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October 19, 2020
John D. Vandermosten, CFA
312-265-9588 / jvandermosten@zacks.com

scr.zacks.com
10 S. Riverside Plaza, Suite 1600, Chicago, IL 60606

Bioasis Technologies Inc. (BIOAF - OTC)

xB³: The Key to Unlocking the BBB

Based on our DCF model and a 15% discount rate, Bioasis is valued at approximately $0.60 per share. Our model applies a weighted 8% probability of ultimate approval and commercialization for xB³-001 and xB³-007 and partnered compounds in a variety of indications including HER2+ metastatic breast cancer and Gaucher Disease. The model includes contributions from global sources.

Current Price (10/16/2020)	$0.29
Valuation ($USD)	**$0.60**

INITIATION

Bioasis is developing a platform that enables therapeutics to cross the BBB designated xB³. The most advanced preclinical programs underway target HER2+ breast cancer metastases and treatment of Gaucher Disease. The first, xB³-001, combines the xB³ platform with trastuzumab and may be awarded accelerated approval. The second, xB³-007, is in combination with Cerezyme and is undergoing proof of concept studies. Other candidates are also in development internally and with partners.

Bioasis' technology transports molecules using receptor-mediated endo-cytosis via the LRP1 receptor. The transport molecule is the xB³ peptide, which is derived from the iron-binding human protein melanotransferrin found in the blood. LRP1 is widely expressed in critical brain regions and is over-expressed in many disease states. We expect clinical trials to begin in 2021 for both candidates.

The company has forged several partnerships with the Chiesi Group, Prothena and other pharmaceutical companies. The partners provide external validation of the platform, upfront funding, candidate development and the opportunity for future royalty revenues.

Our valuation assumes a 2030 approval and launch of xB³-001, xB³-007 and later for other candidates globally through collaborator efforts.

SUMMARY DATA

52-Week High	**0.38**
52-Week Low	**0.09**
One-Year Return (%)	**88.4**
Beta	**0.69**
Average Daily Volume (sh)	**5,349**
Shares Outstanding (mil)	**68.0**
Market Capitalization ($mil)	**19.5**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**0.00**
Insider Ownership (%)	**0.53**
Annual Cash Dividend	**$0.00**
Dividend Yield (%)	**0.00**
5-Yr. Historical Growth Rates	
Sales (%)	**N/A**
Earnings Per Share (%)	**N/A**
Dividend (%)	**N/A**
P/E using TTM EPS	**N/A**
P/E using 2020 Estimate	**N/A**
P/E using 2021 Estimate	**N/A**
Zacks Rank	**N/A**

Risk Level	**Above Average**
Type of Stock	**Small-Growth**
Industry	**Med-Biomed/Gene**

ZACKS ESTIMATES

Revenue

(In millions of CAD)

	Q1 (May)	Q2 (Aug)	Q3 (Nov)	Q4 (Feb)	Year (Feb)
2020	$0.2 A	$0.2 A	$0.2 A	$0.0 A	$0.6 A
2021	$0.0 A	$0.3 E	$0.3 E	$0.3 E	$0.8 E
2022					$1.6 E
2023					$1.8 E

Earnings per Share

	Q1	Q2	Q3	Q4	Year
2020	-$0.02 A	-$0.02 A	-$0.01 A	-$0.02 A	-$0.07 A
2021	-$0.02 A	-$0.01 E	-$0.01 E	-$0.01 E	-$0.05 E
2022					-$0.04 E
2023					-$0.04 E

INITIATING COVERAGE

We are initiating coverage of Bioasis Technologies Inc. (OTC: BIOAF) with a current valuation of $0.60[1] per share. This present value is based on our estimates for development of the xB^3 platform in multiple indications. Bioasis is advancing several candidates in its pipeline, including one in the IND-enabling phase that we expect to enter the clinic by the end of next year. The company has developed an amino acid sequence derived from a human protein called p97 or melanotransferrin which is able to deliver biologics and oligonucleotides across the blood brain barrier (BBB) without impacting the efficacy of the payload.

In addition to its internal programs, Bioasis also has cultivated partnerships with other drug development companies that wish to leverage xB^3's ability to cross the BBB. Bioasis is working with three collaborators including Chiesi Group, Prothena Corp. and an unidentified pharmaceutical partner pursuing several lysosomal storage disease and neurodegenerative targets.

xB^3 is a twelve amino acid peptide that activates receptor mediated transcytosis to carry molecules across the BBB. Based on the naturally occurring, iron-binding protein melanotransferrin, the sequence can be linked to a variety of payloads including antibodies, enzymes, siRNA and small molecules. While still in the preclinical stage, Bioasis' platform has demonstrated the ability to efficiently and effectively transport a variety of therapeutics across the BBB with a broader payload capability as compared to competing technologies.

The two leading internally-developed candidates are designated xB^3-001 and xB^3-007 which are intended to treat Human Epidermal growth factor Receptor 2-positive (HER2+) breast cancer that has metastasized to the brain and Gaucher Disease (GD). xB^3-001 conjugates Bioasis' amino acid sequence to Herceptin, which is approved for use in HER2+ breast cancer, while xB^3-007 links the sequence to Cerezyme, which is approved to treat Type 1 GD.

Bioasis has received non-dilutive funding from interested partners that wish to evaluate the abilities of the xB^3 platform with their own products. Further, the company has an agreement in place with XOMA (US) LLC (XOMA), a royalty aggregator that provides funding in return for future interests in developed products.

The blood brain barrier prevents free access to the brain from the bloodstream. Only select solutes such as water, gasses, lipid soluble substances and other substances transported via endocytosis or transcytosis are allowed through. While the BBB prevents many harmful substances such as toxins and pathogens from crossing into the brain parenchyma it also blocks helpful therapies that may address a multitude of brain diseases including cancer, neurodegenerative and lysosomal storage diseases among numerous others.

Bioasis is a preclinical company with several candidates in early stages of development. We anticipate that xB^3-001 and xB^3-007 will enter the clinic in 2022 followed by the other candidates in the pipeline in subsequent years, some of which will be advanced by partners.

At the end of its first fiscal quarter on May 31, 2020, Bioasis held approximately CAD $190,000 in cash that was augmented by another USD $3 million (~CAD $4 million) following the end of the first quarter representing the upfront payment from the Chiesi agreement. Other non-dilutive funds may be obtained from XOMA in return for royalty and milestone interests in the Chiesi agreement and future commercialization efforts. Additional capital will be required prior to entry in the clinic. The company currently holds no substantive debt following the June 2020 repayment of its 7.5% debentures. We expect Bioasis to consume CAD ~$750,000 in cash per quarter until clinical trials start next year. Note that financial statement items are denominated in Canadian dollars and our target price is denominated in US dollars.

Bioasis' innovative approach to crossing the BBB addresses many of the shortcomings faced by therapies developed to treat diseases of the brain. The xB^3 technology has attracted attention from a variety of stakeholders, including development partners and investors providing capital, supporting internal development of the product. While the company is in an early stage of development, data generated to date is highly supportive of the amino acid chain's ability to transport molecules across the BBB. With many approved and in development products that may address brain diseases but cannot cross the BBB on their own, we see many opportunities for future development and ultimate approval of medicines attached to the xB^3 platform.

[1] Share prices are in US Dollars and financial statement items are in Canadian Dollars.

INVESTMENT THESIS

The blood brain barrier (BBB) is difficult to cross for many substances, both harmful and helpful. While it is able to exclude pathogens and toxins, it can also block helpful therapeutics. To address this unmet need, Bioasis has developed a technology based on a natural receptor mediated transport system in the brain. Bioasis scientists have identified a twelve amino acid sequence that is able to activate the low-density lipoprotein receptor-related protein (LRP1) receptor, shuttling bound molecules across the blood brain barrier. With many therapies unable to pass, including antibodies, siRNA, enzymes and other large molecules, xB^3 may serve a substantial unmet need.

Preclinical work has shown early evidence of xB^3's utility. The compound has demonstrated *in vivo* central nervous system (CNS) transport efficiency, an ability to carry a variety of payloads, efficacy on brain tumors and effective delivery and activity of fusion proteins to targets within the brain. With this capacity, xB^3 is an attractive conjugate for numerous medicines that have proven their therapeutic value in the body that can have similar utility in the brain, once past the BBB.

Since xB^3 is not the active pharmaceutical ingredient itself and functions as a carrier, it is a natural partner for other sponsors with approved or in-development compounds that anticipate their product has activity in the brain. This opens the door for upfront, milestone and royalty revenue, building on the internally developed portfolio.

The effectiveness of the BBB to isolate brain tissue from peripheral blood flow is a primary factor that prevents treatment of brain diseases. The BBB is composed of endothelial cells, surrounded by associated pericytes, astrocytes and neurons. The BBB spans hundreds of miles[2] of capillaries with tightly compressed endothelial cells to prevent passage of blood-borne substances into the brain. The closely spaced cells form a tight junction that blocks diffusion across the blood vessel lining. A second layer surrounding the barrier is made up of astrocytic end feet, an important component in regulating the activity of the BBB.

The LRP1 receptor is highly expressed on the BBB as well as in various cell types in the brain, providing a rich binding environment for xB^3. The peptide binds to the LRP1 receptor on the surface of the cell membrane which then buds off inside the cell to form a vesicle, transported across the endothelial layer along with its payload and exocytosed into the interstitial fluid immediately surrounding the brain. xB^3 can deliver large proteins such as antibodies and enzymes or smaller compounds such as siRNA and small molecule drugs via this mechanism.

Other approaches for crossing the BBB lack the broad payload capacity of xB^3 and confer lower overall exposure of brain cells to payload, shifting the balance towards xB^3 as an attractive carrier for a successful therapeutic. Bioasis is developing its own candidates and working with partners to seek regulatory approval in a variety of brain-related diseases. The most advanced internal candidates are xB^3-001 and xB^3-007 for metastatic HER2+ breast cancer and Gaucher Disease, respectively.

We adopt a conservative approach for Bioasis' portfolio of indications. Our model forecasts an eight-year clinical development and regulatory approval timeline followed by commercialization using estimates based on average drug revenues. As we do not expect Bioasis to commercialize approved candidates itself, we assume a royalty payment from partners of 33% for internally developed assets and a 10% royalty for partner-developed candidates. Revenue forecasts assume average global drug revenues are achieved after a two year ramp.

Our price target forecasts revenue contribution from six in-development candidates and applies a weighted average 8% probability of ultimate commercialization. Additional candidates may be added or existing ones may be replaced with other targets. We will modify the model as more information becomes available and refine estimates as the programs advance through the clinical development process.

[2] Begley DJ, and Brightman MW. Structural and functional aspects of the blood–brain barrier. Prog Drug Res. 2003;61: pp. 39–78.

Key reasons to own Bioasis shares:

- **Best in class xB^3 blood brain barrier penetrating technology**
  - **Non-transferrin based transcytotic pathway**
- **Addresses a major hurdle to CNS therapy**
- **High selectivity for BBB and CNS parenchyma**
- **Preserves payload function and pharmacodynamics**
- **Can deliver antibodies, enzymes, siRNA and small molecules**
- **Lead indications in HER2+ metastatic breast cancer and Gaucher Disease**
- **Broad licensing and funding opportunities with partners**
  - **Chiesi Group**
  - **Prothena Corporation**
  - **Leading pharma company**
- **Diversified preclinical portfolio able to address multiple CNS disorders**
- **120+ patents and pending applications across 10+ patent families**

In the following sections we review xB^3 technology and its mechanism of action. We then detail Bioasis' most advanced candidates, their respective indications and markets and current research partnerships. We provide an overview of the firm's intellectual property, risks, peers and competitors, and leadership team. Finally, we discuss the assumptions in our appraisal supporting our valuation of USD $0.60 per share.

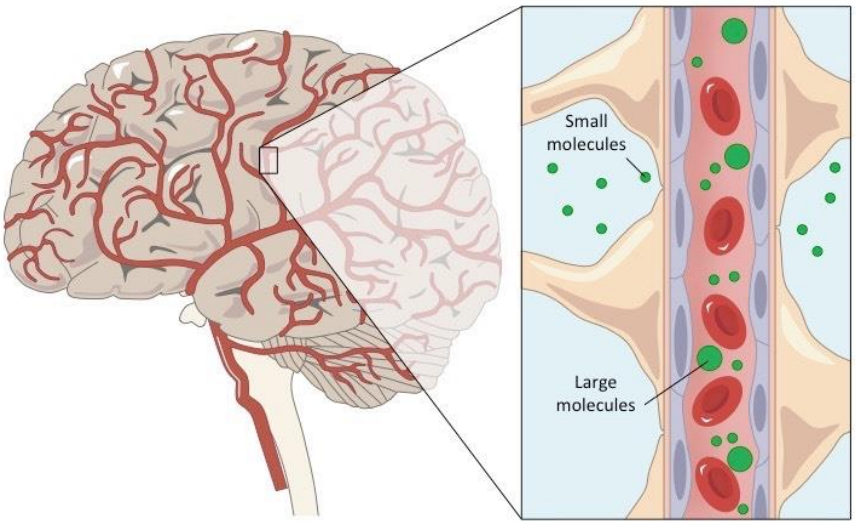
The Blood Brain Barrier

Overview

The blood-brain barrier (BBB) is an important cellular boundary that controls access to the central nervous system (CNS) to allow for proper neuronal function. The semipermeable barrier that lines blood vessels in the nervous system is made up of endothelial cells that form tight junctions preventing many harmful blood components from passing into the brain. This seal is augmented by pericytes, astrocytes and neurons which surround the endothelial cells. Small molecules, fat-soluble molecules and some gases can pass through the barrier. However, pathogens, all large molecule drugs and most small molecule drugs are prevented from entering. Some medicines can cross the BBB, including certain small molecules via lipid-mediated free diffusion or saturable transport systems. However, the majority cannot[3] cross and they must rely on other mechanisms to enter the brain.

The tight junctions in the BBB are intended to block toxins and pathogens from passing through to the brain cells and help maintain hormones and fluid levels. The restrictive barrier blocks both the bad and the good, obstructing harm and relief alike: a factor that must be considered when determining treatments for diseases in the brain. The BBB serves as the body's natural, extra line of defense preventing exogenous infections from reaching the brain and preserving a clean operating environment for highly complex and sensitive central neurochemistry to function. On the other hand, the barrier prevents medicines that are otherwise effective in the peripheral body from working in the brain because they cannot enter.

Exhibit I – Vascularization of the brain, the blood-brain barrier[4]

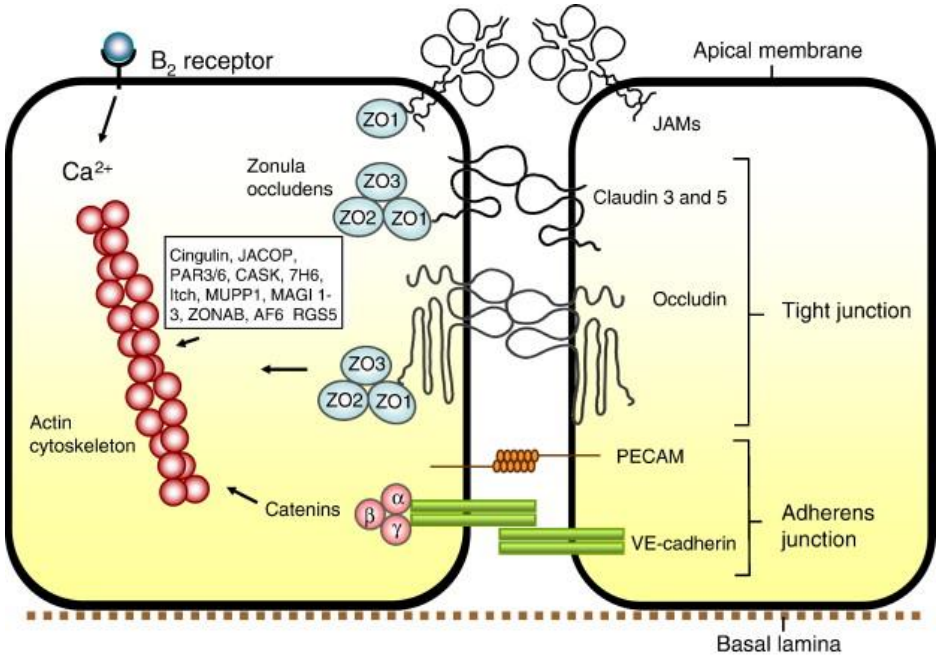


There are three key interfaces between the peripheral blood and the CNS: the BBB, the blood-cerebrospinal fluid (CSF) barrier and the arachnoid barrier, and of these, the BBB presents the largest area.[5] The BBB is endothelial tissue, specifically capillary wall endothelial cells, that is sealed via high density tight/adherens junctions, obstructing intercellular or paracellular pathways to entry. This mechanism screens out pathogens, large molecules and most small molecules from entering the interstitial fluid that supports the CNS and the brain. The neuronal micro-environment requires protection against pathogens and must be maintained for the proper function of ion gradients and neurotransmitter concentrations. For example, in mammals, the plasma concentration of potassium is approximately 4.5 mM, but the plasma concentration in CSF and brain interstitial fluid (ISF) is approximately 2.5-2.9 mM. Likewise, the blood plasma concentration of glutamate, a neuroexcitatory amino acid, fluctuates greatly after ingestion of food. Spikes of glutamate also occur in the brain, but only after ischemic stroke, and can cause permanent neurotoxic damage. Thus, the BBB acts to insulate signals between the CNS and body. The brain is densely vascularized, and the interface defined by the brain's capillaries' endothelial cells is expansive.

[3] Pardridge, W., Drug transport across the blood-brain barrier. J Cereb Blood Flow Metab. 2012 Nov; 32(11):
[4] Bioasis July 2020 Corporate Presentation
[5] Abbott, N. J., Patabendige, A. A., Dolman, D. E., Yusof, S. R., & Begley, D. J. (2010). Structure and function of the blood–brain barrier. *Neurobiology of Disease, 37*(1), 13-25. doi:10.1016/j.nbd.2009.07.030

It is estimated that the total surface area of the BBB approaches up to 18 square meters for the average human adult.[6] While the BBB is effective in protecting the brain and CNS, the BBB is also effective in filtering therapeutic compounds aimed at targets here. Yet the BBB allows much to pass through; it is highly controlled yet dynamic, shuttling via membrane transporters and vesicular mechanisms. The BBB is close to the neurons of the brain and once past, solutes do not need to travel far to reach their intended destination.

Exhibit II – BBB Junctions[7]



The complexes between the endothelial cells include adherens and tight junctions where the cells can physically attach to one another. In the case of the BBB, junctions are used to create a tight seal between the cells, preventing infiltrates from passing through. In adherens junctions, cadherin proteins[8] rivet the intercellular cleft; these junctions also lend structural support to the tissue. The tight junctions consist of occludin, claudins and junctional adhesion molecules that span the intercellular cleft. Both adherens and tight junctions are anchored to cytoplasmic scaffolding proteins inside the cells. The junctions are very restrictive and have been observed to control the diffusion of ions, the smallest of solutes. As a result, the BBB also has very high electrical resistance. Small molecules may diffuse across the lipid membrane of cells via passive diffusion, or via other active pathways.

Mechanisms have been developed, natural transport systems identified and receptors discovered that can be used to help desired materials to cross. Small molecules can be re-engineered to pass through the barrier using carrier mediated transport. Recombinant proteins can be modified to bind to a receptor to facilitate their crossing. A Trojan horse can be employed using a recognized protein to carry a payload across the endothelial frontier. Larger molecules can also pass through if chaperoned by a transporter protein and glucose and insulin can be ferried past the cellular boundary by proteins. Other strategies include nanoparticle-based methods, receptor mediated processes, BBB permeability manipulation, lipid solubility, inhibition of efflux transporters and prodrug bioconversion among other approaches. Chemical and sonic processes have also been used to open a cleft in the endothelial cells, astroglia, pericytes, and perivascular mast cells in order to allow therapeutics into the brain.

Chimeric peptides are yet another approach and are used for drugs that cross the barrier at a slow rate. A chimeric peptide is covalently bound to an otherwise non-transportable drug, modifying it into a transportable peptide vector. The chimeric peptide crosses the barrier via receptor-mediated transcytosis and transported to the brain where disulphide enzymes separate the drug from the peptide.[9]

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[6] Abbott, N. J., Patabendige, A. A., Dolman, D. E., Yusof, S. R., & Begley, D. J. (2010). Structure and function of the blood–brain barrier. *Neurobiology of Disease, 37*(1), 13-25. doi:10.1016/j.nbd.2009.07.030

[7] Abbott, N. J., Patabendige, A. A., Dolman, D. E., Yusof, S. R., & Begley, D. J. (2010). Structure and function of the blood–brain barrier. *Neurobiology of Disease, 37*(1), 13-25. doi:10.1016/j.nbd.2009.07.030

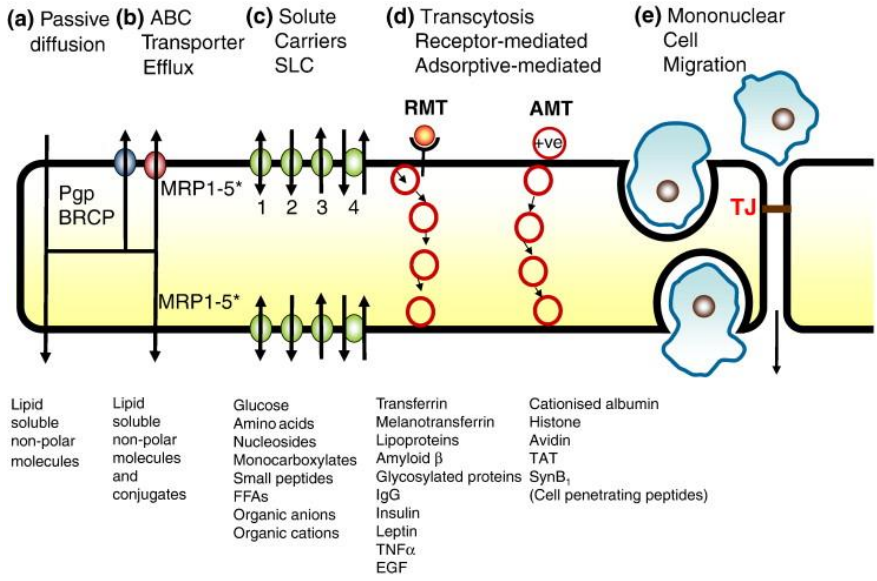
[8] Cadherins (named for "calcium-dependent adhesion") are a type of cell adhesion molecule (CAM) that is important in the formation of adherens junctions to bind cells with each other. Cadherins are a class of type-1 transmembrane proteins. They are dependent on calcium (Ca2+) ions to function, hence their name. Source: Wikipedia. https://en.wikipedia.org/wiki/Cadherin

[9] Bellettato, C., Scarpa, M., Possible strategies to cross the blood–brain barrier. Ital J Pediatr. 2018; 44(Suppl 2): 131.

BBB-penetrating Technologies

There are several routes by which blood-borne substances, nutrients and drugs can enter into the brain. The **paracellular route** traffics small hydrophilic substances across the barrier while the **transcellular route** allows small lipophilic substances to cross. **Carrier mediated transport** (CMT) allows amino acids, glucose and nucleosides to pass and **receptor mediated transport** (RMT) employs endocytosis leveraging certain receptors including the low-density lipoprotein receptor (LDLR), insulin receptor or the transferrin receptor. There is also an **adsorptive mechanism** for crossing the BBB which allows positively charged substances such as cationic lipids, polymers, dendrimers, nanoparticles, and albumin to internalize.

Exhibit III – Natural mechanisms of crossing the blood-brain barrier[10]



Commercial BBB-penetrating methods currently being explored include receptor mediated transcytosis, Trojan horse, nanoparticle based and ultrasonic. One key objective of BBB-penetrating technologies is to avoid disrupting the BBB's protective properties, which is a shortcoming of ultrasonic and electric stimulation methods.

Receptor-mediated transcytosis (RMT) is of particular interest and is the basis for many leading BBB-penetrating technology platforms today. RMT requires a ligand to bind to a particular receptor. Once bound, endocytosis begins and an invagination forms, pinching off into a vesicle with both ligand and receptor inside. The vesicle is then routed across the inside of the cell until it is exocytosed on the other side.

The xB^3 Platform

xB^3 operates based on RMT and its mechanism of action is illustrated in a video available here.[11] It was derived from a naturally occurring iron-binding protein found at low concentrations in the blood called melanotransferrin and was refined and optimized to a single 12 amino acid peptide that is able to penetrate the BBB. xB^3 takes advantage of the low-density lipoprotein receptor-related protein (LRP1) receptor which facilitates rapid endocytosis and recycling. LRP1 is highly expressed in various cell types in the brain and overexpressed in Alzheimer's and Parkinson's disease. The xB^3 peptide binds with the LRP1 receptor forming an invagination that pinches off into a vesicle before it is endocytosed, transported across the endothelial cell layer and exocytosed on the other side of the cell layer into the interstitial fluid immediately surrounding the brain. xB^3 can deliver large proteins such as antibodies and enzymes or smaller compounds such as siRNA and small molecule drugs.

xB^3 has been independently validated *in vitro* and *in vivo.* Work done by Demuele *et al.* showed that xB^3 has superior volume of distribution in the brain compared to transferrin as measured by *in situ* brain perfusion. xB^3 has also demonstrated superior transcytosis examined in an *in vitro* BBB model. Finally, xB^3 does not affect the functionality of its payload, as was confirmed by Nounou *et al.* and Thom G. *et al*. xB^3 has been validated in multiple models of brain tumors, neuropathic pain, lysosomal storage disorder, and stroke.

[10] Abbott, N. J., Patabendige, A. A., Dolman, D. E., Yusof, S. R., & Begley, D. J. (2010). Structure and function of the blood–brain barrier. *Neurobiology of Disease, 37*(1), 13-25. doi:10.1016/j.nbd.2009.07.030
[11] Source: Bioasis website. https://www.bioasis.us/science/platform/

xB^3 Background

Bioasis Technologies Inc. was founded in 2007 based on work initiated at the University of British Columbia (UBC). The technology platform was initially named Transcend and launched as a potential carrier of effector molecules across the BBB for therapeutic use. It used the naturally occurring protein p97 (melanotransferrin) to deliver chemotherapeutic agents across the BBB with up to tenfold efficacy compared to non-carrier delivered drugs.

The Transcend platform evolved and was renamed xB^3 in late 2017 to reflect the technology's primary function to carry therapeutics across the BBB. xB^3 transports a variety of molecules and therapeutics across the BBB, including antibodies, enzymes, small molecules, small-interfering RNA and other gene therapies via receptor mediated transcytosis. The technology leverages the penetrating properties of the recombinant soluble human protein melanotransferrin, or p97. It crosses the BBB via a transcytotic pathway engaging the low-density lipoprotein receptor-related protein (LRP1) receptor, which is a highly efficient route featuring rapid endocytosis and recycling. Highlights of the platform below:

- Small peptide convenient to manufacture, easy to manipulate and lower in cost vs. predecessor technology
- Allows for rapid and reproducible synthesis of xB^3 based therapeutics
- Therapeutic agents transported more readily across the blood-brain barrier vs. previous technology
- Preclinical collaborations demonstrated xB^3 does not affect the pharmacokinetics of its therapeutic payload
- xB^3 linked to payloads has demonstrated therapeutic efficacy in rodent disease models
- xB^3 has been demonstrated to be safe in a wide range of doses in rodent models

xB^3 is currently being investigated in several preclinical programs with lead efforts in brain metastatic HER2+ breast cancer, with xB^3 conjugated to trastuzumab, and in Gaucher Disease, with xB^3 linked to Cerezyme. Other programs include indications in Parkinson's Disease, Lewy Body Dementia, frontotemporal lobe dementia and other neurological diseases.

Trastuzumab (Herceptin)

Trastuzumab is a humanized IgG1 *kappa* light chain monoclonal antibody, branded Herceptin, used in the treatment of metastatic HER2 overexpressing breast cancer (HER2+).[12] The drug was originally sponsored and developed by Genentech jointly with UCLA and was approved by the US Food & Drug Administration (FDA) in September 1998 and by the EMA in August 2000. Trastuzumab is used as part of chemotherapy regimen (including paclitaxel, doxorubicin, and cyclo-phosphamide) for adjuvant treatment of node-positive, HER2 positive breast cancer, in treatment of gastric cancer and may be effective in other HER2 expressing tumor types. Trastuzumab is also indicated as first line treatment for HER2+ metastatic breast cancer in combination with paclitaxel and second line treatment as a single agent for HER2+ positive patients who have already received one or more chemotherapy agents. The biologic is administered intravenously on a seven day or 21 day schedule. Common weekly dosing is at 2 mg/kg beginning one week after loading dose of 4 mg/kg. 21 day dosing starts with loading dose of 8 mg/kg followed by 6 mg/kg every 21 days.[13] The first, larger dose is infused over 90 minutes, and depending on tolerance, subsequent maintenance doses may be infused over 30 minutes.[14]

Common side effects of trastuzumab include chills, fever, rash, neutropenia, anemia, myalgia, weakness, nausea and vomiting. Serious complications related to trastuzumab is cardiac dysfunction in 2-7% of cases.[15] Patients are at risk of left ventricular dysfunction (ejection fraction) and congestive heart failure. Serious reactions such as anaphylaxis, angioedema, pneumonitis and acute respiratory distress syndrome have also been reported. To avoid toxicity, close monitoring of trastuzumab administration is needed. Despite its efficacy in treating HER2+ breast cancer, trastuzumab has difficulty crossing the BBB and many patients treated with the biologic develop brain metastases.[16] Technologies like xB^3 can deliver trastuzumab to the brain to treat metastases as necessary.

[12] HER2 over expression is driven by HER2/neu gene located on chromosome 17. Human epidermal growth factor receptor 2, or HER2, is a transmembrane protein, and is overexpressed in HER2+ breast cancer.
[13] Boekhout AH, Beijnen JH, Schellens JH. Trastuzumab. *Oncologist*. 2011;16(6):800-810. doi:10.1634/theoncologist.2010-0035
[14] http://chemocare.com/chemotherapy/drug-info/Trastuzumab.aspx
[15] Trastuzumab (Herceptin) J.J. Gemmete, S.K. Mukherji American Journal of Neuroradiology Sep 2011, 32 (8) 1373-1374; **DOI:** 10.3174/ajnr.A2619
[16] Oktay, E. *et al.* Nearly Complete Response of Brain Metastases from HER2 Overexpressing Breast Cancer with Lapatinib and Capecitabine after Whole Brain Irradiation. Case Reports in Oncological Medicine / 2013

Exhibit IV – Trastuzumab and HER2 signaling[17]

Trastuzumab targets the HER2 receptor, specifically the extracellular domain, known as domain IV or ErbB-2, preventing its dimerization. Prevention of dimerization allows cell arrest during G1 phase, halting cancer cell growth and mitosis.

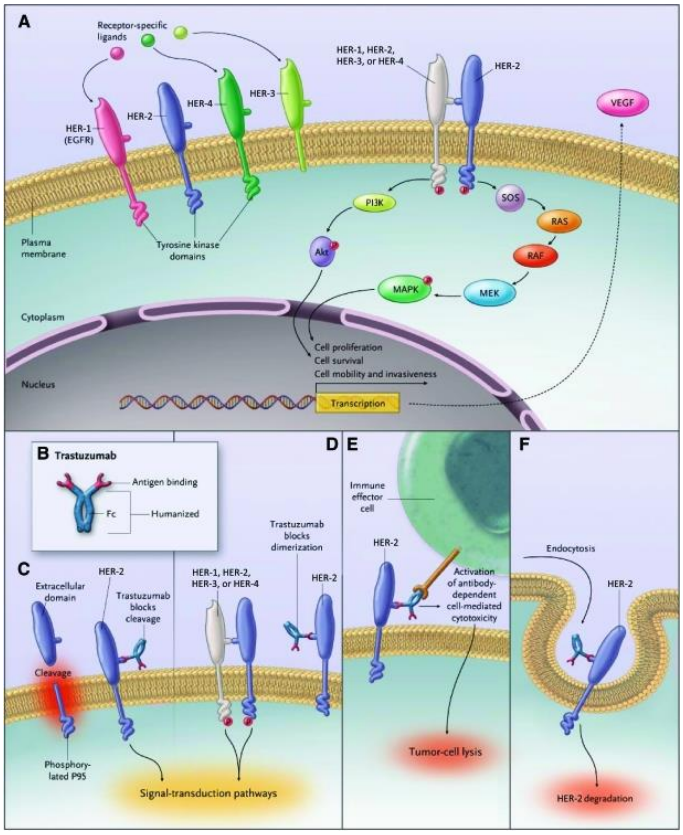
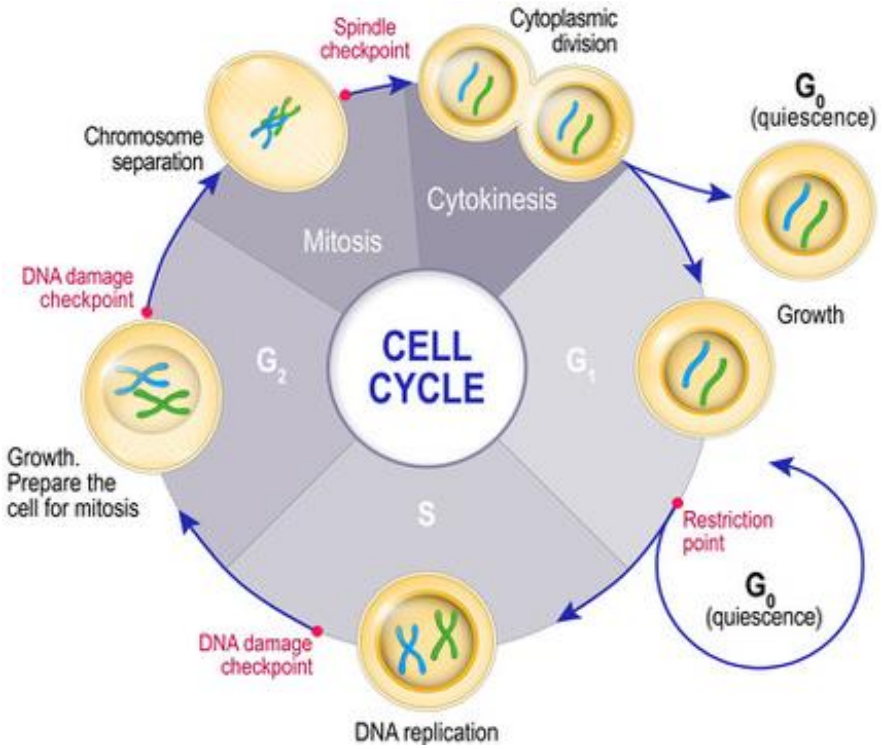


Exhibit V – Cell cycle stages[18]

Trastuzumab has been shown to be effective in the clinic both as a monotherapy and in combination with chemotherapy.[19] In Phase III trials, trastuzumab chemotherapy combinations outperformed chemotherapy alone with statistical significance. Time to progression (TTP) for anthracycline-based chemotherapy in conjunction with trastuzumab was 7.4 months compared to 4.6 months with chemotherapy alone; in combination with anastrozole versus anastrozole monotherapy, progression-free survival was 4.8 months versus 2.4 months; patients receiving paclitaxel, carboplatin and trastuzumab had an overall response rate of 52% compared to paclitaxel and trastuzumab at 36%.

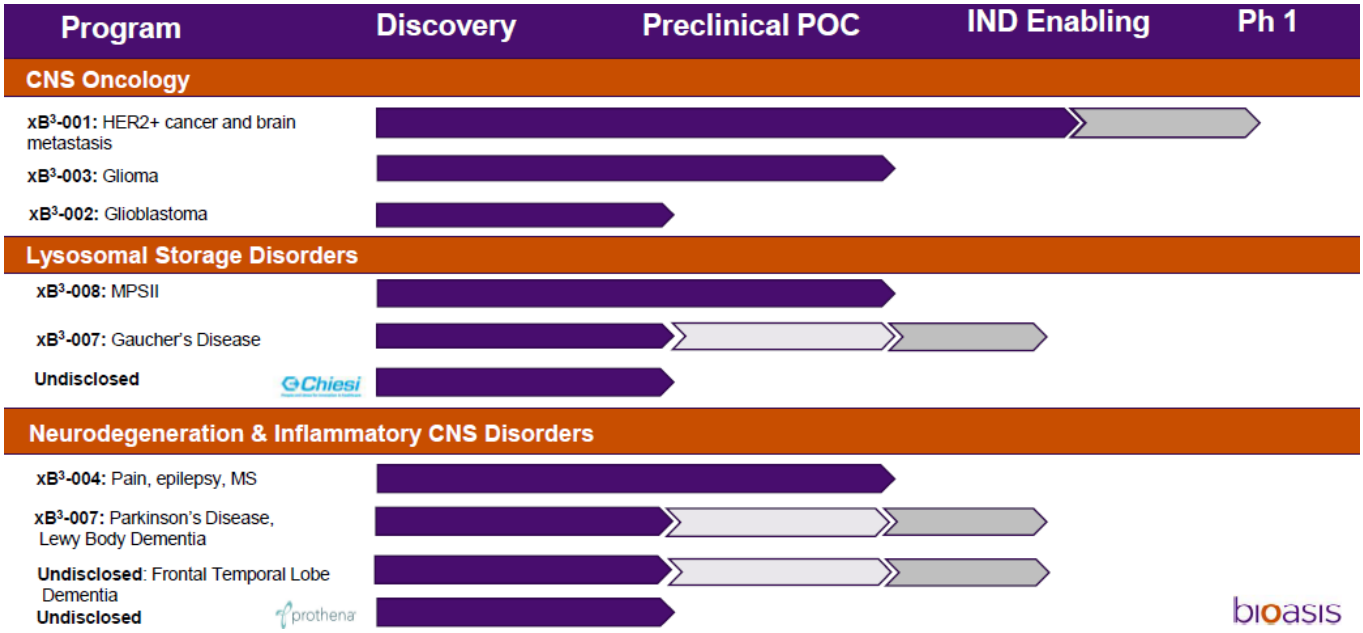


[17] Trastuzumab (Herceptin) J.J. Gemmete, S.K. Mukherji American Journal of Neuroradiology Sep 2011, 32 (8) 1373-1374; **DOI:** 10.3174/ajnr.A2619
[18] Source: Shutterstock
[19] Boekhout AH, Beijnen JH, Schellens JH. Trastuzumab. *Oncologist*. 2011;16(6):800-810. doi:10.1634/theoncologist.2010-0035

Candidates

Pipeline

Exhibit VI – Bioasis' Pipeline[20]



xB^3-001

xB^3-001 combines Bioasis' platform technology with trastuzumab, the most widely used HER2-targeting agent. The improved ability of xB^3-001 to cross the BBB is likely to provide superior efficacy as compared to using trastuzumab alone. Bioasis uses site specific genetic fusion of xB^3 to trastuzumab using a non-cleavable linker.

Breast Cancer

Breast cancer is one of the most common cancers with an estimated 2 million new cases worldwide in 2018, and in 2020, the American Cancer Society estimated 276,480 new cases per year in the US alone.[21] In women, this accounts for 30% of all new cancer cases and the second leading cause of cancer-related deaths.[22] HER2+ breast cancer represents 15%-20% of breast cancer cases worldwide and is the more aggressive phenotype compared with HER2 negative.[23] Of patients with HER2+ metastatic breast cancer, up to 50% develop brain metastases during the course of their disease.

Risk Factors

Age and sex are the primary drivers of breast cancer risk followed by being overweight, drinking alcohol and undergoing Hormone Replacement Therapy (HRT). HER2 overexpression occurs in 15%-25% of all breast cancers. Risk factors specific to HER2+ overexpressing breast cancer are faced by younger Hispanic or Asian women and are less likely to have used HRT.[24] A considerable number of HER2+ patients develop brain metastases. In a study by Maurer *et al.*, approximately 22.4% of HER2+ patients developed metastases and 10.8% developed brain metastases.[25] Of those that presented with non-brain metastases, 41.7% eventually developed brain metastases. Risk factors related to brain metastases were age younger than 40, had no surgery for primary lesion, tumor size larger than 2 cm, nodal involvement, the absence or late start of (neo) adjuvant anti-HER2 treatment including anthracyclines and taxanes, and development of lung metastases at first site of relapse.

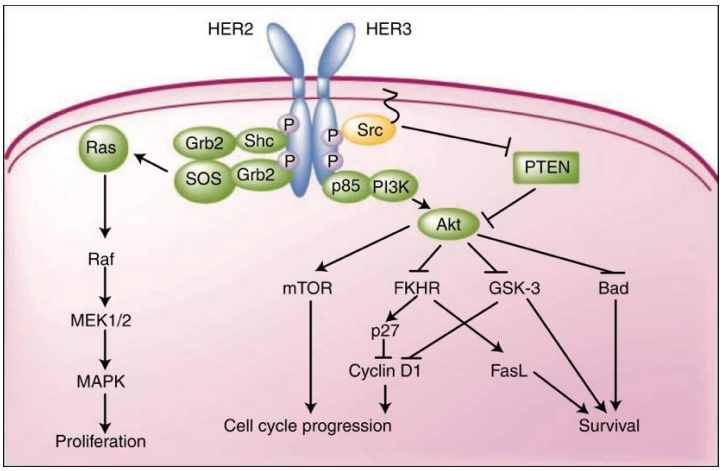
[20] Source: July 2020 Corporate Slide Deck
[21] American Cancer Society, Cancer Facts and Figures 2020
[22] American Cancer Society, Cancer Facts and Figures 2020
[23] https://www.her2centrality.com/breast-cancer-landscape
[24] https://www.breastcancer.org/research-news/20090522
[25] Maurer C, Tulpin L, Moreau M, et al. Risk factors for the development of brain metastases in patients with HER2-positive breast cancer. ESMO Open 2018;**3**:e000440. doi:10.1136/ esmoopen-2018-000440

Pathophysiology

In general, cancer cells replicate to form tumors; they progress via a series of key mutations that affect the cells' ability to naturally regulate replication and death. As tumors enlarge, they can invade surrounding tissues. Often, cancer is described in stages based on the spread of the tumor. If the tumor is early stage and remains *in situ,* it is labeled Stage 0; Stage IV cancers have metastasized and have invaded other parts of the body, such as the brain in brain-metastatic breast cancer.

HER2+ is breast cancer that is positive for the HER2 oncogene, that is, it has the gene mutation that causes overexpression of HER2 receptors on the cancer cells causing them to rapidly proliferate. HER2 is a 185-kDa transmembrane tyrosine kinase which bears close resemblance to epidermal growth factor receptor (EGFR).[26]

Exhibit VII – HER2 signaling pathway[27]



HER2 signaling via the HER2/HER3 heterodimer drives tumor cell survival and proliferation through activation of PI3K and MAPK signaling pathways. HER2/HER3 heterodimer is the most potent driver of proliferation in breast cancer tumor cells that overexpress HER2.

Due to mutations, such as HER2, cancer cell mechanical properties change while they rapidly proliferate and survive, driving metastasis. From the primary tumor, typically in the breast, cells leave and can circulate and deposit throughout the body, and can end up in the brain, as is the case in brain-metastatic breast cancer.

Standard of Care

HER2+ breast cancer is characterized by the overexpression of the tyrosine kinase, HER2, which can be targeted in therapy. Trastuzumab is a humanized monoclonal antibody directed against the extracellular domain of HER2, approved as first line treatment. Pertuzumab, also a monoclonal antibody, has been approved for use in combination with trastuzumab and docetaxel for metastatic HER2+ breast cancer, and can also be used as a neoadjuvant.

Unfortunately, metastasis in the brain leaves few treatment options. There are antibodies targeting HER2+ breast cancer; however, they do not cross the blood-brain barrier easily on their own. Standard of care is limited to surgery, whole-brain radiotherapy, stereotactic radiosurgery, supportive care, and palliative care.[28] xB^3 technology can help otherwise proven therapies (trastuzumab) to cross the blood-brain barrier efficiently and effectively while maintaining efficacy in the body, providing true systemic immunotherapy coverage.

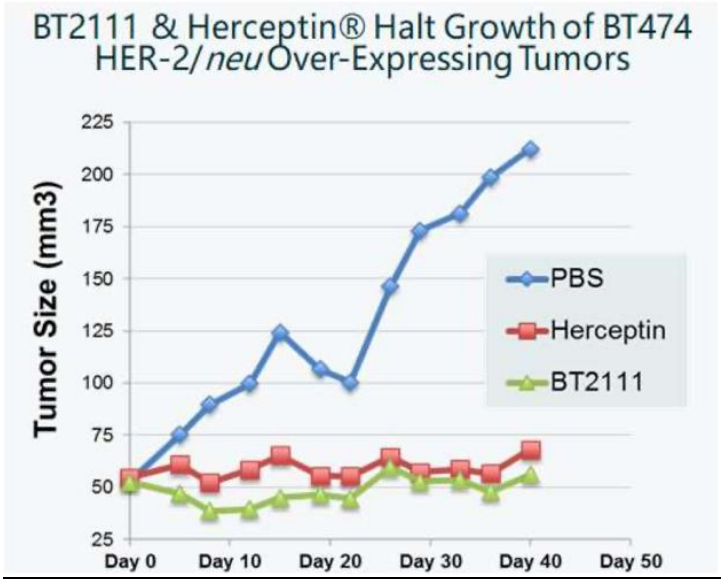
Tucatinib, sold under the brand name Tukysa was approved in April 2020. The kinase inhibitor is indicated along with trastuzumab and capecitabine for treatment of advanced unresectable or metastatic HER2-positive breast cancer, including those with brain metastases, who have received one or more prior anti-HER2-based regimens in the metastatic setting.

[26] https://clincancerres.aacrjournals.org/content/clincanres/13/6/1648.full.pdf
[27] https://clincancerres.aacrjournals.org/content/clincanres/13/6/1648.full.pdf
[28] Ramakrishna N, Temin S, Chandarlapaty S, et al. Recommendations on Disease Management for Patients With Advanced Human Epidermal Growth Factor Receptor 2-Positive Breast Cancer and Brain Metastases: ASCO Clinical Practice Guideline Update. *J Clin Oncol*. 2018;36(27):2804-2807. doi:10.1200/JCO.2018.79.2713

Preclinical Validation

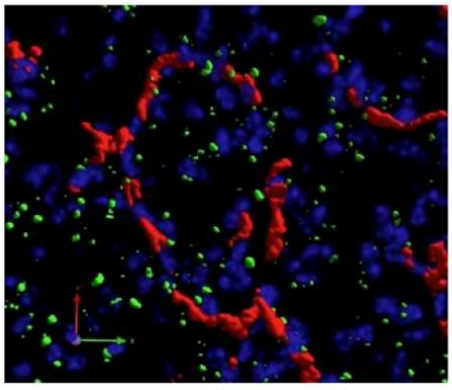
Bioasis' xB^3-001 candidate is xB^3 conjugated trastuzumab. Trastuzumab is a monoclonal antibody targeting the extracellular domain of HER2 receptors, overexpressed in HER2+ breast cancer cells and is currently standard of care, first line of therapy. Trastuzumab is indicated for adjuvant treatment as a single agent and in combination with chemotherapy. It is also indicated in metastatic breast cancer in combination with paclitaxel as first line treatment, and as a single agent for those who have previously received one or more chemotherapy regimens. Conjugated to xB^3, trastuzumab can be delivered effectively and efficiently into the brain to treat metastases. As xB^3 does not affect peripheral activity, xB^3-001 may become adjuvant of choice if cleared for market, protecting patients against metastases in both the body and brain.

Exhibit VIII – xB^3-001 Efficacy Equivalent to Trastuzumab (Herceptin)[29]



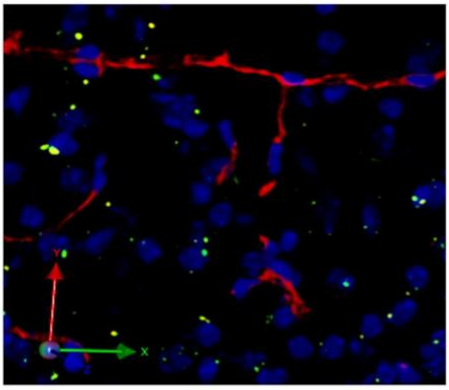
xB^3-001 performance has been validated independently. Work performed at Biopharmaceutical Research Inc. showed that xB^3-001 retained peripheral trastuzumab activity in a BT474 xenograft model. xB^3-001 showed non-inferior tumor growth suppression when compared to trastuzumab without xB^3 when administered via intraperitoneal injection twice a week for five weeks at 10 mg/kg.

Exhibit IX – Fluorescence Microscopy Imaging of Mouse Brain, xB^3-001 vs. Herceptin, IV-administration[30]



xB^3-Herceptin

Red: Brain capillaries
Blue: Brain Nuclei
Green: xB^3-Herceptin in brain



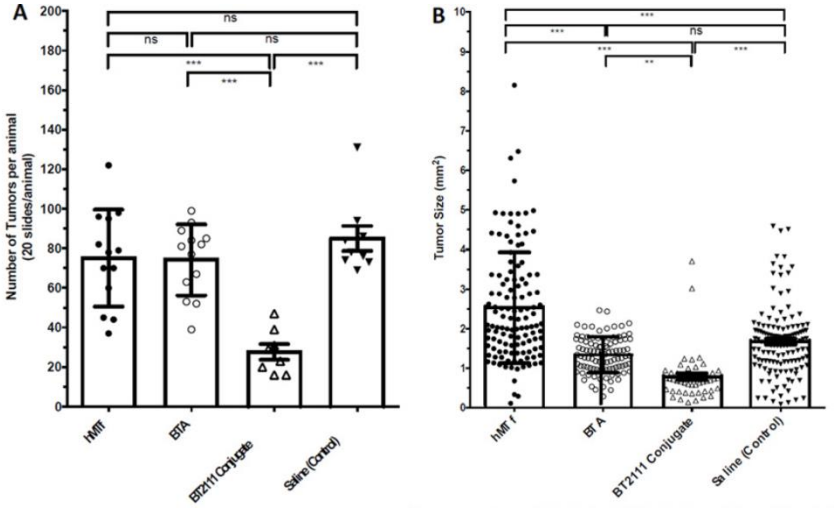
Herceptin

Red: Brain capillaries
Blue: Nuclei
Green: Herceptin in brain

[29] Bioasis September 2020 Corporate Presentation
[30] Bioasis September 2020 Corporate Presentation

xB^3-001 was further vetted in work done by the National Research Council of Canada. The compound was observed, two hours post IV administration at 10 mg/kg, to have increased localization in the brain parenchyma compared to trastuzumab alone, supporting xB^3's ability to deliver across the BBB.

Exhibit X – HER2+ Breast Cancer Brain Metastases Tumor Number & Size, xB^3-001 vs Trastuzumab[31]



In a murine model of HER2+ brain-metastatic breast cancer, Nounou *et al.* demonstrated that five weeks after intracardiac injection of MDA-MB-231-BR$^{HER2/eGFP}$, fluorescently labeled brain-targeting HER2+ human breast cancer cells, melanotransferrin-trastuzumab conjugates (xB^3-001) were effective reducing tumor number and size by 68% and 46%, respectively, compared to control groups, all under bi-weekly, 10 mg/kg administration. Trastuzumab alone had no effect on reducing number of metastases and minimally reduced metastases size.[32] Radiographic analysis showed that xB^3-001 began acting two hours after a single injection. Finally, trastuzumab uptake was shown to be ~10 fold higher in metastases using the xB^3 conjugate vs the antibody on its own.

xB^3-007

xB^3-007 targets Gaucher Disease (GD) type 2 and links Cerezyme (glucocerebrosidase) with xB^3. While Cerezyme in its approved form is able to treat type 1 GD, it is not effective against type 2 and 3 as the enzyme cannot cross the BBB and these two forms affect the central nervous system. Cerezyme is used in first-line, standard of care enzyme replacement therapy for GD and works by reducing the levels of glycolipid glucocerebroside that build up in the body. The drug was developed by Sanofi Genzyme and approved by the FDA in 1994.

Indication

GD results from deficiency of glucocerebrosidase enzyme, driven by GBA gene mutation, resulting in the pathological accumulation of cells in various organs in the body. Type 1 GD is the most common and is treated with enzyme replacement. GD type 2 and 3 have early onset brain involvement that progressively worsens over time; these types are sometimes known as neuronopathic Gaucher Disease.[33] GD is an autosomal recessive disease meaning both parents must be carriers of the gene creating a 50% chance that the child will be an asymptomatic carrier and a 25% that the child will have the disease. Diagnosis requires measuring the enzyme activity of glucocerebrosidase and can also involve genetic testing.

Type 1 GD (GD1) is the most common form of the disease in western countries where approximately 95% of GD patients have type 1 and some are asymptomatic. GD1 is limited to peripheral maladies and the brain is unaffected. Symptoms include liver and spleen enlargement, and is treated with enzyme replacement therapy (ERT) or substrate reduction therapy (SRT). Other symptoms include bone marrow fibrosis, which negatively impacts the production of red blood cells leading to anemia and fatigue and white blood cells causing leukopenia. People of Ashkenazi Jewish descent are especially prone to GD1 with an estimated prevalence of 118 per 100,000 people.

[31] Nounou, M. *et al.* Anti-cancer antibody trastuzumab-melanotransferrin conjugate (BT2111) for the treatment of metastatic HER2+ breast cancertumors in the brain: An in-vivo study. Pharm Res. 2016 December ; 33(12): 2930–2942. doi:10.1007/s11095-016-2015-0.
[32] Nounou MI, Adkins CE, Rubinchik E, et al. Anti-cancer Antibody Trastuzumab-Melanotransferrin Conjugate (BT2111) for the Treatment of Metastatic HER2+ Breast Cancer Tumors in the Brain: an In-Vivo Study. *Pharm Res*. 2016;33(12):2930-2942. doi:10.1007/s11095-016-2015-0
[33] https://www.gaucherdisease.org/about-gaucher-disease/what-is/type-2-3/

Type 2 GD (GD2), which is also known as acute infantile neuronopathic GD, has the earliest onset and is characterized by buildup of glucocerebroside in the brain. Symptoms appear within the first three to six months of life. This type is fatal within two years. In addition to the symptoms associated with type 1, those with type two also suffer from loss of motor skills, decrease in muscle tone, muscle spasms and trouble swallowing. The symptoms can lead to severe feeding and breathing difficulties which may lead to death in the first few years of life.

Type 3 GD (GD3) is known as chronic neuronopathic GD and has later and more gradual onset compared with GD2. People with this type can survive into adulthood. GD3 is more common than GD1 in the Middle East, India, China and other Asian countries. The symptoms for GD3 are varied and include seizures, eye movement disorders, cognitive and coordination issues, enlarged liver and spleen, respiratory problems and blood disorders. Due to the prolonged duration of GD3, there are also skeletal irregularities that do not occur in GD2.

Neurologic pathology dominates GD2 and GD3. There is no effective treatment available for GD2. GD3 patients can only treat non-neurological symptoms with enzyme replacement therapy; the enzymes do not penetrate into the brain.

Incidence and Prevalence

According to Nalysnyk *et al.*, GD2 and GD3 incidence is between one in 100,000 and one in 300,000, with studies varying in their estimates. Combined, standardized prevalence rates for GD2 and GD3 were 0.34 in the Czech Republic, 0.26 in the Netherlands and 0.55 in Portugal, per 100,000, respectively. At the lower end of this estimate, and assuming global total births of approximately 140.7 million in 2020,[34] approximately 470 births per year will have neuronopathic GD. Assuming average life expectancy of one year, prevalence of GD2 is, again, approximately 470 infants.[35] Estimates do not distinguish between GD2 and GD3. The ICGG Gaucher Registry reports 6%[36] worldwide prevalence of neuronopathic GD, the majority of whom are, based on the analysis above, likely GD3. Though Bioasis is pursuing GD2 as an indication, sufferers of GD3 will need brain-accessing therapies such as xB^3-007. Likewise, if xB^3-007 is successful in extending the life of GD2 sufferers, the prevalence will correspondingly increase.

Pathophysiology

GD is an inherited lysosomal storage disorder (LSD). It results from deficiency of lysosomal enzyme acid β-glucosidase, driven by GBA gene mutation. Due to the lack of the enzyme, sphingolipid glucosylceramide accumulates in the lysosomes of macrophages; these engorged cells are known as Gaucher cells.[37,38] The accumulation of these cells is the root of the symptomology and morbidity of the condition. Gaucher cells will accumulate typically in the liver, spleen, bone and bone marrow and, depending on the type of GD, the brain, causing organ inflammation and dysfunction.

Standard of Care

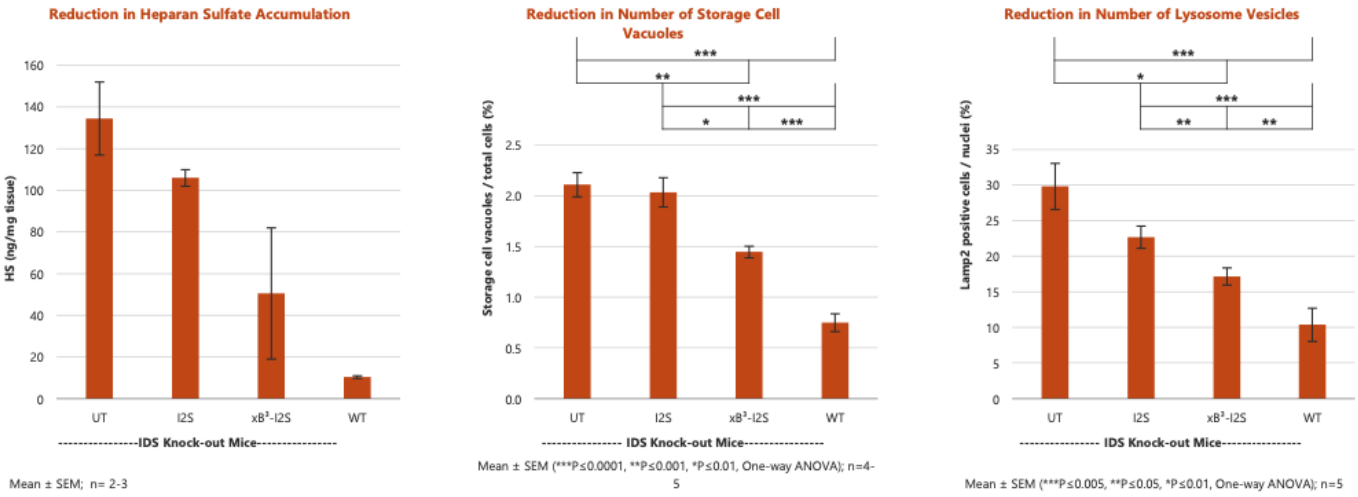
The most common treatment for GD is enzyme replacement therapy. The enzyme typically supplemented is imiglucerase (Cerezyme), which is a recombinant analogue of β-glucocerebrosidase and is produced by Sanofi Genzyme. Other glucocerebrosidase derivatives include velaglucerase alfa, manufactured by Shire, and taliglucerase alfa (Elelyso), marketed by Protalix and Pfizer. Substrate reduction therapy (SRT) is another way to control GD that reduces the amount of GL-1 produced. The two SRT available for GD are miglustat (Zavesca) and eliglustat (Cerdelga), which are small molecules marketed by Actelion and Genzyme, respectively. As xB^3 retains peripheral therapy efficacy, xB^3-007, if successful in the clinic, would be appropriate to replace imiglucerase ERT as standard of care in neuronopathic GD.

Pre-clinical Validation

While not directly performed on xB^3-007, Bioasis has conducted validation work on xB^3-I2S, an I2S xB^3 conjugate targeting Hunter Syndrome, also a lysosomal storage disorder. Hunter Syndrome (MPS II) is caused, like GD, by an enzyme deficiency. Hunter Syndrome is characterized by a deficiency in iduronate 2-sulfatase and currently the CNS effects are untreatable. In an IDS-knockout murine model, xB^3-I2S treatment led to significant reduction in brain heparan sulfate accumulation. Reduction in cell vacuolation and lysosome vesicles was also observed.

[34] https://ourworldindata.org/births-and-deaths
[35] https://www.gaucherdisease.org/about-gaucher-disease/what-is/type-2-3/
[36] Nalysnyk finds this an underestimate as prevalence of GD3 is higher than GD1 in the Middle East and Asia.
[37] Nalysnyk L, Rotella P, Simeone JC, Hamed A, Weinreb N. Gaucher disease epidemiology and natural history: a comprehensive review of the literature. *Hematology*. 2017;22(2):65-73. doi:10.1080/10245332.2016.1240391
[38] https://www.gaucherdisease.org/about-gaucher-disease/what-is/

Exhibit XI – *In vivo* Evidence Supporting xB^3-I2S (Enzyme) Efficacy[39]



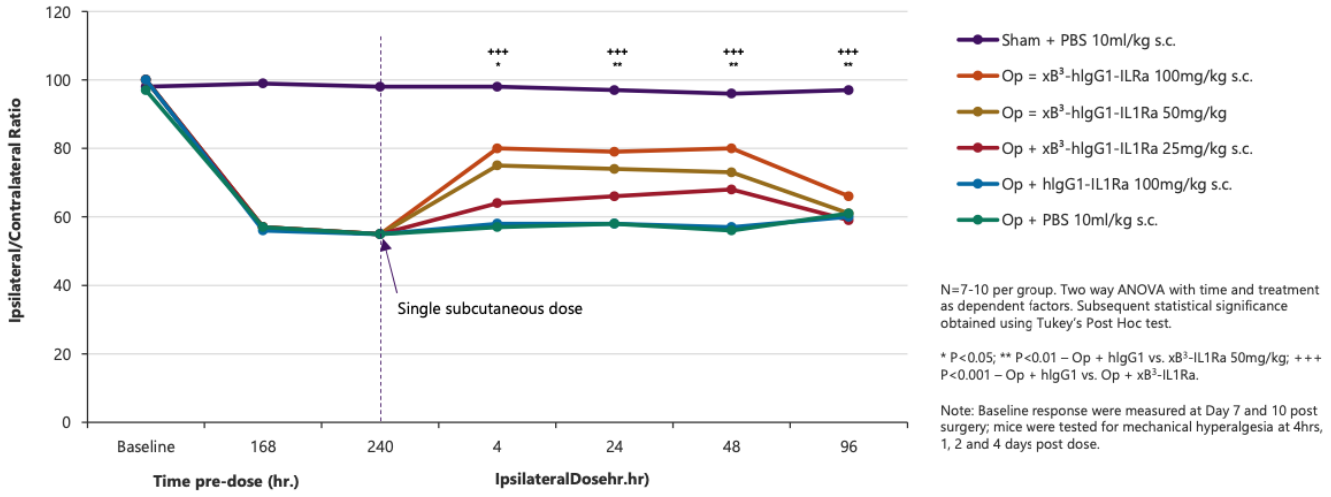
Additional Candidates

In addition to its lead products, Bioasis has multiple candidates in varying stages of pre-clinical confirmation.

IL-1RA in Neuropathic Pain

Medimmune evaluated eight blood-brain barrier platforms to deliver antibodies to the brain, including xB^3. The work done by Thom *et al.* evaluated speed of delivery, superiority to transferrin and multi-modality potential. Evaluation was performed by measuring brain parenchymal localization using confocal microscopy imaging a fluorescently labelled antibody (NIP228). Experiments measured systemic and brain pharmacokinetics in wild-type mice (kb3-hIgG1), followed by a pharmacodynamic study in a mouse neuropathic model (xB^3-hIgG1-IL1RA).

Exhibit XII – hIgG1 Localization, After Two Hours Single IV Admin. (10mg/kg)[40]



The results showed that plasma kinetics were similar between the xB^3-conjugate and unmodified NIP228 control. Brain exposure was shown to be superior for xB^3 versus the full length melanotransferrin peptide. In the neuropathic pain model, the analgesic effects induced by peripheral IL-1RA-xB^3 fusion administration were confirmed. IL1RA alone can only induce analgesia when administered intrathecally and peripheral administration does not induce analgesia. The test provided evidence of dose-dependent improvement of subcutaneously injected xB^3-IL1RA in ipsilateral/contralateral ratio.

[39] Bioasis Corporate Presentation July 2020

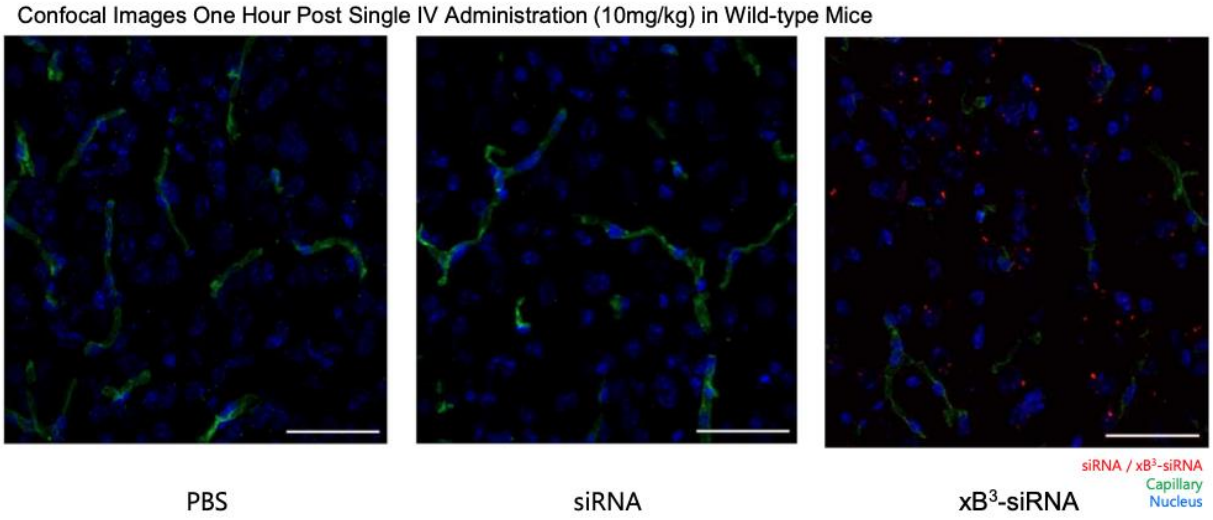
[40] Thom G, Tian MM, Hatcher JP, et al. A peptide derived from melanotransferrin delivers a protein-based interleukin 1 receptor antagonist across the BBB and ameliorates neuropathic pain in a preclinical model. *J Cereb Blood Flow Metab*. 2019;39(10):2074-2088. doi:10.1177/0271678X18772998

siRNA in Ischemic Induced Stroke Mouse Model

siRNA is an appealing payload for xB^3 as siRNA therapies have largely been challenged with their ability to cross the BBB, instead, localizing in the kidney and liver. In the case of ischemic stroke, NADPH oxidase (NOX) has been implicated. Stroke is one of the leading causes of death in North America. NOX4 is thought to contribute to the majority of oxidative stress observed in acute traumatic brain injury and has been identified in neurons, astrocytes and microglia. Furthermore, animal models that are purposely deficient in NOX4 have been shown to be strongly protected from ischemic stroke. Thus, NOX4 expression could be knocked down by an siRNA-xB^3 conjugate.

Here, we see confirmed uptake by the brain of xB^3 delivered siRNA.

Exhibit XIII – Fluorescence Microscopic Observation of xB^3-siRNA Delivery[41]



An evaluation of an anti-NOX4 xB^3-siRNA conjugate was conducted in a murine model. The mice were intravenously administered 30 mg/kg of PBS (control), siRNA or the xB^3-siRNA conjugate prior to induction of stroke. The model was induced through a middle cerebral artery occluded via filament for 60 minutes simulating stroke ischemia. After sacrifice, the brain was analyzed via chloride staining, behavioral assessment and quantitative PCR. The results showed reduction in infarct volume, improved neurological deficit and lower levels of NOX4 mRNA.

Intellectual Property

Bioasis maintains a broad patent portfolio that defends the xB^3 platform and portfolio constituents. This includes filings that support the lead candidate, xB^3-001 for the treatment of HER2+ breast cancer brain metastases. The portfolio is global with patents applied for and accepted from the World Intellectual Property Organization (WIPO), Israel, Australia, Europe, the United States, New Zealand, Japan and China among other regions.

The majority of the patents address combinations and conjugates of p97 (melanotransferrin) related to the xB^3 platform and blood brain barrier delivery vectors. Additional patents address conjugates intended for lysosomal storage diseases with claims to composition of matter, pharmaceutical compositions and methods of using p97 to deliver therapeutic agents across the BBB.

The 9,364,567 patent broadens the xB^3 claims to include more efficient and biochemically amenable p97 peptide vectors and strengthens the company's intellectual property portfolio. Below is a selection of the over 130 patents representing Bioasis patent grants or applications around the world.

[41] Bioasis Corporate Presentation July 2020

Exhibit XIV – Summary of Key Bioasis Patents[42]

Title	Patent #	Region	Filed
Fragments of p97 and uses thereof	9,364,567	US	13-Mar-14
Fragments of P97 and uses thereof	9,993,530	US	12-May-16
Fragments of P97 and uses thereof	15/974,293	US	8-May-18
Use of P97 as an enzyme delivery system for the delivery of therapeutic lysosomal enzymes	10,716,862	US	28-Feb-17
P97-IDS fusion proteins	10,392,605	US	27-Aug-15
P97 fusion proteins	2015210612	Australia	3-Feb-15
p97-polynucleotide conjugates	2015252906	Australia	1-May-15
P97-IDS fusion proteins	2015219339	Australia	12-Feb-15
Treatment of Lymphatic Metastases	WO 2020/023300	WIPO	19-Jul-19
Treatment of Gaucher Disease	WO 2019/231725	WIPO	18-May-19
Fragments of p97 and uses thereof	2,970,433	Europe	13-Mar-14
P97 fusion proteins	3,102,608	Europe	3-Feb-15
P97-ids fusion protein	3,107,562	Europe	12-Feb-15
P97 fragments with transfer activity	3,321,281	Europe	3-Aug-12

Partnerships

Bioasis is working with three other companies in partnership to develop the xB^3 platform. These partnerships are beneficial as they help validate the effectiveness of xB^3 and also provide additional funding to further develop the technology. Along with the deal, are financial incentives consisting of upfront, milestones and royalties following successful commercialization. Bioasis is now working with three partners including Prothena Corp. PLC, an unidentified leading pharma company and Chiesi Group.

In October 2018, the company signed a $34 million licensing deal with Prothena with a $1 million upfront and $33 million in milestones. The agreement will be used for Prothena to develop an xB^3 conjugate in one neurodegenerative disease indication and a time limited option to advance a conjugate in three other diseases. Prothena will receive worldwide, exclusive rights to use the xB^3 platform in the agreed indications. Prothena is based in Ireland and is developing a pipeline focused on α-synuclein in Parkinson's Disease, TTR amyloid protein for ATTR Amyloidosis among other targets and indications.

In January 2019, the company announced a joint research collaboration with a leading global pharmaceutical company. Neither the identity of the partner nor the targets pursued were disclosed; however, additional information about the collaboration may be made available as the research progresses. Under the terms of the agreement, Bioasis received $500,000 in an upfront payment. Up to $3 million in research and development costs will be also paid, at least some of which will be contracted out to others.

In late June 2020, Bioasis announced a rare diseases strategic alliance with Chiesi Group to develop the xB^3 platform with a focus on four undisclosed lysosomal storage disorder assets. The agreement provides a $3 million upfront payment and additional milestones of $138 million as well as royalties on licensed products. Chiesi will be responsible for R&D expenses. The deal confers worldwide rights to Chiesi to develop its candidates.

In February 2019, Bioasis entered into a royalty purchase agreement with XOMA LLC where the latter purchased potential future milestone and royalty rights from Bioasis related to the Prothena deal. XOMA is a biotech royalty aggregator that provides non-dilutive, non-recourse funding in return for future economic rights. Bioasis received US$300,000 for a 1% future royalty and 10% of future milestones and option payments from the Prothena license agreement. Bioasis can receive contingent payments of US$50,000 for the initiation of IND-enabling GLP toxicology studies of each of Prothena's three potentially licensed products and US$25,000 for the IND filing for three additional Prothena-licensed products. The parts of the agreement total US$225,000 of contingent IND milestone payments.

[42] Source: Author's own work, uspto.gov, Bioasis corporate filings

RISKS

All investments contain an element of risk which reflects business uncertainty and opportunity. Some investments exhibit higher predictability, with current cash flows and established sales. These enterprises will have a lower level of perceived risk while other companies that are developing an undefined, new technology have a much higher level of perceived risk.

The biotechnology space includes companies at both ends of the spectrum, from mega-cap pharmaceutical powerhouses that have multiple established products, to small operations with a handful of employees conducting preclinical studies. Many of the risks faced by the large pharmaceutical companies and smaller biotechnology-focused firms are similar; however, there are some hazards that are particular to smaller companies that have not yet established themselves or their products. The typical risks faced by companies operating in the biotechnology space include risks related to liquidity, financing & trading, clinical trials, regulatory, personnel, intellectual property, marketing, and geopolitics.

Liquidity, Financing & Trading

Regardless of a company's large target market, promising technology and leadership experience, securing funding always presents a challenge. Access to financing comes and goes in cycles. During periods of improving confidence, capital may be easy to obtain; however, during a liquidity crisis or a period of heightened risk perception, even companies with bright prospects may be in trouble if they are dependent on the financial markets to fund their work. Pre-revenue biotech firms rely primarily on equity issuance to fund their operations. The duration of drug development is considerable, and can last as long as 12 to 15 years before product revenues come in the door. Funds can be sourced through debt or grants and tax credits; however, these sources may reduce the flexibility of the company and can create difficulties if debt is unable to be repaid.

If capital is needed to sustain operations and it is not readily available, the company may be forced to suspend research and development, sell equity at a substantial discount to previous valuations and dilute earlier shareholders. A lack of funding may leave potentially promising therapies without a viable route to progress or force a company to accept onerous terms. The recent pandemic has disrupted capital markets, and any economic effects, now and in the future, are uncertain.

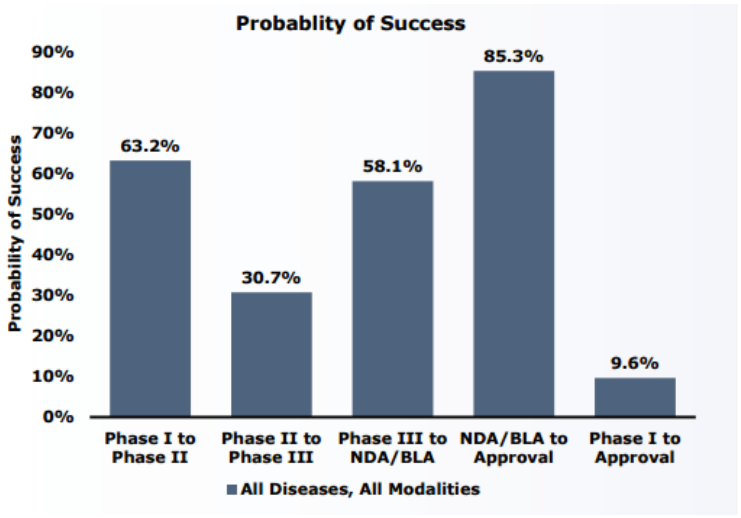
Trading volumes are lower for smaller biotech firms, creating liquidity risk for the investor and large transactions may have a material impact on share price. In periods of crisis or heightened risk perception, share price may be volatile. Companies with smaller capitalizations are typically considered riskier and changes in sentiment may adversely affect their trading prices and volumes. Smaller firms may also have less visibility, compete for investor dollars in a shallow market and be excluded from market indices.

Bioasis has endured operational losses since inception and is like to continue to do so for the foreseeable future. As all of its candidates are in the preclinical stage, it will be years before Bioasis will be able to directly or indirectly commercialize one of its products. Bioasis entered into a deal with Chiesi Group on June 29, 2020 which will provide an upfront payment of US$3 million and potential additional amounts up to US$138 million. While these funds will support near term operations, Bioasis will need to raise additional capital after funds are exhausted. Although markets have been accessible for new biotechnology investments in recent months, there is risk that they can close unexpectedly, especially during this period of macroeconomic uncertainty.

Clinical Trials

For smaller early-stage companies, investing in drug development is a lengthy process. The timeframe for conducting preclinical research to eventually commercializing a drug can take from 12 to 15 years or even longer given market and company-specific conditions. And with, on average, only one in one thousand compounds eventually making it to the market from the preclinical stage, the risks are substantial.

Exhibit XV – Success of Phased Trials and Regulatory Approval[43]



The future of a company is largely dependent on the data produced from expensive clinical trials. Due to the cost, magnitude and complexity typical of advanced trials, partners are often sought out to help finance and manage them. Partners may have competing demands which can adversely affect the work they are managing on behalf of the firm. Contract research organizations (CROs) and subcontractors must abide by strict execution and trial parameters that if violated can jeopardize trial execution or data validity. Subcontractors supervise and execute research, biometric and pharmacovigilance, which are complex tasks. Patient recruitment may be difficult. Clinical investigational centers need sufficient capacity and the candidate drug needs to be manufactured according to current Good Manufacturing Practices (cGMP) and available to administer. Finally, clinical endpoints need to achieve statistical significance to justify regulatory approval.

Development and Commercialization

Some biotechnology firms' share prices have performed well as a result of the pandemic and the biotechnology industry is frequently decoupled from the greater economy; however, many clinical trials have also been delayed and disrupted. Furthermore, biotechnology firms typically have a global presence and must navigate clinical trials, regulatory approval and marketing regulations. Companies with a long history of research success in drug development, opinion leaders and experts advocating for the product in the field will hold a more favorable position compared to those that do not.

Bioasis' candidates are all at the preclinical stage and must traverse considerable ground before they can be presented to regulatory authorities for approval. Following clearance of an investigational new drug (IND) application, Bioasis will begin conducting clinical trials. It will bear risk related to enrollment, site selection, drug manufacturing, CROs and subcontractors. Although Bioasis' indications may qualify for orphan designation they may also experience difficulty enrolling due to small populations in these disease areas.

Regulatory and Legislative

Regulatory risk centers on a sponsor's interactions with regulatory authorities such as the FDA and EMA related to clinical trial requirements, marketing approval of the candidate, expedited pathways and the associated oversight. Previous success with the FDA or other regulatory agencies is another attractive attribute for a sponsor. Success is uncertain and may take years depending upon the needs and desires of the determining authority. Substantial expense is undertaken to bring a molecule or compound through clinical trials and address all of the regulatory agencies' concerns. Some accelerated pathways to approval are available such as those outlined in the Orphan Drug Act and the Breakthrough Therapy designation; however, changes in sentiment or perceived safety of drugs approved through these pathways could influence the regulatory environment to demand a more rigorous process and these pathways may be extended or additional requirements may be put in place.

Companies with exposure to the United States' healthcare system have experienced legislative disruption with the Patient Protection and Affordable Care Act (PPACA) of 2010 and the Health Care and Education Reconciliation Act. These legislative actions impose non-deductible excise taxes on pharmaceutical manufacturers or importers that

[43]Clinical Development Success Rates 2006-2015. David Thomas, Justin Burns, John Audette, Adam Carroll, Corey Dow-Hygelund, Michael Hay.

sell branded prescription drugs to government programs, which can increase drug prices as levies are passed through to consumers. Under the PPACA, some firms are required to provide a discount on branded prescription drugs equal to 50% of the government-negotiated price, for drugs provided to certain patients who fall in the Medicare coverage gap. PPACA increases the level of Medicaid rebates payable by manufacturers of brand-name drugs from 15.1% to 23.1% and requires collection of rebates for drugs paid by Medicaid managed care organizations. The PPACA also introduced changes to the 340B drug discount program that expanded the patient population with access to the drugs, though at a discounted price. Prior to the PPACA, Congress had adopted the Medicare Prescription Drug, Improvement and Modernization Act of 2003. The Act modified Medicare reimbursement and coverage policies for prescription drugs.

Personnel

Biotechnology companies rely on the expertise and leadership of their executives to make both technical and strategic decisions and investments. Due to the highly competitive nature of the industry, many talented personnel are highly sought after and firms with the best resources are in the strongest position to attract talented leaders. Sometimes, leadership turnover can be high in small biotech firms. Change in management is disruptive and can dramatically change the course of a firm. Personnel turnover can put a small company at a disadvantage when compared to larger firms with more specialized personnel. Furthermore, there can be risks and challenges associated with adding talent as the firm grows in size, especially with capital constraints. The size of the firm, volatility of stock price and a large component of compensation made up of equity-based compensation can deter certain talent from joining the firm or make it difficult to retain.

As a small firm, Bioasis has a limited number of personnel, all of whom play an important role. The loss of Dr. Rathjen, President and CEO, would be material negative as would the loss of Mei Mei Tian, Ph.D., Vice President of External Research, who has been with Bioasis for over a decade and is primarily responsible for Bioasis' research and development.

Intellectual Property

Intellectual property is the lifeblood of biotechnology development. Even with government regulation, patent protection is not guaranteed. The patent application process requires time, capital and the disclosure of substantial detail on the company's technology which is eventually made public. Despite submission of an application, patents may not be granted. Patent protection requires legal resources that a startup biotech firm may not have. Furthermore, countries differ in the degree and type of intellectual property protection. Some firms may in- or out-license intellectual property, which exposes parties holding the patent to risk of adherence and litigation regarding the parameters of the licensing. Finally, patent protection is temporary and there is no guarantee that the firm will benefit from the patent protection before it expires.

Market Risk

Successful marketing of approved drug candidates relies on adoption by patients and providers. The approved drug must have convincing clinical trial data and maintain a favorable reputation amongst prescribers. Marketing is expensive and requires an experienced sales force and a presence in the marketing area. Marketed products remain under surveillance and any unexpected adverse effects damage the product's reputation. Furthermore, the risk of a competing or superior therapy is a continuous threat. Insurance coverage is also important. Rapidly obtaining a preferred position on health plan and payor formularies is critical to achieving target penetration rates. If health plans and payors cannot agree on appropriate pricing for the drug and the compound fails to offer a significant benefit above standard of care, patients may be out of pocket for the costs. Historically, orphan drug coverage varies between national and nonnational plans, with coverage of 86% and 77%, respectively. A quarter of these drugs are considered to have low, or almost nonexistent coverage rate.[44]

[44] Institute of Medicine (US) Committee on Accelerating Rare Diseases Research and Orphan Product Development; Field MJ, Boat TF, editors. Rare Diseases and Orphan Products: Accelerating Research and Development. Washington (DC): National Academies Press (US); 2010. C, Medicare Part D Coverage and Reimbursement of Orphan Drugs. Available from: https://www.ncbi.nlm.nih.gov/books/NBK56190/

If Bioasis' portfolio candidates successfully clear clinical hurdles, the products must then be marketed. In smaller patient populations with unmet needs, often patients and physicians will use the product and penetration is high. However, development and other fixed costs will be spread across a smaller population, requiring high drug prices to support the effort.

Bioasis' strategy seeks to enter into licensing agreements and partnerships. There is risk that the firm will not establish additional or beneficial partnerships. Furthermore, as Bioasis's licensing revenue would most likely be tied to partner performance, Bioasis would be at risk of the partners' ability to achieve milestones and generate revenue.

Geopolitical

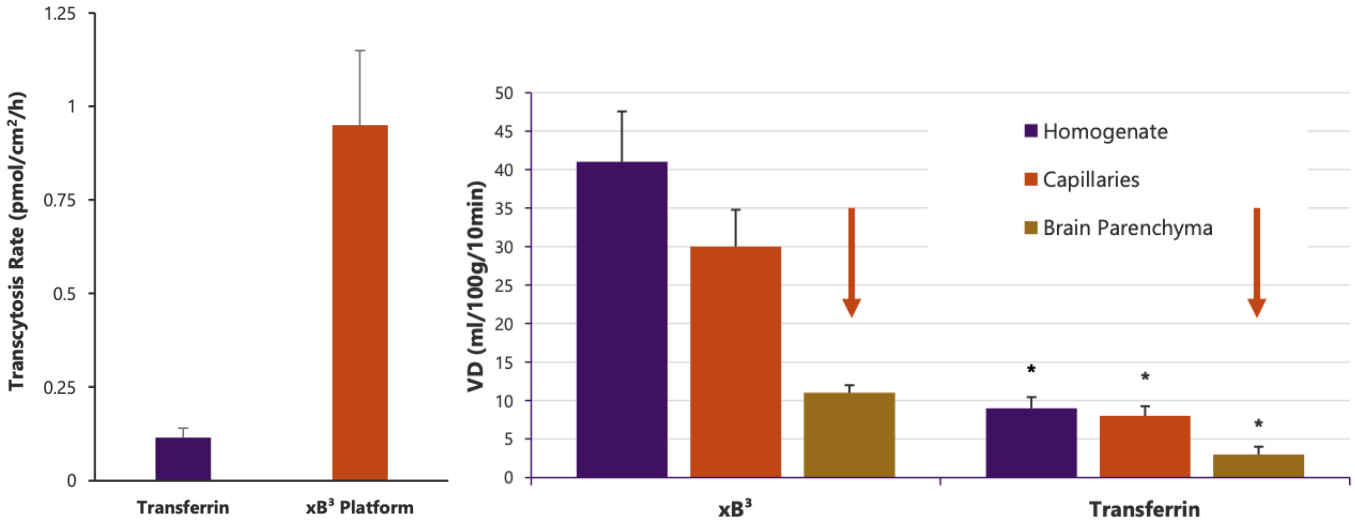
Recent trade tensions between the US and China threaten the world economy and have been exacerbated during the ongoing pandemic. There has been a cross-pollination of capital and drug development between China and North America in recent years which may slow as a result of the trade and political dispute between the countries. This conflict may reduce the availability of capital, partnerships and future development deals between companies in the two nations. The UK seceded from the European Union in 2020, potentially creating additional difficulties for companies seeking to obtain approval and marketing rights throughout Europe. Previously, a drug approved under the centralized procedure in the European Union would be approved in all member states. However, with the withdrawal of the UK, additional efforts and expense may be required to obtain marketing approval in this large European market.

Competitors, Peers and Competing Therapies

Bioasis' peers and competitors can be categorized by the technology used and indications pursued. There are other blood-brain barrier penetrating approaches being developed, as well as drugs that can permeate the blood-brain barrier on their own, without the assistance of a transiting vehicle. Bioasis' lead candidates are targeting HER2+ brain-metastatic breast cancer and Gaucher Disease.

The performance of xB^3 has been evaluated against competing technologies. In independent validation,[45] Medimmune compared xB^3 to seven other candidates before proceeding with xB^3 based on speed of delivery, superiority to transferrin[46] and multimodality potential. xB^3 has also been shown to be superior in comparison to transferrin and transferrin-based technologies in terms of transcytosis and parenchyma distribution.

Exhibit XVI – xB3 Transcytosis and Distribution Volume Compared to Transferrin[47]



Several companies have blood-brain barrier penetrating technologies including Denali, Genentech, Roche, Armagen and Angiochem. Denali, Genentech Roche and Armagen base their technology on transferrin. Similar to Bioasis, Armagen bases its technology on LRP1, transferrin and insulin receptors. Angiochem also leverages the LRP1 endo/transcytosis pathway engineering drugs that bind to the receptor.

Exhibit XVII – Competing BBB-penetrating technologies and payload compatibility[48]

Features	Bioasis xB³ Platform	Denali	Genentech	Roche	Armagen	Angiochem
% injected dose in brain	4-6%	1-1.5%	1-1.5%	1-1.5%	1-1.5%	~1.5%
Mode of Action	LRP1	TfR	TfR	TfR	TfR and IR	LRP1
Payload Modalities						
Antibodies	✓	✓	✓	✓	✓	✓
Enzymes	✓	✓			✓	
siRNA	✓					
Small molecules	✓					✓

[45] Thom, G., *et al.* A peptide derived from melanotransferrin delivers a protein-based interleukin 1 receptor antagonist across the BBB and ameliorates neuropathic pain in a preclinical model. Journal of Cerebral Blood Flow & Metabolism, 2018.
[46] xB3 is based on melanotransferrin that, despite naming, is different than transferrin and operates on different receptors.
[47] Bioasis July 2020 Corporate Presentation
[48] Bioasis July 2020 Corporate Presentation

In April 2020 the FDA approved Seattle Genetics' (SGEN) tucatinib which is marketed as Tukysa. The drug is indicated in combination with trastuzumab and capecitabine for treatment of adult patients with advanced unresectable or metastatic HER2-positive breast cancer, including patients with brain metastases who have received one or more prior anti-HER2-based regimens in the metastatic setting. Tucatinib is a tyrosine kinase inhibitor, a class which blocks cell signaling, growth and division and acts as a targeted therapy. Forecasts are optimistic for Tukysa with revenues of over $1 billion estimated for 2025.[49]

Bioasis is targeting a variety of indications independently and in partnership with lead and secondary candidates targeting HER2+ breast cancer in the brain and Gaucher Disease. These indications affect smaller patient sub-populations. For HER2+ brain-metastatic breast cancer, standard of care is limited to surgery, whole-brain radiotherapy and stereotactic radiosurgery. Other options include systemic therapy, supportive care, and palliative care.[50] Antibody therapies targeting HER2+ breast cancer have been developed; however, they do not cross the BBB on their own. The most common treatment for GD is enzyme replacement therapy. The enzyme typically supplemented is imiglucerase (Cerezyme), which is a recombinant analogue of β-glucocerebrosidase and is produced by Sanofi Genzyme. Bioasis's xB^3-007 is a Cerezyme conjugate. Other glucocerebrosidase derivatives include velaglucerase alfa, manufactured by Shire, and taliglucerase alfa (Elelyso), marketed by Protalix and Pfizer. Substrate reduction therapy (SRT) is another way to control GD that reduces the amount of GL-1 produced. The two SRT available for Gaucher Disease are miglustat (Zavesca) and eliglustat (Cerdelga), which are small molecules marketed by Actelion and Genzyme, respectively.

Exhibit XVIII – Peers and Competitors[51]

Ticker	Company	Price	MktCap (MM)	EV (MM)	Therapeutic Area
RHHBY	Roche	$42.50	$291,061	$308,600	Brain shuttle for antibodies
DNLI	Denali Therapeutics	$44.15	$4,679	$4,130	Transferrin based delivery
CNSP	CNS Pharma	$1.83	$30.5	$27.8	Small BBB-penetrating molecule for GBM
Pvt	2-BBB				G-Technology, CNS targeted liposome
Pvt	AIM Biotech				Stem cell derived in vitro BBB models
Pvt	Angiochem				LRP1 based BBB penetration
Pvt	Armagen				HIR, transferrin, LRP1
Pvt	BrainsGate				Electrical stimulation of SPG to cross BBB
Pvt	Braizon Therapeutics				DDS delivery platform
Pvt	CarThera				Ultrasound for BBB opening
Pvt	Cyclenium Pharma				CMRT macrocycles
Pvt	Evox Therapeutics				Exosomes for LSD
Pvt	Genentech				Transferrin based penetration, bispecific antibodies
Pvt	Innov. Calif. Biosci. Int'l				SMART antibody derivatives that penetrate BBB
Pvt	Nortis, Inc.				3D organ modeling system to create BBB in vitro
Pvt	Ossianix				BBB shuttles, variable new antigen receptor fragments
Pvt	Vect-Horus				VECTrans receptor-mediated transport
BIOAF	Bioasis	$0.29	$19.5	$19.3	Melanotransferrin based LRP1 transcytosis

[49] Source: Evaluate Pharma, Tukysa worldwide product sales.
[50] Ramakrishna N, Temin S, Chandarlapaty S, et al. Recommendations on Disease Management for Patients With Advanced Human Epidermal Growth Factor Receptor 2-Positive Breast Cancer and Brain Metastases: ASCO Clinical Practice Guideline Update. *J Clin Oncol*. 2018;36(27):2804-2807. doi:10.1200/JCO.2018.79.2713
[51] Price and market capitalization data is as of October 16, 2020.

MANAGEMENT PROFILES

Deborah Rathjen, Ph.D., MAICD, FTSE, Chief Executive Officer, President and Executive Chair

Dr. Rathjen joined Bioasis as the Executive Chair of the Board in December 2018, and then was appointed as President and CEO in March 2019, bringing substantial life sciences leadership experience. Prior to joining Bioasis, Dr. Rathjen served as the CEO and Managing Director at Bionomics and previous to that she was at Peptech Limited where she gained experience and expertise in business development, licensing and intellectual property legal defense. Dr. Rathjen also brings experience in company financing, M&A, R&D and commercialization. Dr. Rathjen served as CEO at NEUROFIT and Prestwick Chemical PC SAS and also served on the boards of AusBiotech and CRC Cancer Therapeutics. She is recognized internationally and is the recipient of the 2004 AusBiotech President's Medal, 2006 Flinders University Distinguished Alumni Award, 2009 BioSingapore Asia Pacific Biotechnology Woman Entrepreneur of the Year, 2009 Regional Finalist Ernst & Young – Entrepreneur of the Year, 2014 BioPharm Industry Awards Woman Executive of the Year and was also included in the 2015 top 50 most influential Australian businesswomen by *The Australian*. Dr. Rathjen holds her Bachelor of Science in immunology from Flinders University, and received her doctorate in immunology from Macquarie University.

Christine Antalik, Chief Financial Officer

Ms. Antalik joined Bioasis as Chief Financial Officer in January 2019. She is also currently Owner and Managing Principal at Founders Bridge Advisors, LLC. Previously, she served as CFO at life sciences companies Aeromics, Inc., SurgiQuest Inc., and Hematech, LLC, and as Controller at Higher One, Tangoe, Inc., Centerprise Advisors, Inc., and Verigen, Inc. Over the course of her career, Ms. Antalik has closed over USD 800 million in deal transactions through IPO, private and venture equity and debt financing. She also brings experience in recapitalization, M&A, and obtaining research grants. Ms. Antalik has launched and grown firms, and has had four consecutive exits over eleven years. At SurgiQuest, she led the sale of the company for USD $265 million after filing its S-1. She closed a USD $108 million IPO at HigherOne, Inc. At Hematech, LLC, Ms. Antalik led the sale of the company to Kirin Brewery Company, Ltd. She earned her Bachelor of Science in business administration from Western New England College.

Mei Mei Tian, Ph.D., Vice President, Head of External Research

Dr. Tian joined Bioasis in 2012 as a Senior Scientist. In 2017 she became Vice President, Head of External Research. Dr. Tian's expertise lies in melanotransferrin, the basis of xB^3 technology. Dr. Tian has accumulated over a decade of experience working with melanotransferrin in both academia and industry. At the University of British Columbia, she investigated melanotransferrin in melanoma malignancy as well as melanotransferrin cellular uptake. Dr. Tian received her doctorate in microbiology and immunology from the University of British Columbia.

May Orfali, MD, Chief Medical Officer

Dr. Orfali joined the firm in February 2020, bringing over two decades experience in drug and clinical development in rare diseases and oncology. In addition to serving as CMO of Bioasis, she is currently the CMO of PYC Therapeutics, on the board of Balanced Biotech, INC., Vice President, Medical of SSI Strategy, Owner and Principal Consultant at Rare Disease and Oncology Consulting, LLC. In the past, Dr. Orfali has served as CMO at Orphan Technologies, CANbridge Life Sciences, Ltd., and has held executive roles at Pfizer, Artisan Pharma, Inc. Aeris Therapeutics, Inc. Cubist Pharmaceuticals, and Boston Scientific. At CANbridge Life Sciences, she led the clinical development of oncology assets in glioblastoma multiforme and esophageal cancer, filing an NDA in China. At Pfizer, Dr. Orfali led drug development across multiple rare disease assets in hematology, sickle cell disease, hemophilia, endocrinology, gene therapy and TTR-amyloidosis. She was a practicing physician at Dana-Farber Cancer Institute, specializing in CNS Oncology Clinical Research. Dr Orfali completed her Fellowship in Pediatric Oncology/ Hematology at Massachusetts General Hospital and holds a Doctorate in Medicine from Baghdad Medical School and a Master's in business administration from Cambridge University.

Graeme Dick, Director, Investor Relations

Mr. Dick has been with Bioasis since 2011. In addition to his investor relations role at Bioasis, Graeme currently serves as President at Colwell Capital Corp. and serves in investor relations at Magnetic North Acquisition Corp., Integrated Compliance Solutions; LLC and CannaIncome Fund Galway Gold, Inc. He also is a Joint Venture Partner at Caribou, LLC. Over the course of his career in biotechnology, oil and gas, infrastructure, mining and technology, Mr. Dick has raised more than USD $400 million in capital. He holds a Bachelor of Management from the University of Lethbridge.

Financial Results

Corporate Milestones

Bioasis was founded in 2007 by investor Rob Hutchison who acquired key research developed at the University of British Columbia for further development. The company was later publicly listed in 2008 on the TSX Venture Exchange and on the OTCQB. Over the next decade, Bioasis researchers developed the Transcend platform through research collaborations and partnerships with industry. In 2017, the Transcend platform was renamed xB^3. xB^3 has distinguished itself through its ability to deliver antibodies, enzymes, siRNA and small molecules across the BBB to the brain parenchyma. Select milestones over the recent past and near term future are included below.

- xB^3 platform technology licensing agreement with Prothena – October 2018
- Agreement with leading pharmaceutical company for xB^3 preclinical research – January 2019
- Appointment of Christine Antalik as CFO – January 2019
- Appointment of Dr. Deborah Rathjen as President and CEO – March 2019
- Rare diseases strategic alliance with Chiesi Group – June 2020

In March 2019, Deborah Rathjen, Ph.D. was appointed as President and CEO of Bioasis. Dr. Rathjen had previously been appointed to the company's Board and has served as executive chair since December 2018. Dr. Rathjen's appointment replaces Dr. Mark Day who departed the company. In June 2019, Bioasis announced that it had received feedback from the FDA regarding pre-IND submission for xB^3-001. The company had briefed the FDA the month prior. The FDA's response marked the completion of the pre-IND process for xB^3-001. On June 29, 2020, Bioasis and Chiesi Global Rare Diseases, a business unit of Chiesi Group, announced a partnership that provided exclusive license of xB^3 for delivery of undisclosed enzymes in treatment of lysosomal storage disorders. As part of the agreement, Bioasis will receive upfront payment of USD $3 million with potential additional milestone payments up to USD $138 million plus royalties on net sales from licensed products. Chiesi Group is responsible for all costs associated with R&D and commercialization of the four undisclosed programs.

In June 2020, the company satisfied its obligation to pay interest to the holders of its 7.5% unsecured debentures due on June 23, 2020 by issuing common shares. On July 7, 2020, the firm announced that it had granted stock options to acquire a total of 1,495,000 common shares effective June 30, 2020 at $0.31 per share to directors and officers of the company. The options expire five years from grant date.

On July 27, 2020 Bioasis filed its fiscal year first quarter financial statements and MD&A for the period ending May 31, 2020. The company reported the April 2020 redemption of its 15% unsecured debentures, issued November 8, 2019 at a price equal to 110% of the principle amount of the debentures. It also reported the issuance of equity to satisfy all interest obligations through the date of the 15% unsecured debentures redemption.

In its first quarter fiscal year 2021 filing for the period ending May 31, 2020, Bioasis reported no revenue. General and administrative expenses were CAD $578,616, down 57% compared with the CAD $1,359,433 recorded in the same quarter for the previous year, driven primarily by a decrease in salaries in consulting, legal and finance fees, share-based compensation, investor relations, marketing, travel, insurance and amortization. The decrease in salaries was due to a reduction in staff and outsourcing of investor relations. Travel was restricted by the pandemic and contributed to the reduction in expenses. R&D expense was CAD $445,267, down 33% year-over-year compared with CAD $667,156 in first quarter FY:20. The decrease was due to lower pre-clinical expenses, salaries, consulting fees and benefits and share based compensation, partially offset by higher patent maintenance, legal costs and filing fees.

Other expenses for the quarter of CAD $31,423 related primarily to the extinguishment of Bioasis's 15% debentures, interest expense, and foreign exchange losses offset by the change in fair value of warrant liability. The result for the quarter was a net loss of CAD ($1.1) million compared to a net loss of CAD ($1.5) million in the first quarter of the prior year. At quarter end, Bioasis held cash and cash equivalents of CAD $190,000 and burned CAD $394,210 during the quarter. Following the end of the reporting period, Bioasis entered into an agreement with Chiesi Group which provided USD $3 million in upfront payments.

VALUATION

Bioasis has a portfolio of preclinical candidates that are pursuing a variety of brain targets ranging from metastatic HER2+ breast cancer to Gaucher Disease. The company's platform serves as a conduit for other drugs that cannot cross the BBB, allowing them to pass into the brain parenchyma and address diseases there. The most advanced asset is xB^3-001, a combination of the xB^3 peptide linked to trastuzumab which is expected to enter the clinic by early 2022. xB^3-007 and xB^3-004 are both expected to enter the clinic by 2H:22. Other candidates, which include undisclosed targets from Chiesi and Prothena are forecast to begin clinical trials in 2024. We anticipate an eight year clinical development and regulatory approval period prior to sales.

Our valuation approach employs a discounted cash flow model. Assumptions include a discount rate of 15% and a terminal growth rate of -10%. We further assume that each candidate will achieve median sales levels equivalent to $435 million based on research conducted by Tay-Teo *et al.*[52] Royalties represent the revenues from future partners commercializing approved products. No royalties are owed to UBC, and we assume that Bioasis receives a 33% royalty on global sales of approved products. Bioasis has entered into an agreement with XOMA where the latter will receive a 1% royalty on the partnership deals with Prothena and 10% of milestones and option payments. We assume that Bioasis receives a 10% royalty for partnered assets net of other obligations.

Exhibit XIX – Bioasis Development Timeline and Royalties[53]

xB^3 Platform	Clinic	NDA/BLA	Sales	Indication	Est Royalty
xB^3 001	1H:22	2029	2030	HER2+ mBC	33%
xB^3 007	2H:22	2029	2030	Gaucher	33%
xB^3 007	2H:23	2030	2031	FTL Dementia	33%
xB^3 004	2H:22	2029	2030	Pain, Epilepsy, MS	33%
xB^3 Chiesi	2024	2031	2032	Lysosomal storage	10%
xB^3 Prothena	2024	2031	2032	Neurodegen	10%

Due to the early stage of Bioasis' portfolio and the large number of candidates, we assume a median sales income for each product rather than forecasting each market individually. We model two years to complete a Phase I, a duration of two years for a Phase II and a duration of three years for a Phase III. Our forecasts call for another year to submit and receive marketing approval from the FDA or other regulatory authorities. Following approval, we project a two-year ramp to average revenues starting with 85% to the average[54] in year one and 100% of the average by year three. In some cases, expedited treatment may be granted by regulatory authorities at which time we will reflect the change in our model.

Bioasis is expected to partner any internal approved candidates for commercialization with a large pharma that has an existing sales force. Partners who develop their own products using the xB^3 platform will commercialize their own sponsored products. Research and development is forecast to be from CAD $2 to $3 million until Phase II trials start. Then it will rise by approximately CAD $1 million per year until reaching CAD $10 million per annum in 2027. After all current in-development products are commercialized, research and development spending falls to zero. General and administrative expenses are forecast to be about CAD $2.1 million in 2021, rising to CAD $2.6 million in 2024 then inflating by 3% per year thereafter. We anticipate a Canadian tax rate of 25%.

As more details become available and as candidates move into the clinic we will update our forecasts accordingly. Based on the assumptions identified in our discounted cash flow model and after adjusting for anticipated share issuance, restricted stock and options outstanding, we generate a current valuation of USD $0.60 per share.

[52] Tay-Teo, K. *et al.* Comparison of Sales Income and Research and Development Costs for FDA-Approved Cancer Drugs Sold by Originator Drug Companies. JAMA Netw Open . 2019 Jan; 2(1): e186875.
[53] Source: Author' own work.
[54] 85% x $435 million = $370 million.

CONCLUSION

Bioasis has developed an important carrier platform able to ferry several types of molecules across the blood brain barrier where they can treat diseases of the brain. This platform designated xB^3 consists of a twelve amino acid sequence based on the iron-binding human protein melanotransferrin. It binds to the LRP1 receptor, endocytosing the amino acid sequence and linked therapy carrying them across the BBB and into the brain parenchyma. xB^3 can bind to antibodies, enzymes, siRNA and small molecules and may serve an important unmet need to deliver in development and existing medicines into the brain which otherwise could not cross.

Substantial preclinical research has been conducted demonstrating xB^3's superiority to transferrin and other competing platforms in both the quantity of dose and type of molecule that can be transported into the brain. Additional *in vivo* work has shown xB^3's ability to shuttle Herceptin into a mouse brain and reduce tumor number and size in the organ. Similar work has been conducted transporting enzymes across the BBB also in mice.

Bioasis offers several candidates being developed in house and by partners. The two leading internal compounds are xB^3-001 and xB^3-007. xB^3-001 binds to Herceptin and is indicated for HER2+ cancer in brain metastases while xB^3-007 is combined with Cerezyme and intended to treat type 2 Gaucher Disease, which has brain involvement. These two candidates are expected to enter the clinic in fiscal year 2022. Bioasis' partnerships are with the rare diseases division of the Italian Chiesi Group, Prothena Corporation and an unidentified leading pharmaceutical company. These partnerships are focused on lysosomal storage disorders and neurodegenerative diseases.

Key reasons to own Bioasis shares:

- **Best in class xB^3 blood brain barrier penetrating technology**
  - **Non-transferrin based transcytotic pathway**
- **Addresses a major hurdle to CNS therapy**
- **High selectivity for BBB and CNS parenchyma**
- **Preserves payload function and pharmacodynamics**
- **Can deliver antibodies, enzymes, siRNA and small molecules**
- **Lead indications in HER2+ metastatic breast cancer and Gaucher Disease**
- **Broad licensing and funding opportunities with partners**
  - **Chiesi Group**
  - **Prothena Corporation**
  - **Leading pharma company**
- **Diversified preclinical portfolio able to address multiple CNS disorders**
- **120+ patents and pending applications across 10+ patent families**

Bioasis has a broad portfolio and a technology platform that can be developed both internally and externally for many therapies that can have activity in the brain. The blood brain barrier is effective at keeping out both the bad and the good; however, when there is disease in the brain, the xB^3 peptide can help shuttle needed medicines into this protected space. We anticipate parallel development of several xB^3 compounds that will enter the clinic over the next several years. Our valuation work assumes median drug revenue for each of the programs underway and applies a discount related to the anticipated 8% weighted probability of success. Based upon our work, we initiate on Bioasis Technologies Inc., with a valuation of $0.60 per share.

PROJECTED FINANCIALS

Bioasis Technologies Inc. - Income Statement in $CAD – February 28 Fiscal Year End

Bioasis Technologies Inc.	2020 A	Q1 A	Q2 E	Q3 E	Q4 E	2021 E	2022 E	2023 E
Total Revenues ($CAD)	**$606**	**$0**	**$250**	**$275**	**$300**	**$825**	**$1,600**	**$1,750**
General & Administrative	$3,174	$579	$500	$490	$502	$2,071	$2,117	$2,420
Research & Development	$2,034	$445	$500	$510	$556	$2,011	$2,490	$2,568
Income from operations	($4,602)	($1,024)	($750)	($725)	($758)	($3,257)	($3,007)	($3,238)
Other Income	$592	($7)	$0	$0	$0	($7)	$0	
Interest Income	($47)	($25)	$0	$0	$0	($25)	$0	
Pre-Tax Income	($4,056)	($1,055)	($750)	($725)	($758)	($3,288)	($3,007)	($3,238)
Provision for Income Tax	$0	$0	$0	$0	$0	$0	$0	$0
Tax Rate	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*
Net Income	**($4,056)**	**($1,055)**	**($750)**	**($725)**	**($758)**	**($3,288)**	**($3,007)**	**($3,238)**
Net Margin	*-669%*							
Reported EPS	**($0.07)**	**($0.02)**	**($0.01)**	**($0.01)**	**($0.01)**	**($0.05)**	**($0.04)**	**($0.04)**
YOY Growth								
Basic Shares Outstanding	62,271	64,824	68,000	68,200	68,320	67,336	69,025	88,125

Source: Company Filing // Zacks Investment Research, Inc. Estimates

HISTORICAL STOCK PRICE

Bioasis Technologies Inc. – Share Price Chart in $USD[55]

[55] Source: Zacks Research System

DISCLOSURES

The following disclosures relate to relationships between Zacks Small-Cap Research ("Zacks SCR"), a division of Zacks Investment Research ("ZIR"), and the issuers covered by the Zacks SCR Analysts in the Small-Cap Universe.

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