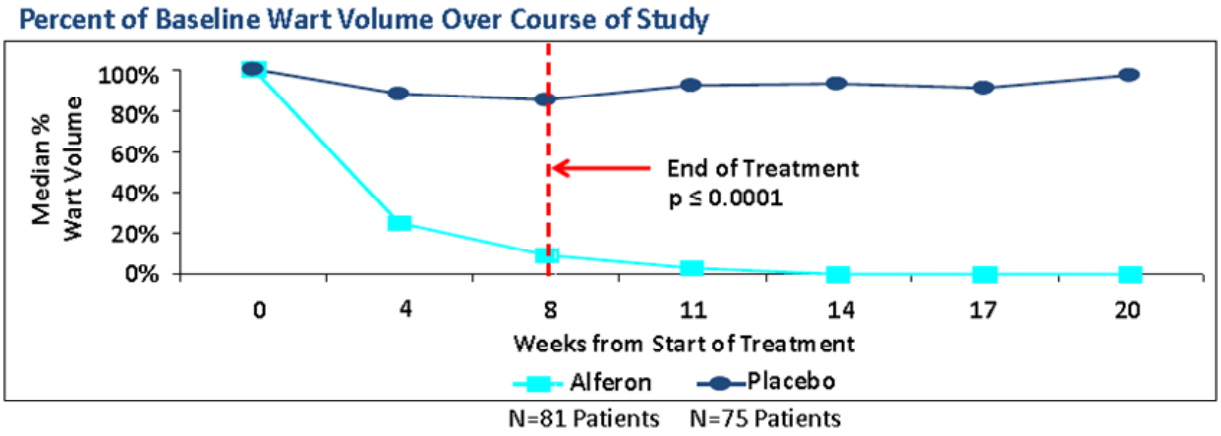


- Double-blind, randomized, parallel study
- Patients 18-50 years old with no prior IFN treatment and at least 4 weeks of no evidence of viral disease
- Treatment with either Alferon or Intron A five times/week for two weeks

Source: JAMA, 1988 Jan 22-29;259(4):533-8.

Figure 25

ALFERON TREATMENT VERSUS PLACEBO



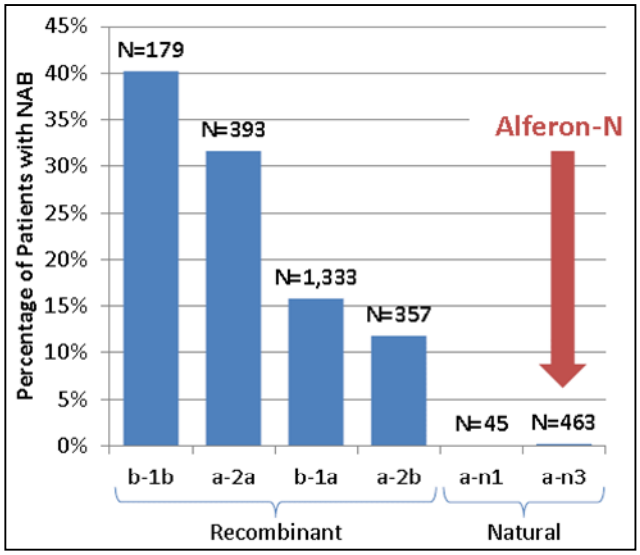
Source: JAMA, 1988, 259(4):533-8.

Alferon as a Natural IFN Substitute to Recombinant IFN

Hemispherx's natural IFN has shown efficacy in 82% of patients who fail recombinant IFN therapy. In these patients, switching to the natural IFN product elicited a restored clinical response where the patient had previously become resistant to therapy. Based on a review of medical literature and published studies for both recombinant and natural IFNs, Hemispherx believes this phenomenon to be due to the low rate of induction of neutralizing antibodies against the natural IFN versus the recombinant IFN. Across a wide range of diseases, incidence of neutralizing antibodies induced against natural IFN was very low (<0.2%) and was significantly less than that for recombinant IFN ($P < 0.0001$), as shown in Figure 26. Generation of neutralizing antibodies was correlated to a larger share of relapsed or refractory patients, while the absence of neutralizing antibodies was correlated to a therapeutic response.

Figure 26

NATURAL VERSUS RECOMBINANT IFN BASED ON THE SHARE OF PATIENTS DEVELOPING NEUTRALIZING ANTIBODIES (NAB)



Source: J Interferon Cytokine Res. 2012 Mar, 32(3):95-102.

Alferon® LDO

Beyond Alferon N Injection®, Hemispherx has continued development of its antiviral technology with Alferon® LDO (low dose oral). Alferon® LDO is a liquid form of the Company's natural interferon designed for oral administration. Hemispherx believes that its oral, non-recombinant interferon can stimulate an immune cascade response in the cells of the mouth and throat as well as be absorbed through the oral mucosa in order to bolster a systemic immune response. As with Alferon N Injection®, Alferon® LDO may have low toxicity and is not expected to generate the adverse formation of antibodies.

Alferon® LDO may be positioned to address global antiviral demand, particularly in government stockpiles and other treatment or prevention programs for pandemic influenzas where the drug's convenient oral dosing and anticipated affordability may present logistical and economic advantages. Additional indications for Alferon® LDO may include seasonal influenza and other emerging viruses.

MARKET OPPORTUNITIES FOR ALFERON N INJECTION®

Growth in the interferon (IFN) market over the next few years will likely come from greater R&D, increasing global awareness of interferon therapy, and rising demand for specialized medicines for diseases, such as hepatitis B, hepatitis C, and cancer. At present, there are more than 15 IFNs available on the market and this number is expected to grow rapidly in the near future (Source: Transparency Market Research's *Interferon Market - Global Industry Analysis, Size, Share, Growth, Trends and Forecast, 2013 – 2019*, 2014). As of 2012, the market for IFN had been expected to exceed $10 billion by 2015 (Source: RNCOS' *Interferon Market Forecast to 2015*, 2012).

Human Papillomavirus (HPV) and Genital Warts

Genital warts, also known as venereal warts or condylomata acuminata, are soft skin growths that appear on the genitals or anal areas, normally caused by certain strains of the human papillomavirus (HPV). These skin growths can cause pain, discomfort, and itching. Although it affects both men and women, women are more likely than men to develop genital warts.

Most cases of genital warts are caused by HPV, a sexually transmitted infection (STI). Genital warts are usually benign (non-cancerous), but many subtypes have the potential for malignant (cancerous) change. There are over 120 different types of HPV that may cause warts, with approximately 40 different subtypes capable of infections that can cause genital warts (Source: *Journal of Clinical and Aesthetic Dermatology*, Vol. 5[6]: 25–36, 2012). Those that do cause genital warts are highly contagious and are passed on through sexual contact with a person who is infected. It is estimated that up to 65% of people who have sexual relations with a person who has genital warts will become infected and develop them too (Source: Medical News Today).

HPV is the most common STI in the U.S., with approximately 79 million people in the U.S. currently infected with HPV and an additional 14 million becoming newly infected each year. HPV is so common that most sexually active men and women will get at least one type of HPV at some point in their lives (Source: CDC). The main health problems related to HPV include genital warts and different types of cancer, including cervical cancer. Every year approximately 17,600 women and 9,300 men are affected by cancers caused by HPV. Cervical cancer has been closely linked with genital HPV infection, while certain types of HPV also are associated with cancer of the vulva, cancer of the anus, cancer of the penis, and cancer of the mouth and throat.

The global HPV therapeutics market, which was approximately $1.4 billion in 2012, is expected to reach $2.3 billion by 2020, behind the rising prevalence of HPV among individuals in both developed and developing countries. The majority of HPV therapeutics are expected to be used to treat genital warts, with this segment likely to contribute the highest share of revenue to the global HPV therapeutics market (Source: Transparency Market Research's *Global Human Papillomavirus (HPV) Therapeutics Market to Reach US$2.34 bn by 2020, Driven by Rising Prevalence of HPV Infections,* March 2016).

Before HPV vaccines were introduced, roughly 340,000 to 360,000 women and men were affected by genital warts caused by HPV every year. It is estimated that anywhere between 500,000 to 1 million new cases are diagnosed each year in the U.S., resulting in roughly 1 in 100 sexually active adults in the U.S. having genital warts at any given time (Source: CDC). While visible genital warts often go away with time, the virus cannot be eliminated once it is in the bloodstream. This means that patients may have several outbreaks over the course their lives (Source: Healthline Media [Medically Reviewed by University of Illinois-Chicago, College of Medicine on June 28, 2016]).

HPV vaccines—such as Gardasil (HPV4) and Cervarix (HPV2)—may play a significant role in reducing the burden of disease by preventing viral infection and transmission, particularly given the high prevalence of genital warts among the population and the lack of adequate therapies. This supports the need for further research into the development of similar vaccines and treatment options (Source: *Journal of Clinical and Aesthetic Dermatology*, Vol. 5[6]: 25–36, 2012).

Competition

Pharmaceutical and biotechnology industries are continually undergoing rapid and substantial technological transformation and as such, competition from pharmaceutical and biotechnology companies, universities, governmental entities, and others diversifying into the field is growing and is expected to continue to do so. It is possible that these other companies or organizations may be in the process of developing technologies that could be the foundation for competitive products to those being developed by Hemispherx. Some of these products may have completely different approaches of achieving similar therapeutic effects to products being developed by Hemispherx. Competing products may be more effective and less costly than those being developed by the Company.

As well, conventional drug therapy, surgery, and other more familiar treatments may compete with Hemispherx's products. Many of these competitors may have greater experience in preclinical testing and human clinical trials of pharmaceutical products and, as well, in obtaining regulatory approvals of products, where these competitors may obtain such regulatory product approvals more rapidly than Hemispherx. Furthermore, competitors have significantly greater experience than Hemispherx in preclinical testing and human clinical trials of pharmaceutical products as well as in obtaining FDA (in the U.S.), European Medicines Agency (EMA), and Health Protection Branch (HPB) (in Canada), and other regulatory approvals of products. Additionally, other companies may succeed in developing products earlier than Hemispherx, where they would obtain approvals for such products more rapidly than the Company may be able to do, or develop products that are more effective than those the Company may develop. That being said, Hemispherx is focused on expanding its technological capabilities in order to remain competitive. The following summaries are not intended to be an exhaustive collection of potential competitors to Hemispherx; however, they are believed to be representative of the type of competition the Company may encounter as it seeks to further commercialize its products/technologies.

Ampligen®

As it relates to the Company's product development candidate, Ampligen®, importantly, there are currently no commercially approved drugs approved for sale to treat CFS in the U.S. and Hemispherx is in extremely late stage. The Company has orphan drug status for CFS in the U.S., and has a final approval in Argentina. In fact, Hemispherx holds the only drug to its knowledge in any respected medical regulatory approval system in the world for this indication, which may make this a largely untapped market.

Leading participants in this market who have drugs to treat disease indications which Hemispherx plans to address include Pfizer, GlaxoSmithKline, Merck & Co., Novartis, and AstraZeneca. As well, biotechnology companies who participate in this market include Baxter International, Fletcher/CSI, AVANT Immunotherapeutics, AVI BioPharma, and Genta. These are among the largest pharmaceutical/biotechnology companies in the world with a well-known presence within both the public and the medical community. Hemispherx believes that its main advantage is the novel mechanism of action of Ampligen® on the immune system.

Alferon N Injection®

Alferon N Injection® competes with Merck's injectable recombinant alpha interferon product (Intron® A) to treat genital warts. As well, other pharmaceutical companies offer self-administered topical cream to treat external genital and perianal warts, including Graceway Pharmaceuticals (Aldara®), Watson Pharma (Condylox®), and MediGene (Veregen®). Furthermore, Alferon N Injection® competes with surgical, chemical, and other methods that treat genital warts. Topical treatments that are normally applied by a doctor have a risk of damaging the skin around the wart, such as (1) Aldara®, also known as Imiquimod®, which is a cream which is marketed to boost the immune systems in an attempt to rid itself of genital warts; (2) Veregen®, an herbal product made from green tea leaves which is self-administered as an ointment and is used to treat external genital warts in adult patients; (3) Condylox® Solution (podofilox) and Podofin® (podophyllin resin), which are liquids applied externally using a cotton applicator or finger which attempts to destroy genital warts by halting cell growth; and (4) Trichloroacetic acid (TCA) or Bichloroacetic acid (BCA), which are chemical treatments which attempt to externally "burn off" genital warts.

The Company may compete largely on the basis of product performance should it gain further approvals to use its product. Competitors have developed or may develop products that contain either alpha or beta interferon or other therapeutic compounds or other treatment modalities for those uses. As well, since certain competitive products are not dependent on a source of human blood cells, such products may be able to be produced in greater volume and at a lower cost than Alferon N Injection®. Additionally, the wholesale price on a per unit basis of Alferon N Injection® is higher than that of the competitive recombinant alpha and beta interferon products.

Historical Financial Results

Figures 27, 28, and 29 (pages 39-41) provide a summary of Hemispherx's key historical financial statements: its Consolidated Statements of Comprehensive Loss, Balance Sheets, and Statements of Cash Flows, as presented in the Company's Form 10-Q for the period ended September 30, 2016, filed with the U.S. Securities and Exchange Commission (SEC) on November 14, 2016.

Figure 27

CONSOLIDATED STATEMENTS OF COMPREHENSIVE LOSS

(in thousands, except share and per share data) (Unaudited)

	Three months ended September 30,		Nine months ended September 30,	
	2016	2015	2016	2015
Revenues:				
Clinical treatment programs	$ 22	$ 23	$ 76	$ 106
Total revenues	22	23	76	106
Costs and expenses:				
Production costs	272	353	830	1,232
Research and development	1,342	1,968	3,244	7,081
General and administrative	1,634	1,685	5,721	5,600
Total costs and expenses	3,248	4,006	9,795	13,913
Operating loss	(3,226)	(3,983)	(9,719)	(13,807)
Interest expense	—	(1)	—	(3)
Interest and other income/(expense)	40	181	156	343
Insurance proceeds from legal settlement, net	190	—	1,626	—
Gain (Loss) on sales of short term marketable securities	31	—	(56)	—
Gain from sale of income tax net operating losses	—	—	1,561	1,374
Redeemable warrants valuation adjustment	103	—	103	—
Net loss	(2,862)	(3,803)	(6,329)	(12,093)
Other comprehensive income (loss):				
Reclassification adjustments for (gain) loss on sales of short term marketable securities included in net loss	(31)	—	56	—
Unrealized gain (loss) on marketable securities	15	(215)	112	(241)
Net comprehensive loss	$ (2,878)	$ (4,018)	$ (6,161)	$ (12,334)
Basic and diluted loss per share	$ (0.13)	$ (0.18)	$ (0.30)	$ (0.62)
Weighted average shares outstanding, basic and diluted	21,832,940	20,564,538	21,046,418	19,358,962

Source: Hemispherx Biopharma, Inc.

Figure 28

CONSOLIDATED BALANCE SHEETS

(in thousands, except for share and per share amounts)

	September 30, 2016 (Unaudited)	December 31, 2015 (Audited)
ASSETS		
Current assets:		
Cash and cash equivalents	$ 4,473	$ 2,115
Marketable securities	3,536	6,795
Inventory-work in process	—	1,326
Assets held for sale	764	—
Prepaid expenses and other current assets	559	335
Total current assets	9,332	10,571
Property and equipment, net	9,779	11,237
Patent and trademark rights, net	919	862
Other assets	1,546	134
Total assets	$ 21,576	$ 22,804
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 1,011	$ 1,213
Accrued expenses	1,420	1,219
Current portion of capital lease	—	1
Total current liabilities	2,431	2,433
Redeemable warrants	2,514	—
Commitments and contingencies (Note 6)		
Stockholders' equity:		
Preferred stock, par value $0.01 per share, authorized 5,000,000; issued and outstanding; none	—	—
Common stock, par value $0.001 per share, authorized 350,000,000 shares; issued and outstanding 24,105,569 and 20,629,957, respectively	24	21
Additional paid-in capital	315,864	313,446
Accumulated other comprehensive income (loss)	71	(97)
Accumulated deficit	(299,328)	(292,999)
Total stockholders' equity	16,631	20,371
Total liabilities and stockholders' equity	$ 21,576	$ 22,804

Source: Hemispherx Biopharma, Inc.

Figure 29

CONSOLIDATED STATEMENTS OF CASH FLOWS

For the Nine Months Ended September 30, 2016 and 2015

(in thousands) (Unaudited)

	2016	2015
Cash flows from operating activities:		
Net loss	$ (6,329)	$ (12,093)
Adjustments to reconcile net loss to net cash used in operating activities:		
Depreciation of property and equipment	854	663
Amortization and abandonment of patent and trademark rights	125	166
Equity-based compensation	344	148
Realized loss on sale of marketable securities	56	—
Redeemable warrants valuation adjustment	(103)	—
Change in assets and liabilities:		
Inventories	—	(1,326)
Prepaid expenses and other current assets	(224)	121
Accounts payable	(202)	97
Accrued expenses	201	(515)
Net cash used in operating activities	(5,278)	(12,739)
Cash flows from investing activities:		
Purchase of property, equipment and construction in progress	(160)	(226)
Additions to patent, trademark and licensing rights	(282)	(188)
Deposits on capital leases refunded	14	—
Sales and maturities of short-term and long-term marketable securities	3,371	2,497
Net cash provided by investing activities	2,943	2,083
Cash flows from financing activities:		
Payments on capital leases	(1)	(19)
Proceeds from sale of stock, net of issuance costs	4,694	9,680
Net cash provided by financing activities	4,693	9,661
Net increase (decrease) in cash and cash equivalents	2,358	(995)
Cash and cash equivalents at beginning of period	2,115	2,156
Cash and cash equivalents at end of period	$ 4,473	$ 1,161
Supplemental disclosures of non-cash investing and financing cash flow information:		
Issuance of common stock for accounts payable	$ —	$ 672
Unrealized gain (loss) on marketable securities	$ 112	$ (241)
Fair Value of redeemable warrants	$ 2,617	$ —
Supplemental disclosure of cash flow information:		
Cash paid for interest expense	$ —	$ (3)
Insurance proceeds from legal settlement	$ 1,626	$ —

Source: Hemispherx Biopharma, Inc.

Risks and Disclosures

This Executive Informational Overview® (EIO) has been prepared by Crystal Research Associates, LLC ("CRA") with the assistance of Hemispherx Biopharma, Inc. ("Hemispherx" or "the Company") based upon information provided by the Company, including peer-reviewed medical literature. CRA has not independently verified such information. Some of the information in this EIO relates to future events or future business and financial performance. Such statements constitute forward-looking information within the meaning of the Private Securities Litigation Act of 1995. Such statements can only be predictions and the actual events or results may differ from those discussed due to the risks described in Hemispherx's statements on Forms 10-K, 10-Q, and 8-K, as well as other forms filed from time to time.

The content of this report with respect to Hemispherx has been compiled primarily from information available to the public released by the Company through news releases, Annual Reports, and U.S. Securities and Exchange Commission (SEC) filings. Hemispherx is solely responsible for the accuracy of this information. Information as to other companies has been prepared from publicly available information and has not been independently verified by Hemispherx or CRA. Certain summaries of activities and outcomes have been condensed to aid the reader in gaining a general understanding. CRA assumes no responsibility to update the information contained in this report. In addition, CRA has been compensated by the Company in cash of thirty-nine thousand, five hundred U.S. dollars for its services in creating this report and for updates. For more complete information about the risks involved in an investment in the Company, please see Hemispherx's Form 10-Q filed with the SEC on November 14, 2016, and available at https://www.sec.gov/Archives/edgar/data/946644/000161577416008259/s104631_10q.htm.

Investors should carefully consider the risks and information about Hemispherx's business, as described below. Investors should not interpret the order in which considerations are presented in this or other filings as an indication of their relative importance. In addition, the risks and uncertainties overviewed herein may not be the only risks that the Company faces. Additional risks and uncertainties not presently known to Hemispherx or that it currently believes to be immaterial may also adversely affect the Company's business. If any of such risks and uncertainties develops into an actual event, Hemispherx's business, financial condition, and results of operations could be materially and adversely affected, and the trading price of the Company's shares could decline.

This report is published solely for information purposes and is not to be construed as an offer to sell or the solicitation of an offer to buy any security in any state. Past performance does not guarantee future performance. Additional information about Hemispherx and its public filings, as well as copies of this report, can be obtained in either a paper or electronic format by calling (215) 988-0080.

RISKS ASSOCIATED WITH THE COMPANY'S BUSINESS

No assurance of successful product development and finding co-development partners.

The development of Ampligen® and its other related products is subject to a number of significant risks. Ampligen® may be found to be ineffective or to have adverse side effects, fail to receive necessary regulatory clearances, be difficult to manufacture on a commercial scale, be uneconomical to market, or be precluded from commercialization by proprietary right of third parties. The Company's investigational products are in various stages of clinical and pre-clinical development and require further clinical studies and appropriate regulatory approval processes before any such products can be marketed. Hemispherx does not know when, if ever, Ampligen® or its other products will be generally available for commercial sale for any indication. Generally, only a small percentage of potential therapeutic products are eventually approved by the FDA for commercial sale.

Although Alferon N Injection® is approved for marketing in the U.S. for the intralesional treatment of refractory or recurring external genital warts in patients 18 years of age or older, to date it has not been approved for other indications. Hemispherx faces many of the risks discussed above, with regard to developing this product for use to treat other ailments.

The Company is committed to a focused business plan oriented toward finding co-development partners with the necessary capital and expertise required to commercialize the many therapeutic aspects of its experimental drugs and its FDA approved drug Alferon N®. If Hemispherx is unable to find a suitable co-development partner to assist in the product development and commercialization of its experimental drugs and FDA approved drug Alferon N®, the Company may be unable to continue or complete the development and commercialization of its products. In addition, there can be no assurance that such co-development partnerships would be on acceptable terms, or that such partnerships, will be acceptable from a profitability standpoint.

The Company's drug and related technologies are investigational and subject to regulatory approval. If Hemispherx is unable to obtain regulatory approval in a timely manner, or at all, the Company's operations will be materially harmed and its stock adversely affected.

All of the Company's drugs and associated technologies, other than Alferon N Injection®, are investigational and must receive prior regulatory approval by appropriate regulatory authorities for commercial distribution and sale and are currently legally available only through clinical trials with specified disorders. At present, Alferon N Injection® is approved for the intralesional treatment of refractory or recurring external genital warts in patients 18 years of age or older. Use of Alferon N Injection® for other indications will require regulatory approval.

The Company's products, including Ampligen®, are subject to extensive regulation by numerous governmental authorities in the U.S. and other countries, including, but not limited to, the FDA in the U.S., the Health Protection Branch (HPB) of Canada, the Agency for the European Medicines Agency (EMA) in Europe, and the Administracion Nacional de Medicamentos, Alimentos y Tecnologia Medica (ANMAT) in Argentina. Obtaining regulatory approvals is a rigorous and lengthy process and requires the expenditure of substantial resources. In order to obtain final regulatory approval of a new drug, Hemispherx must demonstrate to the satisfaction of the regulatory agency that the product is safe and effective for its intended uses and that the Company is capable of manufacturing the product to the applicable regulatory standards. Hemispherx requires regulatory approval in order to market Ampligen® or any other proposed product and receive product revenues or royalties. The Company cannot assure you that Ampligen® will ultimately be demonstrated to be safe and efficacious. While Ampligen® is authorized for use in clinical trials in the U.S., Hemispherx cannot assure that additional clinical trial approvals will be authorized in the U.S. or in other countries, in a timely fashion or at all, or that the Company will complete these clinical trials. In addition, although Ampligen® has been authorized by the FDA for treatment use under certain conditions, including provision for cost recovery, there can be no assurance that such authorization will continue in effect.

On February 1, 2013, Hemispherx received a CRL from the FDA declining to approve the Company's Ampligen® NDA for the treatment of CFS. The FDA communicated that Hemispherx should conduct at least one additional clinical trial, complete various nonclinical studies, and perform a number of data analysis.

The FDA's regulatory review and approval process is extensive, lengthy, expensive and inherently uncertain. To receive approval for a product candidate, Hemispherx must, among other things, demonstrate to the FDA's satisfaction with substantial evidence from well-controlled pre-clinical and clinical trials that the product candidate is both safe and effective for each indication for which approval is sought. Before the Company can sell Ampligen® for any use, or promote Alferon® for any use other than as Alferon N Injection® for treatment of refractory or recurring genital warts, Hemispherx will need to file the appropriate NDA with the FDA in the U.S. and the appropriate regulatory agency outside of the U.S. where the Company intends to market and sell such products. At present the only NDA Hemispherx has filed with the FDA is the NDA for the use of Ampligen® to treat CFS. As discussed in the prior paragraph, the FDA declined to approve this NDA and indicated that the Company needed to conduct additional work. Therefore, ultimate FDA approval, if any, may be delayed by several years and may require Hemispherx to expend more resources than it has available. It is also possible that additional studies, if performed and completed, may not be successful or considered sufficient by the FDA for approval or even to make the Company's applications approvable. If any of these outcomes occur, Hemispherx may be forced to abandon one or more of its future applications for approval, which might significantly harm the Company's business and prospects. As a result, Hemispherx cannot predict if or when it might receive regulatory approval for the use of Ampligen® to treat CFS or for the use of any other products. Even if regulatory approval from the FDA is received for the use of Ampligen® to treat CFS or eventually, for the use of any other product, any approvals that the Company obtains could contain significant limitations in the form of narrow indications, patient populations, warnings, precautions or contra-indications or other conditions of use, or the requirement that Hemispherx

implements a risk evaluation and mitigation strategy. In such an event, the Company's ability to generate revenues from such products could be greatly reduced and its business could be harmed.

Even if Hemispherx believes that data collected from its preclinical studies and clinical trials of its product candidate are promising, this data has not been, and may not be in the future, sufficient to support marketing approval by the FDA, and regulatory interpretation of these data and procedures may continue to be unfavorable.

To the extent that Hemispherx is required by the FDA pursuant to the Ampligen® NDA to conduct additional studies and take additional actions, approval of any applications that the Company submits may be delayed by several years, or may require Hemispherx to expend more resources than it has available. It is also possible that additional studies, if performed and completed, may not be successful or considered sufficient by the FDA for approval or even to make the Company's applications approvable. If any of these outcomes occur, Hemispherx may be forced to abandon one or more of its future applications for approval, which might significantly harm its business and prospects. As a result, Hemispherx cannot predict when or whether regulatory approval will be obtained for any product candidate it develops.

Obtaining approval of a NDA by the FDA, or a comparable foreign regulatory authority, is inherently uncertain. Even after completing clinical trials and other studies, a product candidate could fail to receive regulatory approval for many reasons, including the following:

- not be able to demonstrate to the satisfaction of the FDA that the Company's product candidate is safe and effective for any indication;
- the FDA may disagree with the design or implementation of the Company's clinical trials or other studies;
- the results of the clinical trials or other studies may not demonstrate that a product candidate's clinical and other benefits outweigh its safety risks;
- the FDA may disagree with Hemispherx's interpretation of data from clinical trials or other studies;
- the data collected from clinical trials and other studies of a product candidate may not be sufficient to support the submission of a NDA;
- the approval policies or regulations of the FDA may significantly change in a manner rendering the Company's clinical and other study data insufficient for approval; and
- the FDA may not approve the proposed manufacturing processes and facilities for a product candidate.

In 2012, FDA reviewers raised certain questions about the status of the Company's existing lots of older Work-In-Process Alferon® materials and Alferon® Active Pharmaceutical Product (API), which would need to be released by the FDA before those materials could be used in commercial product. After conducting all of the appropriate tests on samples of the inventory during 2013, Hemispherx concluded that it could not alleviate certain questions the FDA had about the older Work-In-Process Alferon N Injection®. Accordingly, these lots were not submitted to the FDA to request release for commercial sale and their remaining dollar value was written-off. In the absence of FDA approvals for product manufactured from existing inventory, commercial sales of Alferon® will not resume until new batches of Alferon® inventory and API can be produced, filled and finished, and released by the FDA for commercial sale.

Alferon® LDO has been approved for pre-clinical testing for possible use as prophylaxis and treatment against influenza. While the studies to date have been encouraging, preliminary testing in the laboratory and in animal models is not necessarily predictive of successful results in clinical testing or human treatment. No assurance can be given that similar results will be observed in clinical trials. Use of Alferon® as a possible treatment of influenza requires prior regulatory approval. In October 2009, Hemispherx originally submitted a protocol to the FDA proposing to conduct a Phase II, double-blind, adaptive-design, randomized, placebo-controlled, dose-ranging study of Alferon® LDO for the prophylaxis and treatment of seasonal and pandemic influenza of more than 200 subjects. In December 2010, the FDA authorized this Phase II, double-blind, adaptive-design, randomized, placebo-controlled, dose-ranging study of Alferon® LDO for the prophylaxis and treatment of seasonal and pandemic influenza of more than 200 subjects. The Company's Phase II study has been delayed. The outcome of this

confirmatory study, if and when resumed, will allow Hemispherx to better evaluate the potential effectiveness of this product and to proceed with this study of seasonal and pandemic influenza. Hemispherx is unable to provide any assurances that the Phase II Alferon® LDO study for the prophylaxis and treatment of seasonal and pandemic influenza will be undertaken.

If the Company is unable to gain necessary FDA approvals related to Ampligen® and Alferon® on a timely basis, its operations most likely will be materially and/or adversely affected. Additionally, if Hemispherx is unable to generate the additional data, successfully complete inspections, or obtain approvals as required by the FDA on a timely manner, or at all, or determine that any of the Company's clinical studies are not cost/justified to undertake or if, for that or any other reason, Ampligen®, Alferon®, or one of the Company's other products or production processes do not receive necessary regulatory approval in the U.S. or elsewhere:

- the Company's ability to generate revenues to sustain its operations will be substantially impaired, which would increase the likelihood that Hemispherx would need to obtain additional financing for its other development efforts;
- the Company's reputation among investors might be harmed, which might make it more difficult for Hemispherx to obtain equity capital on attractive terms or at all; and
- the Company's profitability would be delayed, its business will be materially harmed and Hemispherx's stock price may be adversely affected.

Biotechnology stock prices, including the Company's stock price, have declined significantly in certain instances where companies have failed to meet expectations with respect to FDA approval or the timing for FDA approval.

Hemispherx may continue to incur substantial losses and its future profitability is uncertain.

The Company last reported net profit from 1985 through 1987. Since 1987, with a major emphasis on new drug diagnostic and development, Hemispherx has incurred substantial operating losses, as the Company pursued its clinical trial effort to get the experimental drug, Ampligen®, approved. As of September 30, 2016, the Company's accumulated deficit was approximately $299,328,000. Hemispherx has not yet generated significant revenues from its products and may incur substantial and increased losses in the future. Hemispherx cannot assure that it will ever achieve significant revenues from product sales or become profitable. The Company requires, and will continue to require, the commitment of substantial resources to develop its products. Hemispherx cannot assure that its product development efforts will be successfully completed or that required regulatory approvals will be obtained or that any products will be manufactured and marketed successfully, or be profitable.

Hemispherx most likely will require additional financing which may not be available.

The development of the Company's products requires the commitment of substantial resources to conduct the time consuming research, preclinical development, and clinical trials that are necessary to bring pharmaceutical products to market. As of September 30, 2016, Hemispherx had approximately $4,473,000 in cash and cash equivalents, and $3,536,000 in marketable securities. However, if Hemispherx is unable to commercialize and sell Ampligen® or Alferon® LDO and/or recommence material sales of Alferon N Injection®, the Company's operations, financial position, and liquidity may be adversely impacted.

In its CRL, the FDA communicated that Hemispherx should conduct at least one additional clinical trial, complete various nonclinical studies, and perform a number of data analyses. Until the Company undertakes the end-of-review conference(s) with the FDA, Hemispherx is unable to reasonably estimate the nature, costs, necessary efforts to obtain FDA clearance, or anticipated completion dates of any additional clinical study or studies. Utilizing the industry norms for undertaking a Phase III clinical study, Hemispherx estimates upon acceptance of the study's design that it would take approximately 18 months to three years to complete a new well-controlled Ampligen® clinical study for resubmission to the FDA. It can be reasonably anticipated that the time and cost to undertake clinical trial(s), studies, and data analysis are beyond the Company's current financial resources without gaining access to additional funding. The actual duration to complete the clinical study may be different based on the length of time it takes to design the study and obtain FDA's acceptance of the design, the final design of an acceptable Phase III clinical study design, availability of suitable participants and clinical sites, along with other

factors that could impact the implementation of the study, analysis of results, or requirements of the FDA and/or other governmental organizations.

Given the challenging economic conditions, Hemispherx continues to review every aspect of its operations for cost and spending reductions to assure the Company's long-term financial stability while maintaining the resources necessary to achieve its primary objectives of obtaining NDA approval of Ampligen® along with the manufacturing, marketing and distribution of the Company's products, including Alferon N Injection®. Due to the repair issues mentioned above within its NJ facility and the high cost estimates to bring the facility back online, Hemispherx most likely will need additional funds to finance the revalidation process in its facility to initiate commercial manufacturing, thereby readying the Company for an FDA Pre-Approval Inspection. Hemispherx may also need additional capital to eventually commercialize and sell Ampligen® or Alferon® LDO and/or recommence and increase sales of Alferon N Injection® or its other products. Hemispherx anticipates considering multiple options in an attempt to secure funding, including but not limited to such methods as the sales of additional equity, licensing agreements, partnering with other organizations, debt financing, or other sources of capital. The Company may also review the possibility of selling the remaining work-in-process inventory through the EAP; however, this inventory has yet to go through the fill and finish process.

In December 2015, Hemispherx entered into an Equity Distribution Agreement with Chardan Capital Markets, LLC to create an at-the-market equity program under which it may sell shares of its common stock from time to time through Chardan as sales agent. On December 15, 2015, prior to the filing the Prospectus Supplement for sales under the Chardan Agreement, the Company filed a Prospectus Supplement reducing all offerings pursuant to its existing equity distribution agreement with Maxim Group LLC to $0.

As recently announced in the Company's November 23, 2015 Current Report on Form 8-K, Dr. William A. Carter, the Company's then chairman of the Board, chief executive officer (CEO), and chief scientific officer, and Thomas K. Equels, the Company's current CEO, president, executive vice chairman of the Board, secretary, and general counsel, waived their rights under their respective employment agreements to any future payment of any incentive bonus related to the sale of the Company's stock under any ATM equity distribution agreements. Dr. Carter and Mr. Equels voluntarily provided these waivers in an effort to preserve cash and to help the Company to ensure its short term commercialization goals.

If Hemispherx is unable to obtain additional funding, through the EDA or otherwise, the Company's ability to develop its products, commercially produce inventory, or continue operations may be materially adversely affected.

The Company's Alferon N Injection® Commercial Sales were halted due to lack of finished goods inventory. If Hemispherx is unable to gain the necessary FDA approvals related to Alferon®, its operations most likely will be materially and/or adversely affected.

Commercial sales of Alferon N Injection® were halted in March 2008 when the Company's finished goods inventory expired. The production of Alferon N Injection® from the Work-In-Process Inventory was restarted in May 2010, continued into January 2011 with its conversion into API.

In April 2012, FDA reviewers raised certain questions about the status of the Company's existing lots of older Work-In-Process Alferon® materials and Alferon® API, which would need to be released by the FDA before those materials could be used in commercial product. After conducting all of the appropriate tests on samples of the inventory during 2013, Hemispherx concluded that it could not alleviate certain questions the FDA had about the older Work-In-Process Alferon N Injection® and their remaining dollar value has been written-off. Commercial sales of Alferon® will not resume until new batches of Alferon® inventory and API can be produced, filled, and finished, and released by the FDA for commercial sale.

While the Company's facility is FDA approved under the BLA by the FDA for Alferon®, this status will need to be reaffirmed upon the completion of the facility's upgrades for Alferon®. Hemispherx cannot provide any guarantee that the facility will necessarily pass a FDA pre-approval inspection for Ampligen® or Alferon® manufacture, which are conducted in separately dedicated areas within the overall New Brunswick manufacturing complex.

If Hemispherx is unable to gain the necessary FDA approvals related to the manufacturing process and/or final product of new Alferon® inventory, the Company's operations most likely will be materially and/or adversely affected.

In light of these contingencies, there can be no assurances that the approved Alferon N Injection® product will be returned to production on a timely basis, if at all, or that if and when it is again made commercially available, it will return to prior sales levels.

Hemispherx may not be profitable unless it can protect its patents and/or receive approval for additional pending patents.

The Company needs to preserve and acquire enforceable patents covering the use of Ampligen® for a particular disease in order to obtain exclusive rights for the commercial sale of Ampligen® for such disease. Hemispherx obtained all rights to Alferon N Injection®, and it plans to preserve and acquire enforceable patents covering its use for existing and potentially new diseases. The Company's success depends, in large part, on its ability to preserve and obtain patent protection for its products and to obtain and preserve its trade secrets and expertise. Certain of the Company's know-how and technology is not patentable, particularly the procedures for the manufacture of its experimental drug, Ampligen®. Hemispherx also has been issued a patent which affords protection on the use of Ampligen® in patients with Chronic Fatigue Syndrome. The Company has not yet been issued any patents in the U.S. for the use of Ampligen® as a sole treatment for any of the cancers which it has sought to target.

Hemispherx cannot assure that its competitors will not seek and obtain patents regarding the use of similar products in combination with various other agents, for a particular target indication prior to the Company doing so. If Hemispherx cannot protect its patents covering the use of its products for a particular disease, or obtain additional patents, the Company may not be able to successfully market its products.

The patent position of biotechnology and pharmaceutical firms is highly uncertain and involves complex legal and factual questions.

To date, no consistent policy has emerged regarding the breadth of protection afforded by pharmaceutical and biotechnology patents. There can be no assurance that new patent applications relating to the Company's products, process, or technology will result in patents being issued or that, if issued, such patents will afford meaningful protection against competitors with similar technology. It is generally anticipated that there may be significant litigation in the industry regarding patent and intellectual property rights. Such litigation could require substantial resources from Hemispherx and the Company may not have the financial resources necessary to enforce the patent rights that it holds. No assurance can be made that the Company's patents will provide competitive advantages for its products, process, and technology or will not be successfully challenged by competitors. No assurance can be given that patents do not exist or could not be filed which would have a materially adverse effect on the Company's ability to develop or market its products or to obtain or maintain any competitive position that Hemispherx may achieve with respect to its products. The Company's patents also may not prevent others from developing competitive products or process using related technology.

There can be no assurance that Hemispherx will be able to obtain necessary licenses if the Company cannot enforce patent rights it may hold. In addition, the failure of third parties from whom Hemispherx currently license certain proprietary information or from whom the Company may be required to obtain such licenses in the future, to adequately enforce their rights to such proprietary information, could adversely affect the value of such licenses to Hemispherx.

If Hemispherx cannot enforce the patent rights it currently holds, the Company may be required to obtain licenses from others to develop, manufacture, or market its products. There can be no assurance that Hemispherx would be able to obtain any such licenses on commercially reasonable terms, if at all. The Company currently licenses certain proprietary information from third parties, some of which may have been developed with government grants under circumstances where the government maintained certain rights with respect to the proprietary information developed. No assurances can be given that such third parties will adequately enforce any rights they may have or that the rights, if any, retained by the government will not adversely affect the value of the Company's license.

There is no guarantee that the Company's trade secrets will not be disclosed or known by its competitors.

To protect Hemispherx's rights, the Company requires all employees and certain consultants to enter into confidentiality agreements. There can be no assurance that these agreements will not be breached, that Hemispherx would have adequate and enforceable remedies for any breach, or that any trade secrets of the Company will not otherwise become known or be independently developed by competitors.

Hemispherx has limited marketing and sales capability. If the Company is unable to obtain additional distributors and its current and future distributors do not market its products successfully, Hemispherx may not generate significant revenues or become profitable.

The Company has limited marketing and sales capability. Hemispherx is dependent upon existing and, possibly future, marketing agreements and third party distribution agreements for its products in order to generate significant revenues and become profitable. As a result, any revenues received by the Company will be dependent in large part on the efforts of third parties, and there is no assurance that these efforts will be successful.

The Company's commercialization strategy for Ampligen® for CFS, if and when it is approved for marketing and sale by the FDA, may include licensing/co-marketing agreements utilizing the resources and capacities of a strategic partner(s). Hemispherx continues to seek a world-wide marketing partner with the goal of having a relationship in place before approval is obtained. In parallel to partnering discussions, appropriate pre-marketing activities will be undertaken. It is the Company's current intention to control manufacturing of Ampligen® on a world-wide basis.

Hemispherx's commercialization strategy for Alferon N Injection® may include the utilization of internal functions and/or licensing/co-marketing agreements that would utilize the resources and capacities of one or more strategic partners. Accordingly, the Company has engaged Armada Healthcare to undertake the marketing, education, and sales of Alferon N Injection® throughout the U.S. along with GP Pharm for both Ampligen® and Alferon® in Argentina and other South and Latin American countries.

Hemispherx cannot assure that its U.S. or foreign marketing strategy will be successful or that the Company will be able to establish future marketing or third party distribution agreements on terms acceptable to Hemispherx, or that the cost of establishing these arrangements will not exceed any product revenues. The Company's inability to establish viable marketing and sales capabilities would most likely have a materially adverse effect on its business. There can be no assurances that the approved Alferon N Injection® product will be returned to prior sales levels.

There are no long-term agreements with suppliers of required materials and services for Ampligen® and there are a limited number of raw material/reagent suppliers for Ampligen® and Alferon®. If Hemispherx is unable to obtain the required raw materials/Reagents and/or services, the Company may not be able to manufacture Ampligen® and Alferon®.

A number of essential raw materials are used in the production of Ampligen® as well as packaging materials utilized in the fill and finish process. Hemispherx does not have, but continues to work towards having long-term agreements for the supply of such materials, when possible. There can be no assurance Hemispherx can enter into long-term supply agreements covering essential materials on commercially reasonable terms, if at all.

There are a limited number of suppliers in the U.S. and abroad available to provide the raw and packaging materials/reagents for use in manufacturing Ampligen® and Alferon®. At present, Hemispherx does not have any agreements with third parties for the supply of any of these materials or the Company is relying on a limited source of reagent suppliers necessary for the manufacture of Alferon®. Hemispherx has established relevant manufacturing operations within its New Brunswick, New Jersey, facility for the production of Ampligen® polymers from raw materials in order to obtain a more consistent manufacturing basis in the quantities necessary for clinical testing. In September 2011 and similar to its prior agreements, Jubilant HollisterStier has agreed to undertake the manufacturing sets to formulate, fill, finish, and package Ampligen® from the key polymers that Hemispherx would supply. Jubilant HollisterStier would have the right of first refusal to manufacture certain Ampligen®-related products.

In July 2016, Hemispherx reached an agreement with Avrio Biopharmaceuticals (now Avecia) to serve as an additional contract manufacturer of Ampligen® for use with clinical studies as well as the recently initiated Early Access Program (EAP) in Europe. The Company believes that it has sufficient quantities of Ampligen® to meet the limited near term projected needs until Hemispherx start receiving product from Avecia. Should there be an unanticipated delay in receiving new product from Avecia or should the Company experiences an unexpected demand for Ampligen® in its clinical studies or pursuant to the EAP, the Company's ability to supply Ampligen® most likely will be adversely affected. Although Hemispherx has engaged Avecia, the Company will continue to work toward an amended agreement with Jubilant HollisterStier.

In addition, during the final stage of the manufacturing process for Alferon®, Hemispherx encountered issues regarding a change in both the contract supplier of leukocytes and the long term supply availability related to a reagent used in the formulation of Alferon®. The Company has substantially resolved these issues through engaging in multiple agreements with suppliers of leukocytes as well as entering into a licensing agreement with a foreign multinational chemicals and biotechnology company that has been in business for over a century for the sourcing of the primary reagent allowing Hemispherx to manufacture Alferon®. However, due to the interruption of the required flow of leukocytes, production ceased, causing parts to malfunction in the upstream process when the system was restarted for testing. The Company was working diligently to make the necessary repairs to be able to restart the validation process; however, in the process of obtaining time estimates for the repairs Hemispherx experienced a flood within portions of its manufacturing facility. As a result, Hemispherx will be constrained in its ability to manufacture product in the near future due to this flood in the upstream processing cleanroom that contains the bioreactor. The flood occurred on the afternoon of January 5, 2016, caused by a malfunctioning water supply pipe for the sprinkler system covering a large amount of the cleanroom in stagnant water and silt from the sprinkler system. The Company's facility insurer has been proactive in addressing and covering the loss. While repairs have required preapproval by the Company's insurer, activity has moved forward quickly. The repairs noted below required special action because of the need to keep this critical manufacturing room within International Organization for Standardization (ISO) classifications and the need to certify that all the equipment that was exposed, or submerged, is in proper condition and operating effectively following the corrective actions. All HEPA filters affected by the flood were tested by an outside contractor and have passed all required tests. The flooring that was damaged has been repaired using a special epoxy that is used in cleanrooms. A large portion of the walls in the ISO classified area were damaged. Hemispherx had a damage mitigation company come in to stop any moisture from seeping further into the ISO classified areas. Subsequently, all damaged walls and ceilings have been replaced with cleanroom grade materials and need no further work. Six pumps that were affected by the flood were sent back to the manufacturer for inspection and repair. Repairs that were required have been completed on the pumps and they were reinstalled in the Alferon manufacturing facility after the floor repair work was completed. All pumps will need to be qualified for use in the manufacturing process prior to the validation process for a Pre-Approval Inspection. All air ducts supplying the Alferon manufacturing area needed to be cleaned and insulation replaced along with ceiling tiles. The duct insulation and ceiling tile replacement will be performed after the duct cleaning work is completed. All smaller pieces of machinery and equipment that could not be salvaged have been replaced. The final repair step required to be performed will be HVAC air balancing and qualification.

Currently, the manufacturing process is on hold and there is no definitive timetable to have the facility back online. If Hemispherx is unable to gain the necessary FDA approvals related to the manufacturing process and/or final product of new Alferon® inventory, the Company's operations most likely will be materially and/or adversely affected. In light of these contingencies, there can be no assurances that the approved Alferon N Injection® product will be returned to production on a timely basis, if at all, or that if and when it is again made commercially available, it will return to prior sales levels.

If Hemispherx is unable to obtain or manufacture the required materials/reagents, and/or procure services needed in the final steps in the manufacturing process, the Company may be unable to manufacture Ampligen®. The costs and availability of products and materials Hemispherx needs for the production of Ampligen® are subject to fluctuation depending on a variety of factors beyond the Company's control, including competitive factors, changes in technology, ownership of intellectual property, FDA and other governmental regulations. There can be no assurance that Hemispherx will be able to obtain such products and materials on terms acceptable to the Company or at all.

There are a limited number of organizations in the U.S. available to provide the final manufacturing steps of formulation, fill, finish and packing sets for Alferon N Injection® and Ampligen®.

There are a limited number of organizations in the U.S. available to provide the final steps in the manufacturing for Alferon N Injection® and Ampligen®. To formulate, fill, finish and package the Company's products, Hemispherx requires a FDA-approved, third-party CMO.

In January 2012, Hemispherx agreed to a Technology, Transfer, Validation, and Commercial Supply Agreement with Althea Technologies, Inc. regarding the fill and finish process for Alferon N Injection®. As Hemispherx no longer has any existing inventory, commercial sales of Alferon® will not resume until new batches of Alferon® inventory and API can be produced, filled, and finished, and released by the FDA for commercial sale.

Pursuant to the Company's Supply Agreement with Jubilant HollisterStier, Jubilant HollisterStier will formulate, fill, finish and package Ampligen® from the key raw materials that Hemispherx would supply. The Company is unable to provide any assurances that the FDA will approve the inventory manufactured by Hemispherx or produced by Jubilant HollisterStier. If this finish goods inventory is not granted approval by the FDA, the Company's operations may be materially adversely affected. This Supply Agreement expired on March 11, 2014. The Company is working toward an amendment to the existing Supply Agreement, which may contain additional fees as part of entering into the extension. In October 2014, Hemispherx entered into a purchase commitment with a contract manufacturer (Jubilant HollisterStier) for approximately $700,000 for the manufacture of clinical batches of Ampligen®. The Company is in discussion with Jubilant HollisterStier about this purchase commitment. In July 2016, Hemispherx reached an agreement with Avrio (now Avecia) to serve as an additional contract manufacturer of Ampligen® for use with clinical studies as well as the recently initiated Early Access Program (EAP) in Europe. Avecia should be able to meet the Company's immediate requirements. Hemispherx believes that it has sufficient quantities of Ampligen® to meet the limited near-term projected needs until it starts receiving product from Avecia. Should there be an unanticipated delay in receiving new product from Avecia or should Hemispherx experience an unexpected demand for Ampligen® in its clinical studies or pursuant to the EAP, the Company's ability to supply Ampligen® most likely will be adversely affected.

If Hemispherx is unable to procure services needed in the final steps in the manufacturing process, the Company may be unable to manufacture Alferon N Injection® and/or Ampligen®. The costs and availability of products and materials Hemispherx needs for the production of Ampligen® and the commercial production of Alferon N Injection® and other products which the Company may commercially produce are subject to fluctuation depending on a variety of factors beyond Hemispherx's control, including competitive factors, changes in technology, and FDA and other governmental regulations and there can be no assurance that the Company will be able to obtain such products and materials on terms acceptable to Hemispherx or at all.

There is no assurance that the Company's manufacturing facility will again be granted a BLA certification by the FDA or return to commercial, large-scale production. In addition, Hemispherx's inability to timely fix the issues caused by the recent flood in its manufacturing facility could hinder the Company's ability to sustain sales of its products, if and when such sales commence.

Hemispherx completed the construction of its $8 million facility enhancement project in 2015 which, upon FDA approval, should provide for a higher capacity, more cost effective manufacturing process for the production of Alferon N Injection®. The production of new Alferon® API inventory commenced in February 2015. While the facility is approved by FDA under the BLA for Alferon®, this status will need to be reaffirmed upon the completion of the facility's enhancements prior to commercial sale of newly produced inventory product. If and when Hemispherx obtains a reaffirmation of FDA BLA status, the Company will need FDA approval to release the final product confirming the quality and stability to allow commercial sales to resume. There can be no assurance the BLA status will be recertified by the FDA upon the completion of the enhancement process or that the manufacturing facility will return to commercial, large-scale production for Alferon®. Additionally, there can be no assurance that any given product will be determined to be safe and effective, or capable of being manufactured under applicable quality standards.

Only if and when the BLA status is recertified by the FDA to produce Alferon® API at the Company's enhanced manufacturing facility and Althea gains FDA's approval to formulate, fill, and finish Alferon, can batches of Alferon® be released by the FDA for commercial sales. Hemispherx is unable to provide any assurances that the FDA will approve its enhanced manufacturing process and/or newly created finish product lots formulated, filled, and finished at Althea. Without FDA approval, the Company's Alferon N Injection® will not be considered suitable for commercial sales.

The Company's ability to manufacture at its manufacturing facility is also hampered and delayed by the recent flood. In light of these contingencies, there can be no assurances that the approved Alferon N Injection® product will be returned to commercial production or sale on a timely basis, if at all, or that if and when it is again made commercially available, it will return to prior sales levels.

There is no assurance that upon successful manufacture of a drug on a limited scale basis for investigational use will lead to a successful transition to commercial, large-scale production.

Changes in methods of manufacturing, including commercial scale-up, may affect the chemical structure of Ampligen® and other RNA drugs, as well as their safety and efficacy. The transition from limited production of pre-clinical and clinical research quantities to production of commercial quantities of the Company's products will involve distinct management and technical challenges and may require additional management, technical personnel, and capital to the extent such manufacturing is not handled by third parties. While Hemispherx believes that the Company could successfully upgrade its production capability at its New Brunswick, NJ facility in a commercial scale-up of Ampligen®, there can be no assurance that the Company's manufacturing will be successful or that any given product will be determined to be safe and effective, or capable of being manufactured under applicable quality standards, economically, and in commercial quantities, or successfully marketed.

Hemispherx has limited manufacturing experience for Ampligen® and Alferon®. The Company may not be profitable unless it can produce Ampligen®, Alferon®, or other products in commercial quantities at costs acceptable to Hemispherx.

Satisfactory inspection by the FDA of both Ampligen® and Alferon® manufacturing process is required before commercial sale of project would be allowed. The CRL from the FDA on February 1, 2013, requests evaluation of variation between lots of Ampligen® tested in the development process and recommends tighter control of the Ampligen® manufacturing process. Hemispherx cannot provide any guarantee that the facility will pass a FDA pre-approval inspection for Ampligen® or Alferon® manufacture, which are conducted in separately dedicated areas within the overall New Brunswick manufacturing complex. The failure to obtain FDA approval for either of the Company's manufacturing process areas would most likely have a materially adverse impact upon Hemispherx.

Ampligen® has been produced to date in limited quantities for use in the Company's clinical trials, and Hemispherx is dependent upon a qualified third party supplier for the manufacturing, filling, finish, and packaging process. The failure to continue these arrangements or to achieve other such arrangements on satisfactory terms could have a material adverse effect on Hemispherx. In furtherance of the capital improvement program at the Company's New Brunswick, NJ facility to upgrade its manufacturing capability to produce bulk quantities of Alferon N Injection® API, the validation phase of the Alferon® manufacturing project is currently underway. While the facility is approved by FDA under the BLA for Alferon®, this status will need to be reaffirmed upon the completion of the facility's enhancements prior to commercial sale of newly produced inventory product. If and when Hemispherx obtains a reaffirmation of FDA BLA status, the Company will need FDA approval to release the final product confirming the quality and stability to allow commercial sales to resume. In light of these contingencies, there can be no assurances that the approved Alferon N Injection® product will be returned to production on a timely basis, if at all. The failure to obtain FDA approval of any of the Company's manufacturing process would most likely have a materially adverse impact upon Hemispherx.

Also to be successful, the Company's products must be manufactured in commercial quantities in compliance with regulatory requirements and at acceptable costs. Hemispherx believes, but cannot assure, that the Company's enhancements to its manufacturing facilities will be adequate for future needs for the production of its proposed products for large-scale commercialization. Hemispherx intend to ramp up its existing facility and/or utilize third party facilities if and when the need arises or, if the Company is unable to do so, to build or acquire commercial-scale manufacturing facilities. Hemispherx will need to comply with regulatory requirements for such facilities,

including those of the FDA pertaining to cGMP requirements or maintaining BLA status. There can be no assurance that such facilities can be used, built, or acquired on commercially acceptable terms, or that such facilities, if used, built, or acquired, will be adequate for the production of the Company's proposed products for large-scale commercialization or long-term needs.

Hemispherx has never produced Ampligen®, Alferon®, or any other products in large commercial quantities. The Company must manufacture its products in compliance with regulatory requirements in large commercial quantities and at acceptable costs in order for Hemispherx to be profitable. The Company intends to utilize third party manufacturers and/or facilities if and when the need arises or, if Hemispherx is unable to do so, to build or acquire commercial-scale manufacturing facilities. If Hemispherx cannot manufacture commercial quantities of Ampligen® and/or Alferon®, or continue to maintain third party agreements for its manufacture at costs acceptable to the Company, its operations will be significantly affected. If and when the Ampligen® NDA is approved, Hemispherx may need to find an additional vendor to manufacture the product for commercial sales. Also, each production lot of Alferon N Injection® is subject to FDA review and approval prior to releasing the lots to be sold. This review and approval process could take considerable time, which would delay Hemispherx having product in inventory to sell, nor can the Company provide any assurance as to the receipt of FDA approval of its finished inventory product. There can be no assurances that the Ampligen® and/or Alferon® can be commercially produced at costs acceptable to Hemispherx.

Rapid technological change may render the Company's products obsolete or non-competitive.

The pharmaceutical and biotechnology industries are subject to rapid and substantial technological change. Technological competition from pharmaceutical and biotechnology companies, universities, governmental entities, and others diversifying into the field is intense and is expected to increase. Most of these entities have significantly greater research and development capabilities than Hemispherx, as well as substantial marketing, financial, and managerial resources, and represent significant competition for the Company. There can be no assurance that developments by others will not render the Company's products or technologies obsolete or noncompetitive or that Hemispherx will be able to keep pace with technological developments.

The Company's products may be subject to substantial competition.

Competitors may be developing technologies that are, or in the future may be, the basis for competitive products. Some of these potential products may have an entirely different approach or means of accomplishing similar therapeutic effects to products being developed by Hemispherx. These competing products may be more effective and less costly than the Company's products. In addition, conventional drug therapy, surgery, and other more familiar treatments may offer competition to the Company's products. Furthermore, many of Hemispherx's competitors have significantly greater experience in preclinical testing and human clinical trials of pharmaceutical products and in obtaining FDA, HPB, and other regulatory approvals of products. Accordingly, the Company's competitors may succeed in obtaining FDA, HPB, or other regulatory product approvals more rapidly than Hemispherx. There are no drugs approved for commercial sale with respect to treating CFS in the U.S. The dominant competitors with drugs to treat disease indications in which Hemispherx plan to address include Pfizer, GlaxoSmithKline, Merck & Co., Novartis and AstraZeneca. Biotech competitors include Baxter International, Fletcher/CSI, AVANT Immunotherapeutics, AVI BioPharma, and Genta. These potential competitors are among the largest pharmaceutical companies in the world, are well known to the public and the medical community, and have substantially greater financial resources, product development, and manufacturing and marketing capabilities than Hemispherx has. Although the Company believes its principal advantage is the unique mechanism of action of Ampligen® on the immune system, Hemispherx cannot assure that it will be able to compete.

The Company's competitors are among the largest pharmaceutical companies in the world, are well known to the public and the medical community, and have substantially greater financial resources, product development, and manufacturing and marketing capabilities than Hemispherx has. Alferon N Injection® currently competes with Merck's injectable recombinant alpha interferon product (INTRON® A) for the treatment of genital warts. In addition, other pharmaceutical firms offer self-administered topical cream, for the treatment of external genital and perianal warts such as Graceway Pharmaceuticals (Aldara®), Watson Pharma (Condylox®) and MediGene (Veregen®). Alferon N Injection® also competes with surgical, chemical, and other methods of treating genital warts. Hemispherx cannot assess the impact products developed by its competitors, or advances in other methods of the treatment of genital warts, will have on the commercial viability of Alferon N Injection®. If and when

Hemispherx obtain additional approvals of uses of this product, the Company expects to compete primarily on the basis of product performance. The Company's competitors have developed or may develop products (containing either alpha or beta interferon or other therapeutic compounds) or other treatment modalities for those uses. There can be no assurance that, if Hemispherx is able to obtain regulatory approval of Alferon N Injection® for the treatment of new indications, the Company will be able to achieve any significant penetration into those markets. In addition, because certain competitive products are not dependent on a source of human blood cells, such products may be able to be produced in greater volume and at a lower cost than Alferon N Injection®. Currently, the Company's wholesale price on a per unit basis of Alferon N Injection® is higher than that of the competitive recombinant alpha and beta interferon products.

Other companies may succeed in developing products earlier than Hemispherx does, obtaining approvals for such products from the FDA more rapidly than the Company does, or developing products that are more effective than those Hemispherx may develop. While Hemispherx will attempt to expand its technological capabilities in order to remain competitive, there can be no assurance that research and development by others or other medical advances will not render the Company's technology or products obsolete or non-competitive or result in treatments or cures superior to any therapy it develops.

Possible side effects from the use of Ampligen® or Alferon N Injection® could adversely affect potential revenues and physician/patient acceptability of the Company's product.

Hemispherx believes that Ampligen® has been generally well tolerated with a low incidence of clinical toxicity, particularly given the severely debilitating or life threatening diseases that have been treated. A mild flushing reaction has been observed in approximately 15%-20% of patients treated in the Company's various studies. This reaction is occasionally accompanied by a rapid heartbeat, a tightness of the chest, urticaria (swelling of the skin), anxiety, shortness of breath, subjective reports of "feeling hot", sweating, and nausea. The reaction is usually infusion-rate related and can generally be controlled by reducing the rate of infusion. Other adverse side effects include liver enzyme level elevations, diarrhea, itching, asthma, low blood pressure, photophobia, rash, visual disturbances, slow or irregular heart rate, decreases in platelets and white blood cell counts, anemia, dizziness, confusion, elevation of kidney function tests, occasional temporary hair loss, and various flu-like symptoms, including fever, chills, fatigue, muscular aches, joint pains, headaches, nausea, and vomiting. These flu-like side effects typically subside within several months.

The FDA in its February 1, 2013 CRL, set forth the reasons for not approving Ampligen® at this time and provided recommendations to address certain of the outstanding issues. The Agency stated that the submitted data do not provide substantial evidence of efficacy of Ampligen® for the treatment of CFS and that the data do not provide sufficient information to determine whether the product is safe for use in CFS due to the limited size of the safety database and multiple discrepancies within the submitted data.

If approved, one or more of the potential side effects of the drug might deter usage of Ampligen® in certain clinical situations and therefore, could adversely affect potential revenues and physician/patient acceptability of the Company's product.

At present, Alferon N Injection® is approved for the intralesional (within the lesion) treatment of refractory or recurring external genital warts in adults. In clinical trials conducted for the treatment of genital warts with Alferon N Injection®, patients did not experience serious side effects; however, there can be no assurance that unexpected or unacceptable side effects will not be found in the future for this use or other potential uses of Alferon N Injection® which could threaten or limit such product's usefulness.

Hemispherx may be subject to product liability claims from the use of Ampligen®, Alferon N Injection®, or other of its products which could negatively affect the Company's future operations. Hemispherx has limited product liability and clinical trial insurance.

Hemispherx maintains a limited amount of Products Liability and Clinical Trial insurance coverage world-wide for Ampligen® and Alferon® due to the minimal amount of historical loss claims regarding these products in the marketplace. Any claims against the Company's products, Ampligen®, Alferon N Injection®, and Alferon® LDO, could have a materially adverse effect on the Company's business and financial condition.

Hemispherx face an inherent business risk of exposure to product liability claims in the event that the use of Ampligen®, Alferon N Injection®, or other of its products results in adverse effects. This liability might result from claims made directly by patients, hospitals, clinics, or other consumers, or by pharmaceutical companies or others manufacturing these products on the Company's behalf. Hemispherx future operations may be negatively affected from the litigation costs, settlement expenses, and lost product sales inherent to these claims. While Hemispherx will continue to attempt to take appropriate precautions, the Company cannot assure that it will avoid significant product liability exposure.

With the Company's recent development on the collaborative agreement with MyTomorrows to provide access to Hemispherx's natural alpha interferon for patients that have become intolerant to treatment with recombinant interferon or where such treatment fails in South America and Europe, Hemispherx have initiated the process of enhancing its insurance coverage for any potential sales that may arise from this arrangement.

The loss of services of key personnel could hurt the Company's chances for success.

Hemispherx's success is dependent on the continued efforts of its staff, especially certain doctors and researchers. The loss of the services of personnel key to the Company's operations could have a material adverse effect on its operations and chances for success. The loss of key personnel or the failure to recruit additional personnel as needed could have a materially adverse effect on the Company's ability to achieve its objectives. Mr. Equels is a key employee with reference to operational and financial management.

Uncertainty of health care reimbursement for Hemispherx's products.

The Company's ability to successfully commercialize its products will depend, in part, on the extent to which reimbursement for the cost of such products and related treatment will be available from government health administration authorities, private health coverage insurers, and other organizations. Significant uncertainty exists as to the reimbursement status of newly approved health care products, and from time to time legislation is proposed, which, if adopted, could further restrict the prices charged by and/or amounts reimbursable to manufacturers of pharmaceutical products. Hemispherx cannot predict what, if any, legislation will ultimately be adopted or the impact of such legislation on the Company. There can be no assurance that third party insurance companies will allow Hemispherx to charge and receive payments for products sufficient to realize an appropriate return on the Company's investment in product development.

There are risks of liabilities associated with handling and disposing of hazardous materials.

The Company's business involves the controlled use of hazardous materials, carcinogenic chemicals, flammable solvents, and various radioactive compounds. Although Hemispherx believes that its safety procedures for handling and disposing of such materials comply in all material respects with the standards prescribed by applicable regulations, the risk of accidental contamination or injury from these materials cannot be completely eliminated. In the event of such an accident or the failure to comply with applicable regulations, Hemispherx could be held liable for any damages that result, and any such liability could be significant. The Company does not maintain insurance coverage against such liabilities.

Four shareholder derivative actions have been filed against Hemispherx and the Company may be subject to civil liabilities.

Four shareholder derivative actions have been filed alleging various state law breach of fiduciary duty, waste of corporate assets, and unjust enrichment claims along with seeking monetary damages, costs, attorneys' fees, and equitable and injunctive relief. Defending against these suits, even if meritless, can result in substantial costs to Hemispherx and could divert the attention of its management.

The existence of these proceedings could have a material adverse effect on the Company's ability to access the capital markets to raise additional funds. While Management believes that the lawsuits are without merit, Hemispherx cannot predict or determine the timing or final outcomes of the lawsuits and are unable to estimate the amount or range of loss that could result from unfavorable outcomes. Adverse results in some or all of these legal proceedings could be material to the Company's results of operations, financial condition, or cash flows.

Hemispherx relies upon information technology and any failure, inadequacy, interruption, or security lapse of that technology, including any cyber security incidents, could harm the Company's ability to operate its business effectively.

Despite the implementation of security measures, the Company's internal computer systems and those of third parties with which Hemispherx contract are vulnerable to damage from cyber-attacks, computer viruses, unauthorized access, natural disasters, terrorism, war, and telecommunication and electrical failures. System failures, accidents, or security breaches could cause interruptions in the Company's operations, and could result in a material disruption of Hemispherx's business operations, in addition to possibly requiring substantial expenditures of resources to remedy. The loss of clinical trial data could result in delays in the Company's regulatory approval efforts and significantly increase its costs to recover or reproduce the data. To the extent that any disruption or security breach were to result in a loss of, or damage to, Hemispherx's data or applications, or inappropriate public disclosure of confidential or proprietary information, Hemispherx could incur liability and its product development and commercialization efforts could be delayed.

RISKS ASSOCIATED WITH AN INVESTMENT IN THE COMPANY'S COMMON STOCK:

The market price of the Company's stock may be adversely affected by market volatility.

The market price of the Company's common stock has been and is likely to be volatile. This is especially true given the current significant instability in the financial markets. In addition to general economic, political, and market conditions, the price and trading volume of Hemispherx's stock could fluctuate widely in response to many factors, including:

- announcements of the results of clinical trials by Hemispherx or its competitors;
- announcements of availability or projections of the Company's products for commercial sale;
- announcements of legal actions against Hemispherx and/or settlements or verdicts adverse to Hemispherx;
- adverse reactions to products;
- governmental approvals, delays in expected governmental approvals, or withdrawals of any prior governmental approvals or public or regulatory agency comments regarding the safety or effectiveness of the Company's products, or the adequacy of the procedures, facilities, or controls employed in the manufacture of the Company's products;
- changes in U.S. or foreign regulatory policy during the period of product development;
- developments in patent or other proprietary rights, including any third party challenges of the Company's intellectual property rights;
- announcements of technological innovations by Hemispherx or its competitors;
- announcements of new products or new contracts by Hemispherx or its competitors;
- actual or anticipated variations in the Company's operating results due to the level of development expenses and other factors;
- changes in financial estimates by securities analysts and whether the Company's earnings meet or exceed the estimates;
- conditions and trends in the pharmaceutical and other industries;
- new accounting standards;
- overall investment market fluctuation;

- restatement of prior financial results;
- notice of NYSE MKT non-compliance with requirements; and
- occurrence of any of the risks described in these "Risk Factors".

The Company's common stock is listed for quotation on the NYSE MKT. For the six months ended June 30, 2016, the trading price of Hemispherx's common stock ranged from $0.20 to $0.07 per share. Hemispherx expects the price of its common stock to remain volatile. The average daily trading volume of the Company's common stock varies significantly.

In the past, following periods of volatility in the market price of the securities of companies in Hemispherx's industry, securities class action litigation has often been instituted against companies in the industry.

The Company's stock price may be adversely affected if a significant amount of shares is sold in the public market.

Hemispherx may issue shares to be used to meet its capital requirements or use shares to compensate employees, consultants, and/or Directors. In this regard, Hemispherx has registered 77,849,014 of securities for public sale pursuant to a universal shelf registration statement and the Company has been selling shares under this shelf registration statement and the EDA with Maxim. Effective December 15, 2015, Hemispherx halted all future offers and sales of its Common Stock under the EDA with Maxim and reduced the amount of potential future offers and sales under the EDA to $0.00. Between July 23, 2012, the date of the EDA, and December 15, 2015, Hemispherx sold an aggregate of 106,581,461 shares of Common Stock pursuant to the EDA for aggregate gross proceeds of $47,453,220. On December 15, 2015, the Company filed a prospectus supplement to the issuance and sale of up to $7,941,000 of its common stock from time to time through its sales agent, Chardan Capital Markets, LLC.

Hemispherx is unable to estimate the amount, timing, or nature of future sales of outstanding common stock or instruments convertible into or exercisable for its common stock. Sales of substantial amounts of the Company's common stock in the public market, including additional sale of securities pursuant to the EDA with Chardan or otherwise under the universal shelf registration statement or upon exercise of outstanding options, could cause the market price for Hemispherx's common stock to decrease. Furthermore, a decline in the price of the Company's common stock would likely impede Hemispherx's ability to raise capital through the issuance of additional shares of common stock or other equity securities.

Provisions of the Company's Certificate of Incorporation and Delaware law could defer a change of Hemispherx's Management which could discourage or delay offers to acquire the Company.

Provisions of the Company's Certificate of Incorporation and Delaware law may make it more difficult for someone to acquire control of Hemispherx or for the Company's stockholders to remove existing management, and might discourage a third party from offering to acquire Hemispherx, even if a change in control or in Management would be beneficial to the Company's stockholders. For example, Hemispherx's Certificate of Incorporation allows the Company to issue shares of preferred stock without any vote or further action by its stockholders. The Company's Board of Directors has the authority to fix and determine the relative rights and preferences of preferred stock. Hemispherx's Board of Directors also has the authority to issue preferred stock without further stockholder approval. As a result, the Company's Board of Directors could authorize the issuance of a series of preferred stock that would grant to holders the preferred right to Hemispherx's assets upon liquidation, the right to receive dividend payments before dividends are distributed to the holders of common stock, and the right to the redemption of the shares, together with a premium, prior to the redemption of the Company's common stock. In this regard, on November 2, 2012, Hemispherx amended and restated its Stockholder Rights Plan and, under the Rights Plan, the Company's Board of Directors declared a dividend distribution of one Right for each outstanding share of Common Stock to stockholders of record at the close of business on November 29, 2002. Each Right initially entitles holders to buy one-hundredth unit of preferred stock for $30.00 and may be redeemed prior to November 19, 2017, the expiration date, at $0.001 per Right under certain circumstances. The Rights generally are not transferable apart from the common stock and will not be exercisable unless and until a person or group acquires or commences a tender or exchange offer to acquire, beneficial ownership of 15% or more of the Company's common stock.

Glossary

Adjuvant—A substance that enhances the body's immune response to an antigen, usually applied after the initial treatment.

Antigen-Presenting Cells (APCs)—A cell that displays foreign antigen complexes with major histocompatibility complex (MHC) on their surfaces. T cells may recognize these complexes using their T cell receptors (TCRs). These cells process antigens and present them to T cells, inducing them to develop specific immunity against such antigens.

Complete Response Letter (CRL)—The FDA issues CRLs when communicating a decision to a drug company that its new drug application (NDA) or abbreviated new drug application (ANDA) to market a new or generic drug will not be approved in its present form.

Current Good Manufacturing Practice (cGMP)—Refers to the Current Good Manufacturing Practice regulations enforced by the U.S. FDA. cGMPs provide for systems that assure proper design, monitoring, and control of manufacturing processes and facilities. Adherence to the cGMP regulations assures the identity, strength, quality, and purity of drug products by requiring that manufacturers of medications adequately control manufacturing operations. This formal system of controls at a pharmaceutical company, if adequately put into practice, helps to prevent instances of contamination, mix-ups, deviations, failures, and errors and assures that drug products meet their quality standards.

Cytokine—Small cell-signaling protein molecule that is secreted by numerous cells and is a category of signaling molecules used extensively in intercellular communication. Cytokines can be classified as proteins, peptides, or glycoproteins.

GMP—See *Current Good Manufacturing Practice (cGMP)* entry above.

Helicases—Any of the enzymes that use the energy derived from the hydrolysis of nucleoside triphosphates to unwind the double-stranded helical structure of nucleic acids.

Immunotherapy—Treatment of disease by inducing, enhancing, modulating, or suppressing an immune response.

Interferons (IFNs)—Proteins made and released by host cells in response to the presence of pathogens such as viruses, bacteria, parasites, or tumor cells. They allow for communication between cells to trigger the protective defenses of the immune system that eradicate pathogens or tumors, and they also trigger functions of both T cells and NK cells.

Macromolecule—A molecule containing a very large number of atoms, such as a protein, nucleic acid, or synthetic polymer.

Macrophages—Cells produced by the differentiation of monocytes in tissues. Macrophages function in both non-specific defense (innate immunity) as well as help initiate specific defense mechanisms (adaptive immunity) of vertebrate animals. Their role is to phagocytose, or engulf and then digest, cellular debris and pathogens, either as stationary or as mobile cells, and can serve as antigen-presenting cells.

Middle East Respiratory Syndrome (MERS)—A viral respiratory disease caused by a coronavirus (MERS-CoV) that was first identified in Saudi Arabia in 2012.

Myalgic Encephalomyelitis (ME)—A chronic, degenerative neuro-immune disease described in medical literature as early as 1935. A child or adult with ME has serious immune and cardiovascular abnormalities, with resulting serious central nervous system consequences due to brain injury.

Natural Killer (NK) Cells—A type of cytotoxic lymphocyte critical to the innate immune system. NK cells provide rapid responses to virally infected cells and respond to tumor formation, acting at around three days after infection. NK cells are unique as they have the ability to recognize abnormal cells in the absence of antibodies and MHC, allowing for a much faster immune reaction.

Open-Label Study—A type of study in which both the health providers and the patients are aware of the drug or treatment being given.

Prophylactic—A medicine or course of action used to prevent disease.

Recombinant—An organism that has a genome containing integrated genetic material from a different organism.

Refractory—Resistant to a treatment or cure.

RNA—Ribonucleic acid (RNA), a nucleic acid present in all living cells. Its principal role is to act as a messenger carrying instructions from DNA for controlling the synthesis of proteins, although in some viruses, RNA rather than DNA carries the genetic information.

T Cells (T Lymphocytes)—Belonging to a group of white blood cells known as lymphocytes, T cells have a central role in cell-mediated immunity. They can be distinguished from other lymphocytes, such as B cells and natural killer (NK) cells, by the presence of a T cell receptor (TCR) on the cell surface. They are called T cells because they mature in the thymus.

Intentionally Blank.

crystal research associates

Facts Without Fiction

EXECUTIVE INFORMATIONAL OVERVIEW®

About Our Firm: For the past decade, Crystal Research Associates, LLC (www.crystalra.com) has successfully articulated the exceptional stories of small- and mid-cap companies to the Wall Street investor community. Our methods are well-established and diverse, from compiling and disseminating objective, factual information for both institutional and retail investor audiences to capitalizing on our expansive line of targeted distribution channels, which include industry-leading financial data and information providers. Our distribution efforts are accompanied by the use of prominent social media channels and by strategic and targeted appearances on national news programs and print media.

Crystal Research Associates is led by Wall Street veterans, Jeffrey Kraws and Karen Goldfarb. Together, Kraws and Goldfarb have built a unique business model, capitalizing on decades of experience as an award-winning sell-side analyst team to produce institutional-quality industry and market research in a manner that is easily understood by investors and consumers. Our firm's approach has been proven successful over the years as our products are published and available on Bloomberg, Thomson Reuters/First Call, Capital IQ, FactSet, Yahoo! Finance, and scores of other popular forums.

880 Third Avenue, 6th Floor, New York, NY 10022 Office: (212) 851-6685