Zacks Small-Cap Research

August 17, 2015
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Matinas BioPharma Holdings, Inc. (MTNB-OTCQB)

MTNB: Matinas' MAT9001 Beats Vascepa® In Head-To-Head Trial…

Current Recommendation	**Buy**
Prior Recommendation	N/A
Date of Last Change	10/28/2014
Current Price (08/17/15)	$0.85
Target Price	**$2.50**

UPDATE

On August 13, 2015, Matinas Biopharma Inc. (MTNB) filed its Form 10Q reporting financial results for the second quarter of 2015. Matinas generated Contract Research Revenue from the NIH in the amount of $77k directly related to grants for MAT2203 and MAT2501 in the second quarter of 2015. Cash burn for the quarter was $2.3 million. As of June 30, 2015, Matinas had $6.6 million in cash on the books. We believe the company has enough cash to fund operations through the first quarter 2016.

We are maintaining our 'Buy' rating and have increased our price target on the shares to $2.50.

SUMMARY DATA

52-Week High	**$1.42**
52-Week Low	**$0.34**
One-Year Return (%)	**6.25**
Beta	**N/A**
Average Daily Volume (sh)	**61,931**
Shares Outstanding (mil)	**57**
Market Capitalization ($mil)	**$48**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**N/A**
Insider Ownership (%)	**0.05**
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 2014 Estimate	**N/A**
P/E using 2015 Estimate	**N/A**

Risk Level	**High**
Type of Stock	**Small-Growth**
Industry	**Med-Drugs**

ZACKS ESTIMATES

Revenue
(In millions of $)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2014	0 A	0 A	0 A	0 A	0 A
2015	0 A	0 A	0 E	0 E	0 E
2016					1.5 E
2017					1.5 E

Earnings per Share
(EPS is report figures)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2014	-$0.07 A	-$0.08 A	-$0.08 A	-$0.09 A	-$0.32 A
2015	-$0.07 A	-$0.04 A	-$0.05 E	-$0.06 E	-$0.22 E
2016					-$0.17 E
2017					-$0.13 E

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WHAT'S NEW?

Financial Review

On August 13, 2015, Matinas Biopharma Inc. (MTNB) filed its Form 10Q reporting financial results for the second quarter of 2015. Matinas generated Contract Research Revenue from the NIH in the amount of $77k directly related to grants for MAT2203 and MAT2501 in the second quarter of 2015. We expect that this contract revenue will be approximately level throughout 2015. The company reported no other revenues in the quarter, as expected. Net loss for the first quarter was $2.4 million, or $0.04 per share.

R&D expense for the second quarter of 2015 was $1.4 million, compared to $1.1 million for the second quarter of 2014, and was in-line with expectations for the quarter. The increase in R&D expense was primarily due to an increase in clinical development related costs related to the human trials for MAT9001 and costs associated with MAT2203 and MAT2501. We expect R&D expenses will increase over the quarters as Matinas continues to develop its product candidates. G&A expense for the second quarter of 2015 was $1.1 million compared to $1.3 million for the quarter ended June 30, 2014, and below our expectations. We do believe that G&A expense will increase in upcoming quarters largely due to Matinas increasing staff personnel as it expands operations to prepare for and execute upon its R&D programs.

Cash burn for the quarter was $2.3 million. As of June 30, 2015, Matinas had $6.6 million in cash on the books. As a reminder to investors, on April 9, 2015, Matinas closed on an $8.5 million private placement financing that included significant insider participation. The company issued 20.0 million shares of common stock at $0.50 per share. The company also issued 20.0 million five-year warrants to investors at $0.75 per share. The warrants are callable by Matinas if the stock trades above $3.00 per share for 20 consecutive days. If exercised, the warrants would provide an additional $14.25 million in cash to the company. The placement agent, Aegis Capital, also received 2.0 million warrants at $0.50 per share and 2.0 million warrants at $0.75 per share. We believe the company has enough cash to fund operations through the first quarter 2016.

An Update on the Pipeline

MAT9001 vs. Vascepa®

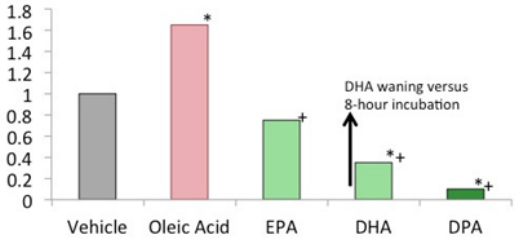
On June 1, 2015, Matinas announced data from a head-to-head study comparing its Phase 3 ready MAT9001 to Amarin's (AMRN) Vascepa® (icosapent ethyl). The primary goal of the 42 patient study was to compare the pharmacokinetic and pharmacodynamic effects of the two drugs, as well as look at key secondary endpoints in triglyceride and cholesterol reduction and biomarkers of cardiovascular disease. The top-line results of the study, showed that Matinas' drug is far superior to Vascepa®, at least with respect to bioavailability and triglyceride reduction. Full data was subsequently presented in a poster entitled "Effects of MAT9001, an Omega-3 Fatty Acid Drug, Compared with Eicosapentaenoic Acid Ethyl Esters, on Triglycerides, Lipoprotein Cholesterol and Related Variables in Hypertriglyceridemic Subjects," at the National Lipid Association Scientific Sessions on June 13, 2015.

Brief Overview of MAT9001

MAT9001 is a uniquely engineered omega-3 fatty acid formulation that Matinas is developing for the treatment of severe hypertriglyceridemia (patients with total triglyceride levels > 500 mg/dL). The differentiating aspect of MAT9001 from other omega-3 prescription products is the inclusion of docosapentaenoic acid (DPA) in the optimized mixture. Preclinical studies suggest that DPA has the potential to confer a unique therapeutic profile compared to existing omega-3 products, particularly in its ability to exert synergistic anti-hyperlipidemic effects in combination with statins.

For example, the gene regulatory effects of DPA in rat liver cells include the down-regulation of genes such as SREBP-1c, acetyl coenzyme-A carboxylase, ChREBP, and fatty acid synthetase that are known targets of other omega fatty acids. Notable, however, is DPA's unusual potency in reducing the expression of RNA encoding HMG-CoA reductase, the enzyme target of statins. By down-regulating gene expression DPA has the potential to act synergistically with statins in reducing the activity of this well-established drug target (Kaur et al., 2011). Reduced enzyme production is a result of the action of DPA at the gene level, and the protein that is produced is inhibited by the statin.

Effect of Various Omega-3 Fatty Acids on HMG-CoA Reductase RNA Levels in Rat Liver Cells

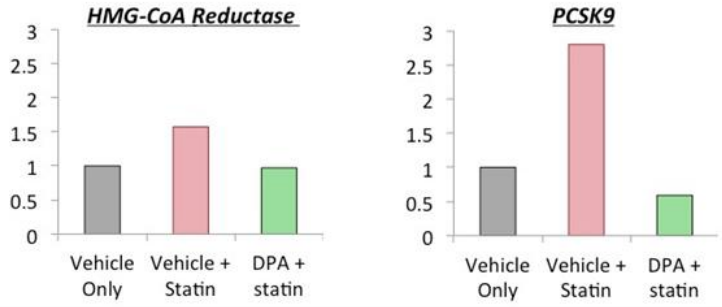


Relative mRNA expression levels after 48 hour incubation of Rat Liver Cells with FA
* Significant difference (p<0.05) from Control (EC)
\+ Significant difference (p<0.05) from Oleic Acid (OAC)

Source: Kaur et al.; PLEFA (2011) 85, 155-161

In vivo results support the *in vitro* finding and its suggestion of potential synergy with statins in man. The figure below shows HMG-CoA reductase and PCSK9 gene levels in fatty Zucker rats treated with vehicle (control), vehicle plus statin, or DPA plus statin. Results show that the RNA encoding each drug target is up-regulated, probably as a compensatory mechanism, in rats treated with statin only. The addition of DPA abolishes this compensatory response, and in the case of PCSK9, drives RNA levels below those of rats not treated with statin.

Relative Levels of mRNA for HMG-CoA Reductase and PCSK9 in Rat Liver - In Vivo

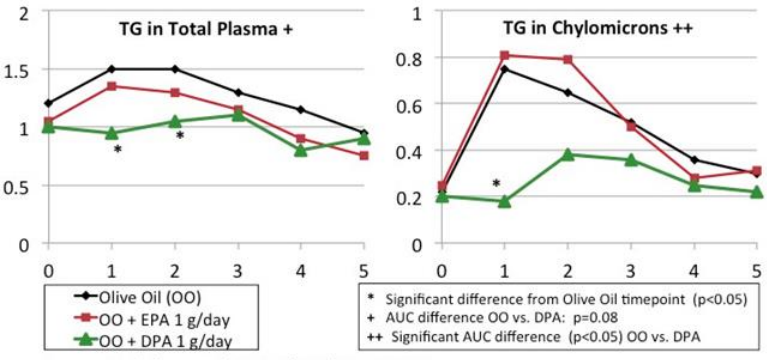


Relative mRNA expression levels in Rat liver after 4 weeks dosing (400 mg DPA/kg*day)

Source: Matinas BioPharma research; unpublished

In addition to the effects described above, DPA has several other types of activity. These include an aspirin-like platelet inhibitory and an anti-angiogenic effect through the suppression of the expression of the gene for the VEGF-2 receptor. Pure DPA has been examined for antihyperlipidemic activity in a small 10 patient Australian cross-over trial. DPA was observed to prevent post-meal excursions in plasma triglyceride levels to a greater extent than EPA. This effect appears to arise from reduction in the production of chylomicrons (Linderborg et al., 2013).

Human Post-Meal TG levels (mmol/L) over 5 Hours

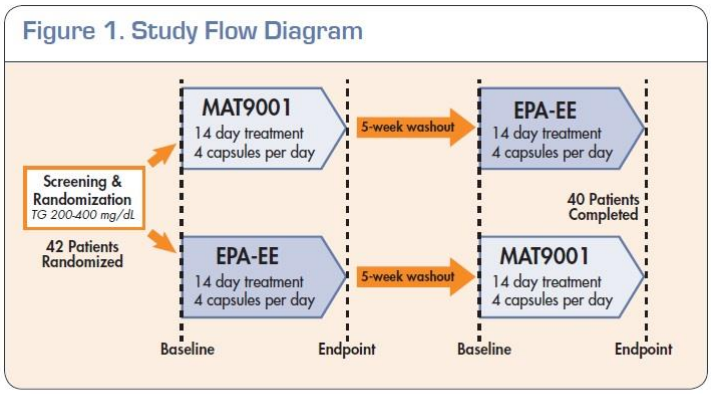


Source: Linderborg et al.; PLEFA (2013) 88, 313-319

MAT9001 is a proprietary and patented mixture of DPA, EPA, trace levels of DHA and certain other omega-3 fatty acids. Given the known properties of EPA and DHA, and the potent ability of DPA to regulate RNA expression for HMG-CoA reductase and other hyperlipidemia targets, this formulation has the potential to be a highly differentiated drug candidate.

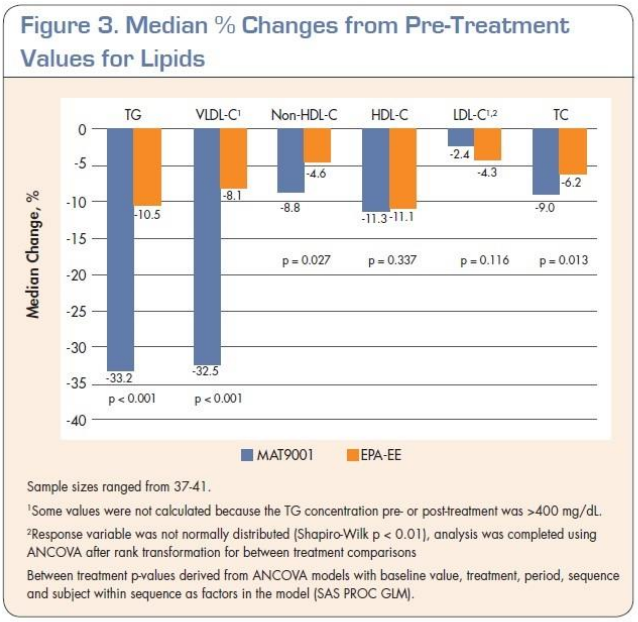
Phase 2 Data Blows Vascepa® Away

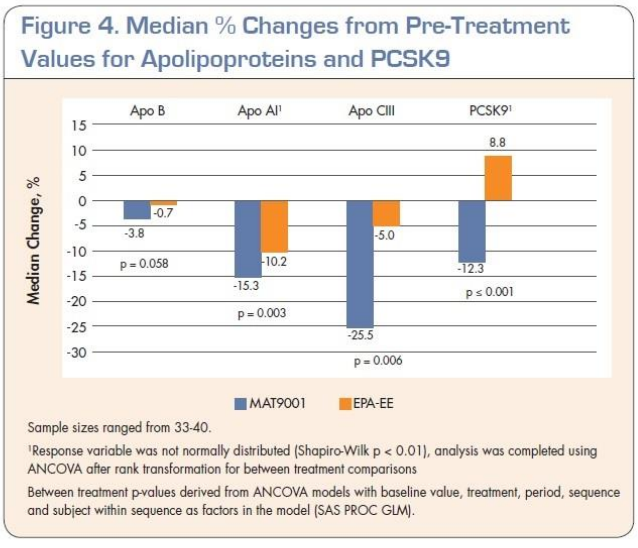
The Phase 2 study was an open-label, randomized, two-way crossover trial that enrolled 42 patients with high triglycerides in a range between 200 mg/dL and 499 mg/dL. Patients were randomized to receive either 4 grams of Vascepa® or MAT9001, and were treated for 14 consecutive days, at which time their triglyceride scores were recorded and compared to baseline. After a five week wash-out period, patients then crossed over to receive the other drug, as seen in the picture below. Scores were then recorded again and averaged.



Sources: Maki, K.; Keane, W.; Bobotas, G. // Matinas Biopharma, Inc. // Pharma Medica Research Inc.

Results released from the study suggest that MAT9001 has 6-fold higher bioavailability than commercially available Vascepa® at 4 grams per day when compared to baseline adjusted AUC and C_{max}. In terms of triglyceride reduction, patients on MAT9001 showed a statistically superior reduction compared to patients on Vascepa®, 33.2% vs. 10.5% ($p<0.001$). The data also demonstrated a statistically significantly greater reduction in total-cholesterol, VLDL-cholesterol and non-HDL-cholesterol for MAT9001 versus Vascepa®. Effects on HDL were not statistically different. In addition, MAT9001 demonstrated a statistically significant reduction in PCSK9 versus Vascepa®, which did not decrease PCSK9 levels.

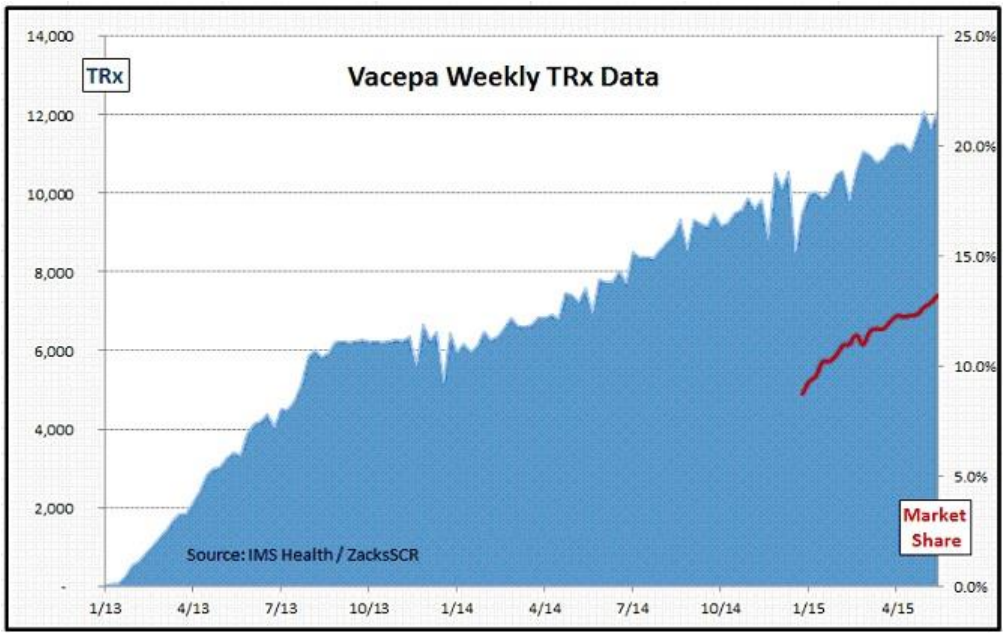




Sources: Maki, K.; Keane, W.; Bobotas, G. // Matinas Biopharma, Inc. // Pharma Medica Research Inc.

Vascepa® Gaining Traction, but Still a Long Way to Go

Amarin reported $15.6 million in Vascepa® sales in the first quarter 2015. Sales came from approximately 137,000 in total prescriptions (source: IMS Health), up 5% sequentially in the quarter from the three months ending December 31, 2014. Prescriptions in the second quarter 2015 came in at 157,000 (source: IMS Health), a 15% sequential uptick from the first quarter 2015, with the company recently reporting $17.7 million in sales in the second quarter 2015. As of the week ending May 22, 2015, Amarin has captured approximately 11.7% of the total U.S. Omega-3 market, with trends suggesting the company will continue to add roughly 0.2% market share per week. We note that generic omega-3-acid ethyl esters (Lovaza® + generics) currently hold the other 88% of the market.



Vascepa® is currently approved for patients as an adjunct to diet to reduce triglyceride levels in adults with severe hypertriglyceridemia (≥500 mg/dL). Amarin is currently enrolling patients in an 8,000 subject outcome study called REDUCE IT, with a goal of expanding the Vascepa® label to include a reduction of major cardiovascular events in high risk patients on statin therapy and triglycerides between 200 and 499 mg/dL. An interim look at the data is expected during the first half of 2016, with final study data expected in early 2018. As a reminder, a U.S. FDA Advisory committee recommended against approval of Vascepa® (9 to 2) in this expanded patient population in October 2013.

Unfortunately, Vascepa® is not yet profitable for Amarin. The company lost $62.9 million in the second quarter 2015, driven by $26.1 million in SG&A and $12 million in R&D expense. Amarin burned $37.6 million in cash during the quarter. We suspect that Amarin needs to get Vascepa® annualizing well over $100 million in sales before the company becomes cash flow positive. At the current rate, assuming the interim look at REDUCE IT in 2016 only concludes that the trial should continue on as planned, we do not suspect that Amarin will achieve cash flow breakeven levels until 2017 off the current Vascepa® commercial opportunity.

Next Steps for MAT9001

On October 20, 2014 the company filed its MAT9001 IND with the U.S. FDA. The next step for the company is to conduct a U.S. Phase 3 registration study. We suspect this study will be very similar to the Amarin MARINE study that offered top-line data in November 2010. This was a 229-patient study that showed patients with severe (≥500 mg/dL) hypertriglyceridemia on 4 grams per data of Vascepa saw an average triglyceride reduction of 33% ($p<0.0001$). The trial took approximately 11 months from start to data. We suspect the all-in cost of a similar study to be conducted by Matinas will be in the area of $15 to $20 million. We are suspecting that Matinas will get underway with the Phase 3 study later this year.

With positive data, we believe Matinas will seek U.S. FDA approval for the severe (≥500 mg/dL) hypertriglyceridemia patient population, the same exact market that Amarin is targeting now with Vascepa®. We note this is the same market that AstraZeneca received approval for EpaNova® (omega-3-carboxylic acids) with in

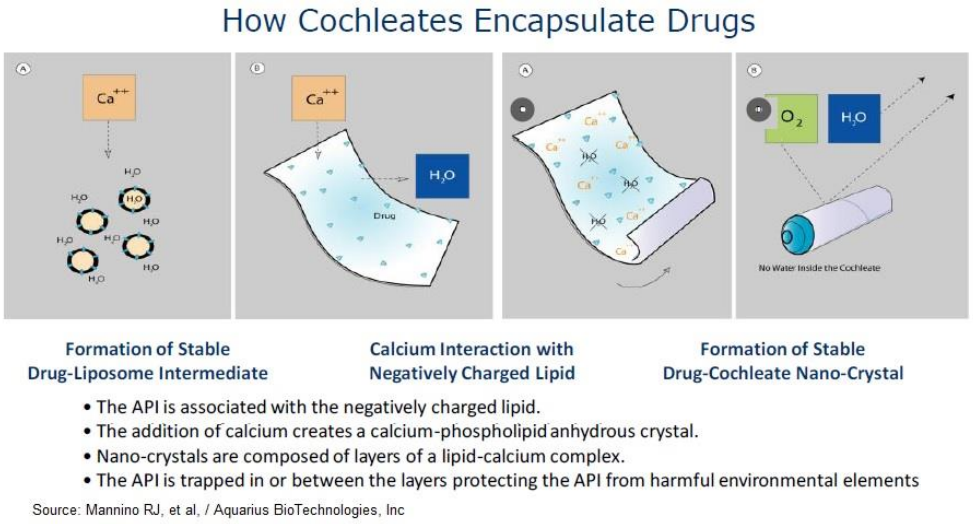
May 2014. AstraZeneca has yet to launch EpaNova, despite the fact that they paid $323 million in cash to acquire the drug in May 2013. If successfully approved, we suspect that Matinas will directly target Vascepa® with its marketing, assuming MAT9001 fairs similarly in terms of beating Vascepa® head-to-head based on the comparative Phase 2 data announced in June 2015.

Until then, however, Matinas and Amarin share similar fates. Matinas management would like nothing-more than to see Vascepa® continue to gain market share against generic omega-3-acid ethyl esters, and eventually turn cash-flow positive for Amarin. Quite simply, the more evidence that exists that the severe hypertriglyceridemia market is attractive for investment, the better it is for Matinas and its superior MAT9001. If Amarin can continue to gain traction with Vascepa®, it makes for low-hanging fruit once MAT9001 is on the market. And if the REDUCE IT study is positive for Amarin in 2018, Matinas now has a pathway to potentially sell or out-license MAT9001 to a larger commercial partner willing to spend the necessary funds to go down the same path with MAT9001 as Amarin did with Vascepa®, assuming the data continues to show that MAT9001 is the superior drug.

Quick Review of the Aquarius Cochleate Formulation Delivery Platform

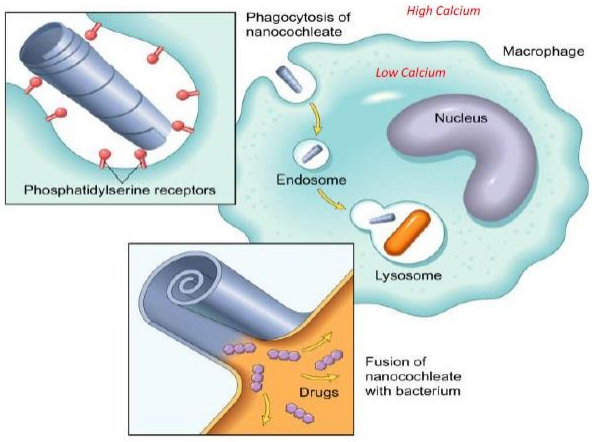
As a reminder, On January 30, 2015, Matinas announced the establishment of a lipid-based, anti-infective platform with the acquisition of Aquarius BioTechnologies, Inc. This was the Bioral™ technology previously owned by BioDelivery Sciences International (BDSI) from 2002 to 2009. BioDelivery was unable to move forward with the technology because sourcing the key raw material to create the cochleate technology, dileoylphosphatidylserine, was just too expensive (~$60 per gram). Inventors of the technology have been able to redesign the formulation to source phosphatidylserine from soy protein. As such, the cost is now less than $1 per gram, thus making it viable drug delivery technology worth pursuing in clinical development. Ultimately, BDSI decided to focus on its BEMA™ technology instead of Bioral™, throwing all available resources to obtain approval for BEMA Fentanyl. With the acquisition of the technology, Matinas significantly expands its pipeline while complementing the company's focus in lipidomics.

The drug delivery platform developed by Aquarius is centered on the use of cochleates, which are stable, crystalline phospholipid-cation delivery vehicles that are composed of soybean phosphatidylserine (PS) and calcium. The compounds have a unique multilayered structure and no internal aqueous space. "Encochleated" molecules within the interior of the cochleate structure remain intact resulting in an increase of oral bioavailability, lower toxicity, and the opportunity for intracellular targeting. As the following figure shows, cochleates are produced from a large, continuous, solid, lipid bilayer sheet rolled up in a spiral or as stacked sheets, with no internal aqueous space.



The unique structure of the cochleate means that the compounds inside are protected, even though the outer layers of a cochleate may be exposed to harsh environmental conditions or enzymes. The figure below shows how cochleates deliver target drug within the cell. Macrophages readily engulf (phagocytosis) cochleates into vesicles (endosomes), which become free in the cytoplasm and can merge into lysosomes. Cochleates open when exposed to the cytoplasmic low calcium concentration, releasing the entrapped target drug.

Cochleates: Cell-targeted Delivery



Source: Mannino RJ, et al, / Aquarius BioTechnologies, Inc

Cochleates themselves appear to have a nontoxic profile and to improve the safety of toxic drugs. They are composed of safe products: phosphatidylserine and calcium. Phosphatidylserine is a natural component of all biological membranes and is most concentrated in the brain. In fact, it has been studied as a potential nutrient supplement that may play a role in the support of mental functions in the aging brain (Engel *et al*., 1992). Thus, there is little worry for adverse effects from the cochleates themselves.

CAmB (MAT2203)

The most advanced product in Aquarius' pipeline is a lipid-crystal nano-particle formulation of Amphotericin B (CAmB) that Matinas has labeled as MAT2203. Amphotericin B (AmB), the gold standard for systemic antifungal drugs, is one example of a well-established, highly efficacious systemic antifungal drug that has a 50+ year history of intravenous (IV) therapy. The drug is highly potent and has utility as an anti-parasitic agent as well. Intravenous formulations such as AmBisome® and Fungizone® remain among the most effective agents in the treatment of life-threatening systemic fungal infections, including aspergillosis, cryptococcosis (torulosis), North American blastomycosis, systemic candidiasis, coccidioido-mycosis, histoplasmosis, zygomycosis including mucormycosis due to susceptible species of the genera *Absidia, Mucor,* and *Rhizopus,* and infections due to related susceptible species of *Conidiobolus* and *Basidiobolus*, and sporotrichosis.

No oral formulations of AmB are currently commercially available given the poor bioavailability of the drug. Although some patients are able to tolerate the IV injection, many experience localized and systemic side effects associated with IV administration of the drug. For example, the Side Effect & Drug Interactions section of the AmBisome® prescribing information includes warnings on renal impairment, hepatic impairment, febrile reactions, fever accompanied by shaking chilies, normochromic and normocytic anemia, musculoskeletal pain, anaphylactic reactions, dermatologic reactions, including Steven-Johnson syndrome, neurologic reactions, including convulsions, tinnitus, and vertigo, hematological reactions, and injection site reactions. Sales of the perceived "least toxic" formulation of AmB, AmBisome®, were $388 million in 2014, up 10% from 2013.

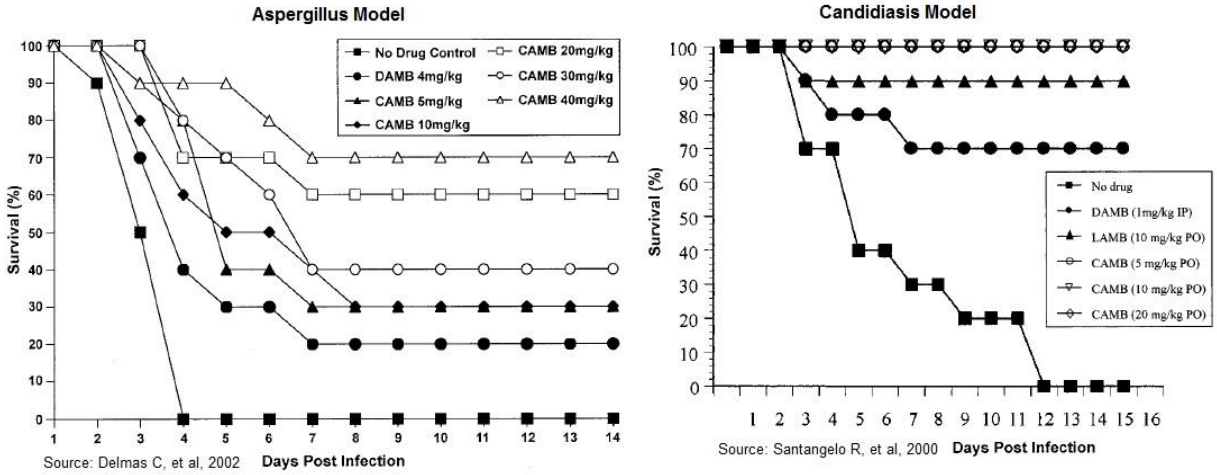
Some of the above side effects can be eliminated or reduced, specifically the injection site reactions and potentially the hematological, hepatic, and renal impairments, by oral administration. As such, we believe there would be a significant market for an orally-available AmB product that offered superior convenience of dose, superior tolerability and safety, and comparable efficacy.

CAmB Proof-of-Concept

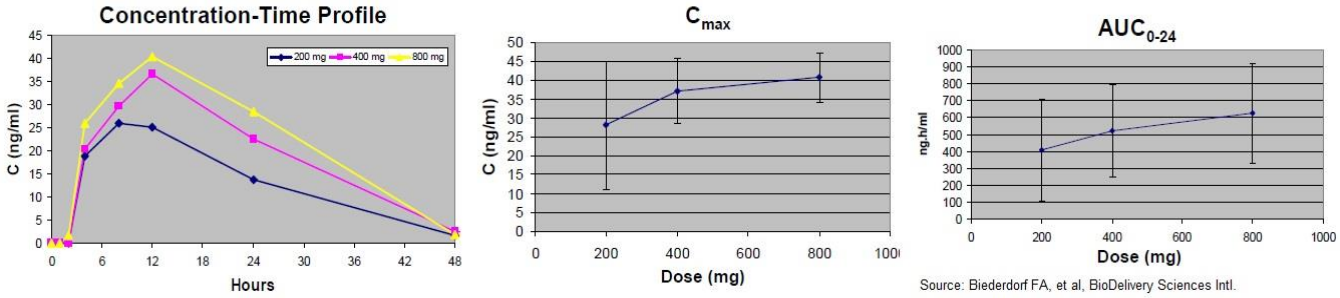
We found several papers showing the efficacy and CAmB in murine models of Aspergillosis and Candidiasis. The graph on the left below shows the efficacy of CAmB in a murine model of Aspergillosis. Survival of mice pretreated with cyclophosphamide at 200 mg/kg and then infected with *A. fumigatus* and given oral CAmB daily at a dose of 5, 10, 20, 30, or 40 mg/kg/day was compared to intraperitoneally-delivered amphotericin B (DAmB) at a dose of 4 mg/kg/day. Results show a significant increase in survival relative to that of untreated (sham-treated) control animals, with high statistical significance (Antimicrobial Agents and Chemotherapy, August 2002: 46,8:2704-2707).

The graph on the right below shows the survival of mice infected with *C. albicans,* treated oral CAmB at 5, 10, and 20 mg/kg, compared to oral liposomal amphotericin B (LAmB, AmBisome®) at 10 mg/kg and intraperitoneally-

delivered amphotericin B (DAmB, Fungizone®) at a dose of 1 mg/kg per day. The results show impressive survival for the oral CAmB formulation, superior to both the LAmB and DAmB formulations (Antimicrobial Agents and Chemotherapy, Sept 200: 44,9:2356-2360).



A single dose, double blind, dose escalating Phase 1 human clinical trial was conducted by BioDelivery Sciences International (BDSI) with oral CAmB (Bioral™) designed to assess the safety and pharmacokinetics of the compound. A total of 48 subjects were planned for participation across three dosing cohorts, with 16 subjects per cohort. Within each cohort, 12 subjects received active drug (200, 400, or 800 mg CAmB) and four received placebo. Results show that CAmB was well tolerated at single oral doses of 200 and 400 mg, with good dose proportionality and pharmacokinetics.



All treatment-emergent adverse events (TEAEs) were mild except for one instance of “upper respiratory tract infection” that was moderate in a patient taking 800 mg CAmB. In addition, a number of subjects in the 800 mg dosing cohort reported mild gastrointestinal tract adverse events, but no laboratory abnormalities of other serious safety issues were reported in the Phase 1 study. The study provides support for a planned multi-dose pharmacokinetic study and Phase 2 efficacy studies.

Planned Phase 2a Study

The next step in the clinical development of CAmB is to move into Phase 2a study, hopefully during the third quarter 2015. The company is working with the National Institute of Allergy and Infectious Diseases (NIAID) of the National Institutes of Health to fund the planned Phase 2a study. The NIH will provide funding, clinical sites, physicians, and patients. Matinas only has to supply drug. That's a heck of a good deal, as it not only greatly reduces the cost to the company but also provides access to some of the best doctors and facilities in the country to run the trial. The final protocol is still being agreed upon with the NIH, but we suspect that the study will enroll roughly 25-30 patients in a dose titration, open-label format where each patient starts out on 3 mg/kg CAmB, with the potential to up-titrate to a higher dose after two weeks of treatment based on the physician’s discretion.

The initial target population will be those patients with refractory mucocutaneous candidiasis infections. These infections no longer respond to azole treatment and typically occur in patients who are immunocompromised (e.g advanced cancer, organ transplant, or viral infection). When this occurs, a patient will typically be treated with IV antifungal agents that are more likely to have toxic side effects. This dose optimization will help guide the design of

future clinical studies with CAmB. We believe the trial will take only a few months to complete, and that initial data will be available by the first quarter 2016.

How Big is CAmB?

Compounds like amphotericin B work by binding to ergosterol, a component of the fungal cell membrane. This binding leads to increased cellular permeability and inhibition of fungal cell growth. Amphotericin B has activity against a broad spectrum of invasive fungi, and thus it was the standard of care for many systemic fungal infections. The drug is fungicidal, which means it kills the invading fungal infection, as oppose to azoles like fluconazole or voriconazole that are fungistatic (only halt the spread of the infection). Unfortunately, the high toxicity of intraperitoneal amphotericin B, which shows up at around 1 mg/kg is roughly equal to the therapeutic dose, thus creating a very small therapeutic window for DAmB use. Gilead's liposomal formulation, AmBisome® (LAmB) has improved tolerability up to the 10 mg/kg range. Work done by BioDelivery science shows that oral delivery of CAmB resulted in no overt adverse events at doses up to 90 mg/kg in animal studies.

We believe amphotericin B, a broadly effective and power drug, has limited use today ($388 million in sales in 2014) because of the toxicity, mainly nephrotoxicity, of the drug. As a result of this toxicity, amphotericin is primarily used either very early on in the treatment paradigm until toxicity shows up, or as a last resort for patients with few other options. Because the drug is administered via intravenous infusion, there is no out-patient use. As a result, when patients leave the hospital, they often leave on less effective azoles or echinocandins. In 2013, Pfizer (PFE) reported $775 million in sales of voriconazole (Vfend®), while Merck (MRK) reported $309 million in sales of posaconazole (Noxafil®). The former market leading product, Pfizer's Diflucan® (fluconazole), now available as a generic, reported peak sales of $1.17 billion in 2003. In 2013, Merck reported $660 million in sales of caspofungin (Cancidas®) while Astellas reported $307 million in sales of micafungin (Mycamine®). These are less effective drugs with usage far greater than AmB due to the fact that they are much less toxic.

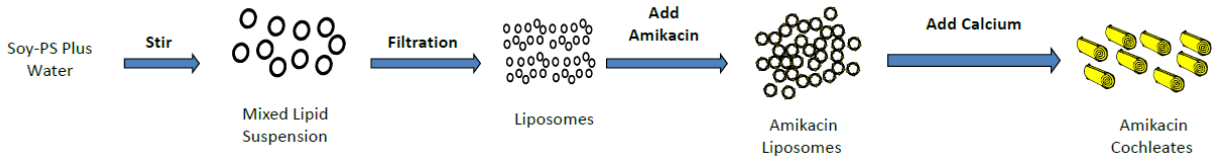
We believe the value proposition for CAmB – being able to prescribe an oral amphotericin B product both in the hospital and after the patient goes home, in a broad population, without overt fears of nephrotoxicity – is rather powerful. CAmB, a fungicidal drug, has significantly less developing resistance, unlike what is now being seen with azoles and echinocandins (Kauffman A, et al., 2015). We believe this is something payors will look very favorably upon, as long hospital stays and resistant infections add significant cost to the system.

Depending upon the efficacy and safety profile, we believe an orally-available encochleated amphotericin B could have tremendous uptake. As noted above, Pfizer's Diflucan® (fluconazole) posted peak sales in excess of $1.1 billion, and we see the drug as far less powerful than amphotericin B. There is potential for paradigm shift in how invasive fungal infections are treated in this country based on the concept of CAmB. Of course, this is all highly contingent upon clinical trial results. This is why we see the Phase 2a data coming in the fourth quarter 2015 as a significant catalyst for Matinas shares.

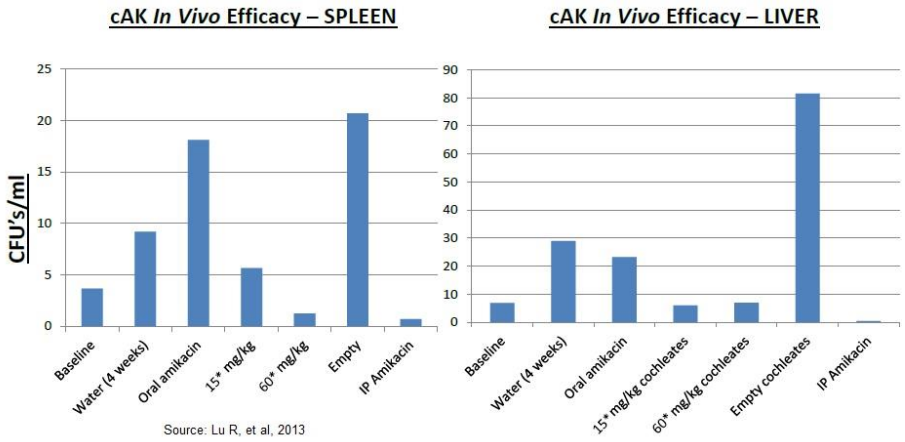
CAK (MAT2501)

MAT2501 is a lipic-crystal nano-particle formulation of amikacin that is currently in preclinical development. Amikacin is an aminoglycoside antibiotic most commonly used to treat severe, hospital-acquired infections, including Gram-negative infections. The drug is administered via IV or intramuscular administration. All aminoglycosides carry the potential risk of nephrotoxicity, with the risk being greatest in those with impaired renal function. A reduction in dosage is usually necessary if evidence of renal dysfunction occurs. In addition, treatment with aminoglycosides can cause neurotoxicity in the form of hearing loss, numbness, skin tingling, muscle twitching, and convulsions.

Due to the fact that the drug can generally only be tolerated at low doses, and the inherent difficulty in treating Gram-negative infections, amikacin is often used with other antibiotics, such as beta lactams. For these reason, an improved formulation of amikacin that would reduce the potential for toxicity and allow for oral dosing is clearly warranted. Formulation work with amikacin and the cochleate technology has been optimized to achieve maximum efficiency for delivery of the target drug.



Proof-of-concept testing in animals has been conducted with C-Amikacin by testing the efficacy of the compound in mice infected with *Mycobacterium avium* complex (MAC), a group of genetically related bacteria belonging to the genus *Mycobacterium*. Twelve mice for each tested group were infected by tail vein injection. After seven days, six mice were harvested and the number of MAC in the spleen was quantified to establish bacterial load. The mice were then treated with various amikacin preparations for two weeks, after which time the mice were harvested and the bacterial load in the spleens was quantified. The results shown below indicate that encochleated amikacin was just as effective as free amikacin when administered intraperitoneal (IP), and far superior to non-optimized orally administered amikacin or an "empty" cochleate control.



The concept of CAK is similar to that of CAmB. Amikacin is a powerful, effective drug with low use today due to the toxic effects of the drug and the rather poor in vivo efficacy compared to the in vitro efficacy. Matinas believes that formulating amikacin with the cochleate technology has the potential to greatly improve the in vivo efficacy of the drug while reducing the toxic side-effects. Management is currently conducting pre-clinical toxicology studies with MAT2501. Similarly to MAT-2203, Matinas is working closely with the NIH on MAT2501 development. We anticipate the company wrapping up the animal toxicology studies shortly, which could position management to meet with the U.S. FDA for a pre-IND meeting in the third quarter 2015. If all goes well, we could see the U.S. IND filing before the end of the year.

Preclinical Data on Encochleated Atovaquone

On July 27, 2015, Matinas announced that preclinical data on encochleated atovaquone (CATQ) will be presented at IDWeek 2015 October 7-11 in San Diego. We look forward to reviewing this oral presentation on the company's novel lipid-crystal nano-particle delivered formulation of atovaquone entitled, "Pharmacokinetics and Efficacy of Encochleated Atovaquone (CATQ) in Murine Model of Pneumocystis," which was a collaborative effort among researchers at the National Institutes of Health (NIH), the University of Cincinnati, New Jersey School of Medicine at Rutgers University, and Matinas BioPharma. Atovaquone is an anti-infective agent that is indicated for the prevention and treatment of pneumocystis pneumonia (PCP), a condition that is often seen in immunocompromised individuals. CATQ is formulated using Matinas BioPharma's proprietary cochleate delivery technology and is currently under preclinical development in collaboration with the National Institutes of Health Clinical Center's Critical Care Medicine Department.

Conclusion and Recommendation

Earlier in 2015, Matinas BioPharma acquired Aquarius Biotechnologies, and with it the company's cochleate formulation technology and MAT2203, an oral amphotericin B candidate for the treatment of serious fungal infections.

In April 2015, Matinas secured roughly $8.5 million in cash through a private placement. Based on our financial model, we believe the company now has enough cash to fund operations over the next twelve months, but more importantly, over these next twelve months we see several catalysts on the horizon that could lead to valuation expansion and position the company for a NASDAQ listing and public offering in 2016. These catalysts include:

→ Approval from the U.S. FDA to begin the Phase 3 registration program with MAT9001

→ Initiation of a Phase 2a study with MAT2203, with data expected in the fourth quarter 2015
→ Pre-IND meeting and U.S. IND filing on MAT2501 in the fourth quarter 2015

In terms of valuation, the key drivers of outperformance at Matinas are Phase 3 ready MAT9001 and Phase 2 ready MAT2203. Successful completion of the CAmB Phase 2 study would validate the opportunity that Matinas has with MAT2203, and we believe that an encochleated amphotericin B could be a potential $500 million or more if commercialized with the right pharmaceutical partner. Post the Phase 2 data, we believe MAT2203 will begin to factor more into the market value of Matinas. For example, if we assume MAT2203 gets approved in 2019 and has peak sales of $500 million in 2024, with a 25% discount rate and price/sales ratio of 5x, with only a 20% probability of success to the program, the asset is worth approximately $65 million in value. We see MAT2501, another potential $500 million or more opportunity, as worth $25 million today given the early-stage nature of the compound.

For MAT-9001, we are concerned with the fact that Amarin could only muster $17.7 million in sales of Vascepa® in the second quarter 2015. That being said, the total prescription trajectory (see graph above) is encouraging and Amarin seems likely, barring a complete failure of REDUCE IT in early 2016, to achieve cash flow positive operations in 2017. As noted above, AstraZeneca acquired the EpaNova product in May 2013, pre-approval, for $323 million. Amarin's current enterprise value is approximately $500 million. This would seem to suggest to us that if Matinas is successful in Phase 3 with MAT9001, shortly after the Phase 3 results the drug could be worth $300 million in value. We are giving the company a 25% chance as success, and admitting that after the success of the Phase 2 data noted above, this is extremely conservative. Nevertheless, NPV analysis pegs the drug at around $60 million in value.

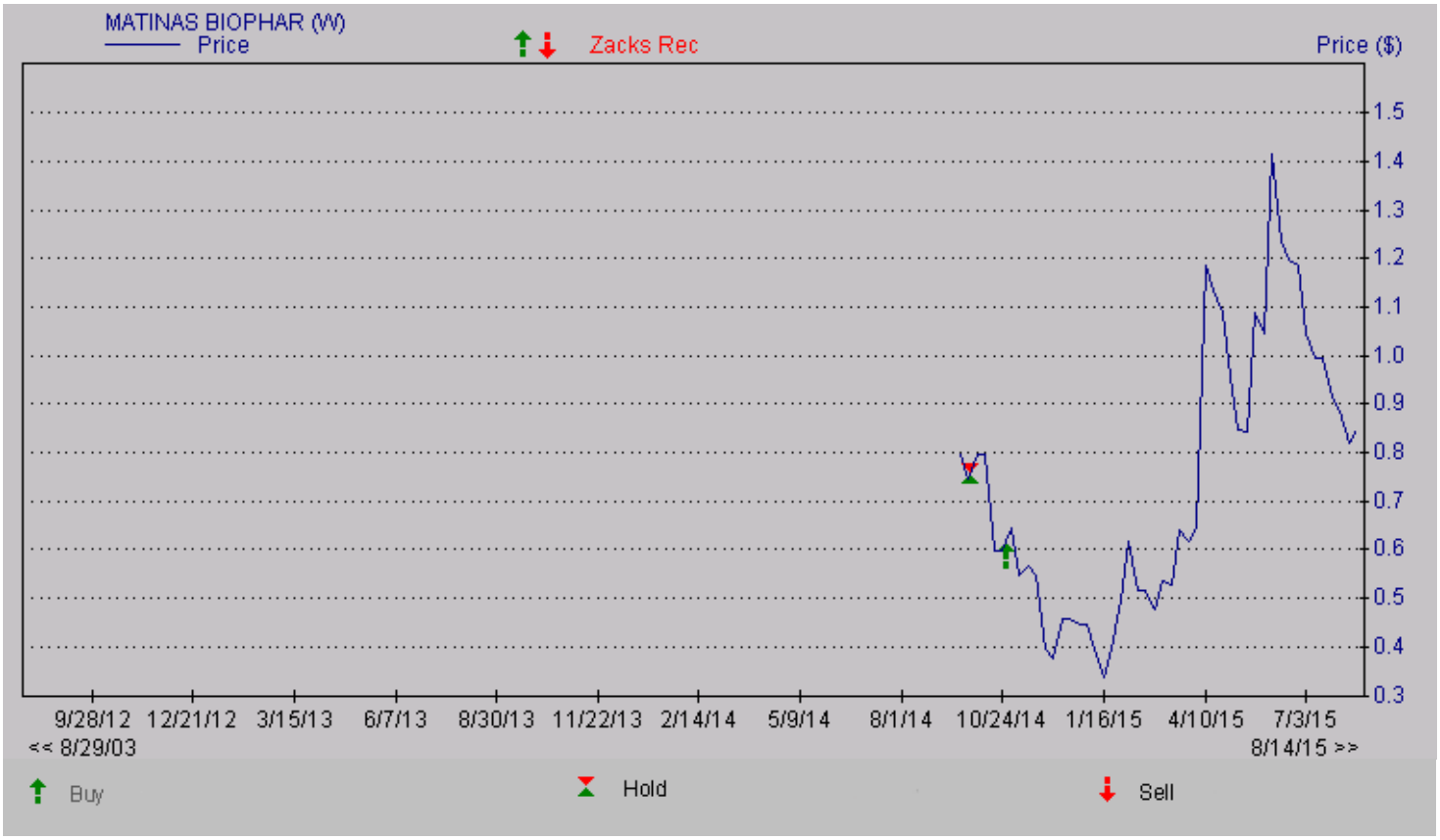
Summing up these parts, we believe that Matinas is worth approximately $150 million in total value, or $2.50 per share (on a basic share count of 56.9 million). This is clearly a stock to watch over the next few quarters. We are maintaining a "Buy" rating, and have increased our price target to $2.50 per share.

Matinas BioPharma Holdings, Inc. – Income Statement

Matinas Biopharma	2014 A	Q1 A	Q2 A	Q3 E	Q4 E	2015 E	2016 E	2017 E
MAT9001	$0	$0	$0	$0	$0	$0	$0	$0
YOY Growth	-	-	-	-	-	-	-	-
MAT2203	$0	$0	$0	$0	$0	$0	$0	$0
YOY Growth	-	-	-	-	-	-	-	-
Grants / Funded R&D	$0	$0.1	$0.1	$0.1	$0.1	$0.3	$1.5	$1.5
YOY Growth	-	-	-	-	-	-	-	-
Total Revenues	$0	$0.1	$0.1	$0.1	$0.1	$0.3	$1.5	$1.5
YOY Growth	-					-	-	-
Cost of Goods	$0	$0	$0	$0	$0	$0.0	$0.0	$0.0
Product Gross Margin	-	-	-	-	-	-	-	-
Research & Development	$5.2	$1.4	$1.4	$1.6	$1.8	$6.2	$8.2	$8.6
General & Admin	$5.3	$1.2	$1.1	$1.4	$1.5	$5.2	$6.0	$6.3
Operating Income	($10.5)	($2.6)	($2.4)	($2.9)	($3.2)	($11.1)	($12.7)	($13.4)
Net Other Income	$0.2	($0.0)	($0.0)	($0.0)	($0.0)	($0.1)	($0.1)	($0.1)
Pre-Tax Income	($10.2)	($2.6)	($2.4)	($3.0)	($3.3)	($11.2)	($12.8)	($13.5)
Taxes	$0	$0	$0	$0	$0	$0	$0	$0
Tax Rate	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Net Income	($10.2)	($2.6)	($2.4)	($3.0)	($3.3)	($11.2)	($12.8)	($13.5)
Net Margin	-	-	-	-	-	-	-	-
Reported EPS	**($0.32)**	**($0.07)**	**($0.04)**	**($0.05)**	**($0.06)**	**($0.22)**	**($0.17)**	**($0.13)**
YOY Growth	-	-	-	-	-	-	-	-
Wt. Ave Shares Outstanding	32.1	35.6	55.9	57.5	58.0	51.8	75.0	100.0

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

HISTORICAL ZACKS RECOMMENDATIONS



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Sell/Underperform: The analyst expects the company will underperform the broader U.S. Equity market over the next one to two quarters.

The current distribution is as follows: Buy/Outperform- 28.1%, Hold/Neutral- 54.0%, Sell/Underperform – 14.9%. Data is as of midnight on the business day immediately prior to this publication.