Zacks Small-Cap Research

December 20, 2016
David Bautz, PhD
312-265-9471
dbautz@zacks.com

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

BrainStorm Cell Therapeutics, Inc. (BCLI-NASDAQ)

BCLI: Gearing Up to Start International Phase 3 Trial of NurOwn™ in U.S. and Israel…

Based on our probability adjusted DCF model that takes into account potential future revenues from NurOwn™ in ALS, BCLI is valued at $12/share. This model is highly dependent upon continued clinical success of NurOwn™ and will be adjusted accordingly based upon future clinical results.

Current Price (12/20/16)	$2.88
Valuation	**$12.00**

OUTLOOK

On December 19, 2016, BrainStorm Cell Therapeutics, Inc. announced it will be initiating an international Phase 3 clinical trial of NurOwn™ in patients with amyotrophic lateral sclerosis (ALS). The trial will will take place at multiple centers in the U.S. and Israel and we anticipate it beginning in the second quarter of 2017. In addition, BrainStorm will apply for Hospital Exemption, which would allow the company to partner with a medical center in Israel in order to treat ALS patients with NurOwn™ for a fee.

On December 9, 2016, Dr. James Berry presented data from the Phase 2 clinical trial of NurOwn™ in ALS patients, including data regarding increases in neurotrophic factor levels in the cerebrospinal fluid of patients following treatment with NurOwn™. Dr. Berry was the Principal Investigator of the Phase 2 trial of NurOwn™.

SUMMARY DATA

52-Week High	**$3.56**
52-Week Low	**$1.92**
One-Year Return (%)	**3.97**
Beta	**1.70**
Average Daily Volume (sh)	**427,320**
Shares Outstanding (mil)	**19**
Market Capitalization ($mil)	**$54**
Short Interest Ratio (days)	**N/A**
Institutional Ownership (%)	**9**
Insider Ownership (%)	**24**
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 2016 Estimate	**-5.8**
P/E using 2017 Estimate	**-5.5**

Risk Level	**Above Avg.,**
Type of Stock	**Small-Blend**
Industry	**Med-Biomed/Gene**

ZACKS ESTIMATES

Revenue
(In millions of $)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2015	0 A	0 A	0 A	0 A	0 A
2016	0 A	0 A	0 A	0 E	0 E
2017					0 E
2018					0 E

Earnings per Share
(EPS is operating earnings before non-recurring items)

	Q1 (Mar)	Q2 (Jun)	Q3 (Sep)	Q4 (Dec)	Year (Dec)
2015	-$0.12 A	-$0.12 A	-$0.14 A	-$0.08 A	-$0.46 A
2016	-$0.10 A	-$0.05 A	-$0.09 A	-$0.10 E	-$0.33 E
2017					-$0.48 E
2018					-$0.57 E

© Copyright 2016, Zacks Investment Research. All Rights Reserved.

WHAT'S NEW

Plan for Phase 3 Program and Hospital Exemption

On December 19, 2016, BrainStorm announced that the company had a successful "end of Phase 2" meeting with the U.S. FDA in which the FDA accepted the key elements of the Phase 3 program for NurOwn™ in ALS. The planned Phase 3 clinical trial will be a randomized, double blind, placebo controlled, multi-dose trial that will take place at multiple centers in both the U.S. and Israel. We anticipate approximately 150 patients being enrolled in the trial randomized 1:1 to NurOwn™ or placebo. Cells will be extracted from each patient one time prior to treatment, with all administrations of NurOwn™ derived from the same extraction of cells. As in previous studies, there will be a 3-month run-in period prior to the first treatment with two additional NurOwn™ treatments occurring two and four months following the first treatment. The company has not stated if there will be exclusion criteria for enrollment in the study based on how rapidly the disease is progressing.

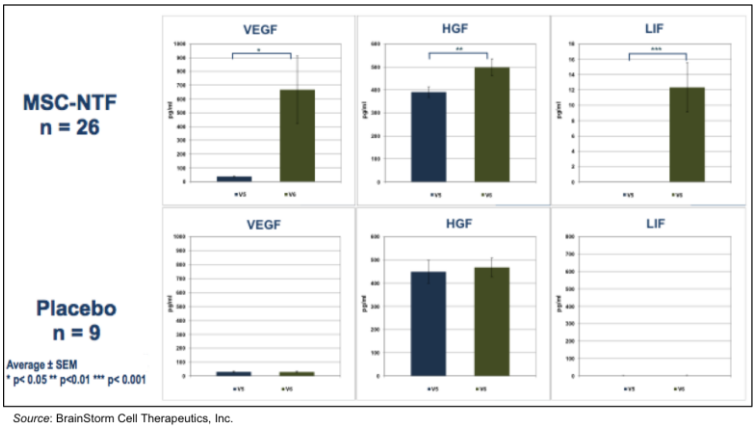
In addition to announcing the Phase 3 program, BrainStorm also announced that it would be submitting an application in Israel to allow for patient access to NurOwn™ as a treatment granted Hospital Exemption. This is a recently approved regulatory pathway in Israel that allows for companies to partner with medical centers in Israel to allow for patients to receive benefit from custom-made, innovative, individual treatments where there is a critical unmet need and an absence of valid therapeutic alternatives. The company estimates that approximately 50 to 60 patients could potentially be treated at a time, with a team of neurologists deciding who will get treatment priority based on review of the patients' medical files. The first patient could be treated under this program as early as the second half of 2017, and we anticipate learning more about this program, including how much the company could earn, later in 2017.

New Data Presented From Phase 2 NurOwn™ Trial

On December 9, 2016, Dr. James Berry presented data from the Phase 2 clinical trial of NurOwn™ in patients with amyotrophic lateral sclerosis (ALS) at the 27th International Symposium on ALS/MND. Dr. Berry was the Principal Investigator of that trial. Below we highlight some of the data, including increased levels of neurotrophic factors in the cerebrospinal fluid (CSF) of patients following NurOwn™ treatment as well as statistically significant changes in the rate of decline in patients whose disease was rapidly progressing.

Increased Levels of Neurotrophic Factors in Patients Treated with NurOwn™

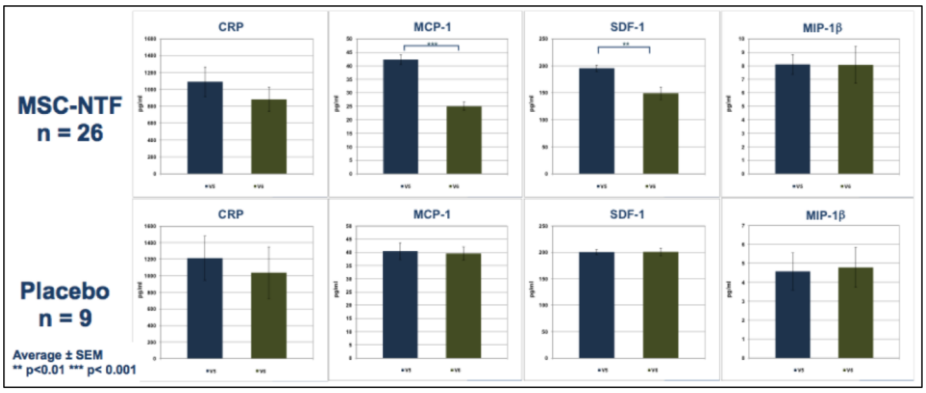
Treatment of patients in the Phase 2 trial involved intrathecal injection of NurOwn™ cells. Analysis of the CSF was performed to analyze whether increased levels of neurotrophic factors could be detected, which would also indicate the cells retained biological activity following injection. The following graphs show that there was a significant increase in the levels of vascular endothelial growth factor (VEGF), hepatocyte growth factor (HGF), and leukemia inhibitor factor (LIF) in patients treated with NurOwn™ following treatment with no increase in the neurotrophic factors seen in placebo-treated patients.



Source: BrainStorm Cell Therapeutics, Inc.

In animal models of ALS, treatment with VEGF leads to improvements in motor function, protection of motor neurons, and increased survival (Zheng *et al*., 2004). Increased levels of HGF were shown to reduce motor neuron degeneration and increase survival in a mouse model of ALS (Sun *et al*., 2002). LIF was also shown to reduce motor neuron degeneration in a mouse model of ALS (Azari *et al*., 2001).

In addition to an increase in neurotrophic factors, there was also a statistically significant decrease in the inflammatory markers monocyte chemoattractant protein-1 (MCP-1) and stromal cell derived factor 1 (SDF-1). MCP-1 is produced by activated microglia (Sargsyan *et al*., 2009) and blocking the interaction between SDF-1 (CXCL12) and its receptor (CXCR4) increases survival in a mouse model of ALS (Rabinovich-Nikitin *et al*., 2016)

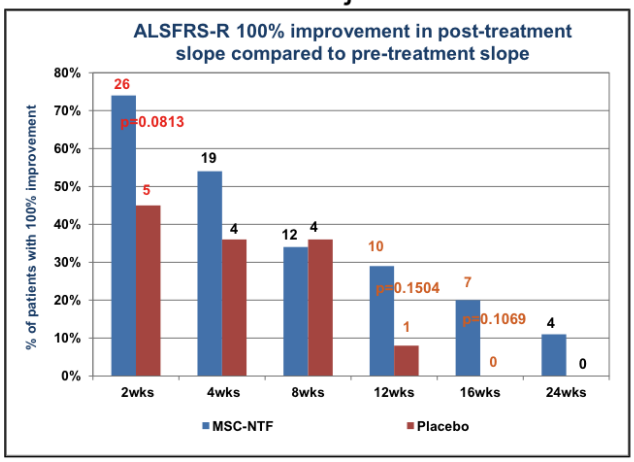


Source: BrainStorm Cell Therapeutics, Inc.

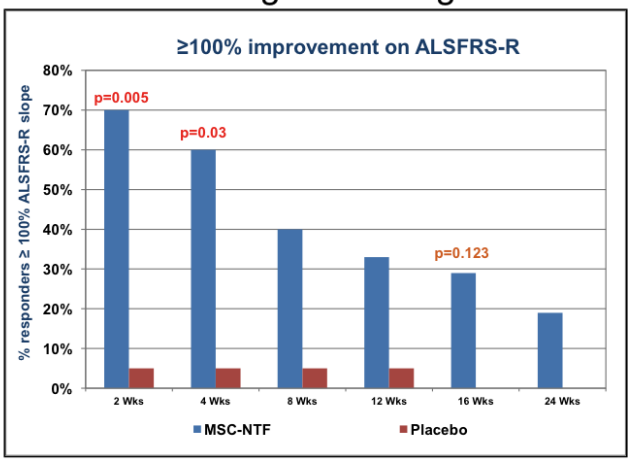
NurOwn™ Effects Most Pronounced in Rapid Progressors

A predefined subgroup analysis was performed that excluded patients who were "slow progressors", defined as ≤ two point decline in the ALSFRS-R from screening to baseline. The ALSFRS-R is a scoring system that measures gross motor tasks, fine motor tasks, bulbar functions, and respiratory functions to quantify the rate of ALS progression. The following graphs show that many more patients in the NurOwn™ treatment group had a halt in decline or improvement in ALSFRS-R following treatment (≥100% improvement in rate of decline of ALSFRS-R), which was particularly evident when the slow progressors were excluded.

All Subjects

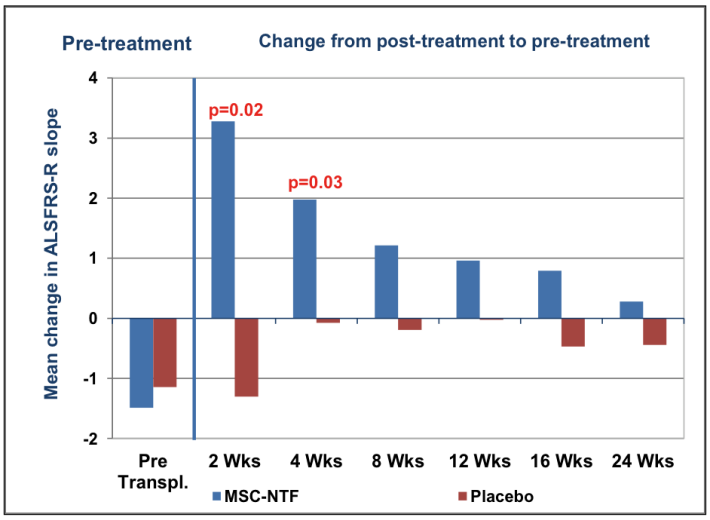


Excluding Slow Progressors



Source: BrainStorm Cell Therapeutics, Inc.

Similarly, when slow progressors were excluded, there was a marked improvement in the rate of decline in ALSFRS-R in those treated with NurOwn™. The following graph shows that patients treated with NurOwn™ actually showed an average improvement in the change in ALSFRS-R of approximately three points at two weeks following treatment, with the average change in the rate of decline still positive all the way out to 24 weeks! This was for a group of patients that had an average decline of approximately -1.3 points in the pre-treatment period. For a terminal illness that is marked by steady decline for virtually all patients, these results are very encouraging.



Source: BrainStorm Cell Therapeutics, Inc.

We believe that the results presented by Dr. Berry show that NurOwn™ cells are active following administration (as shown by an increase in neurotrophic factors in the CSF) and result in clinically meaningful changes in the course of the disease (as shown by the percentage of patients with ≥100% improvement in rate of decline of ALSFRS-R), particularly in those patients that were progressing most rapidly. Since these results were obtained with only one administration of NurOwn™, we anticipate that multiple administrations of NurOwn™ could extend the results seen for an even greater period of time.

Background on ALS

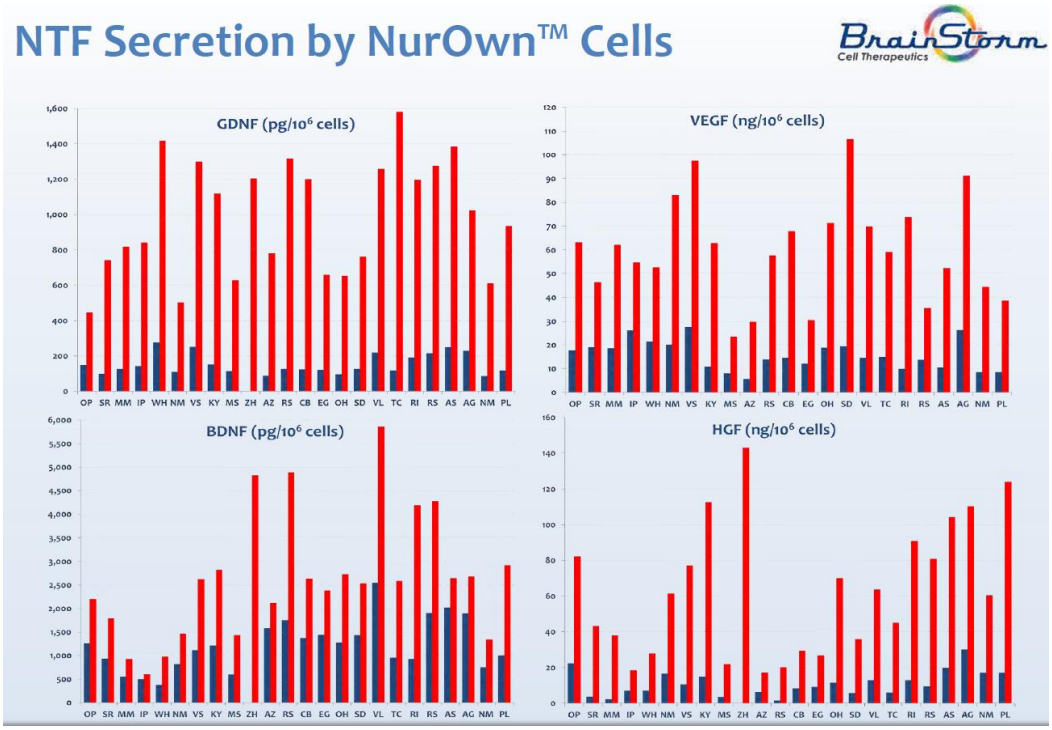
ALS is a rapidly progressing neurodegenerative disease whereby the nerve cells in the brain and spinal cord that control muscle movement degenerate. As the disease progresses, all patients will experience increased difficulty swallowing and speaking, with most patients not able to use their arms or legs. Eventually, patients in later stages of the disease may become completely paralyzed, which includes losing the ability to control their breathing. Patients typically do not live more than three to five years after being diagnosed with the disease, although there is considerable variability in disease progression from one patient to another. In the U.S., approximately 30,000 people are currently living with ALS.

The rate at which disease progression occurs is measured utilizing a scoring system called the "ALS Functional Rating Scale Revised" (ALSFRS-R; Cedarbaum *et al*., 1999). The ALSFRS-R measures gross motor tasks, fine motor tasks, bulbar functions, and respiratory functions through a scoring system consisting of a series of 12 questions on basic tasks (speech, salivation, swallowing, handwriting, cutting food, dressing and hygiene, turning in bed, walking, climbing stairs, dyspnea, orthopnea, and respiratory insufficiency) that are rated on a five-point scale where 0 = can't do and 4 = normal ability. The individual items are summed to produce a score of between 0 = worst and 48 = best.

There are only a limited number of treatment options available for ALS patients, which are mostly designed to relieve symptoms and improve quality of life. Sanofi's Riluzole® (rilutek) is the only treatment shown to improve survival, but only for two to three months, and it does not reverse nerve damage that has already occurred. Sales of Riluzole® peaked at around $50 million per year. It is now available as a generic.

NurOwn™

BrainStorm is developing adult stem cells therapies for the treatment of a range of neurodegenerative diseases. The company has a proprietary process called NurOwn™ that harvests and propagates autologous Mesenchymal Stem Cells (MSC) and then induces their differentiation into neurotrophic factor (NTF) secreting cells, called MSC-NTF. The cells are then returned to the patient at or near the target area for treatment. Because these cells are autologous, there is virtually no risk of rejection or tumor formation. Below is a graph showing the dramatic increase in various neurotrophic factors secreted by NurOwn™ cells (red) compared to normal mesenchymal stem cells (blue).



BrainStorm previously conducted a Phase 1/2 and a Phase 2a clinical trial of NurOwn™, both of which took place at Hadassah Medical Center between June 2011 and October 2014. All patients in the trials had a three-month run-in period, were treated with NurOwn™, and then evaluated during a six-month follow-up time. The Phase 1/2 trial consisted of 12 patients (six patients received NurOwn™ intramuscularly (IM) while six patients received NurOwn™ intrathecally (IT)) and the study met its primary endpoints of safety and tolerability, with no treatment-related adverse events reported. The Phase 2a study consisted of 14 patients that received both IM and IT injections of NurOwn™. The results from these studies were published in January 2016 in the journal *JAMA Neurology* and discussed in a previous Seeking Alpha article.

Phase 2 Study of NurOwn™

BrainStorm conducted a randomized, double blind, placebo controlled Phase 2 clinical trial to evaluate the safety and efficacy of a single dose of NurOwn™ in early-stage ALS patients (NCT02017912). The trial took place at three centers in the U.S. (Massachusetts General Hospital (MGH), University of Massachusetts Memorial Hospital, and the Mayo Clinic) and enrolled 48 patients randomized 3:1 to receive either NurOwn™ cells (n=36) or placebo (n=12).

Just as with the company's Phase 2a trial, there was a three-month run-in (to determine the rate of decline in ALSFRS-R prior to treatment), followed by treatment and a six-month follow up. Patients were evaluated at two, four, eight, twelve, sixteen, and twenty-four weeks after treatment. The primary endpoint of the study was safety based on the number of patients with adverse events, with secondary efficacy endpoints including the change in ALSFRS-R.

Along with showing NurOwn™ was safe and well tolerated, the study also achieved a number of secondary efficacy endpoints. The results presented by BrainStorm are all in the context of a 2010 survey of ALS clinicians and researchers that showed all participants felt a 25% change in decline of the ALSFRS-R score would be at least somewhat clinically meaningful, and 93% of participants felt a 50% change in the decline of the ALSFRS-R score would be very clinically meaningful (Castrillo-Viguera *et al*., 2010).

Additional Patent Granted for NurOwn™

On October 31, 2016, BrainStorm announced that the U.S. Patent and Trademark Office granted to the company U.S. Patent No. 9,474,787 titled "Mesenchymal Stem Cells for the Treatment of CNS Diseases". The allowed claims cover mesenchymal stem cells that secrete neurotrophic factors, including brain-derived neurotrophic factor (BDNF) and glial derived neurotrophic factor (GDNF), along with pharmaceutical compositions comprising those factors.

Financial Update

On November 15, 2016, BrainStorm Cell Therapeutics (BCLI) announced financial results for the third quarter of 2016 and provided a business update. The company reported a net loss of $1.6 million, or $0.09 per share, which consisted of $0.8 million in R&D expenses and $0.8 million in G&A expenses, compared to $1.5 million in R&D expenses and $1.1 million in G&A expenses in 2015. The decrease in R&D expenses was due to a decrease in costs related to the U.S. Phase 2 clinical trial, which was winding down during the third quarter of 2016. The decrease in G&A expenses was due to a decrease in stock-based compensation, payroll costs, and other expenses.

The company exited the third quarter of 2016 with approximately $11.2 million in cash, cash equivalents, and short-term deposits. Based upon the company's current clinical plans and spending levels, we anticipate the company's current cash level will fund operations for the next 24 months. During the conference call on December 19, the company re-iterated that there are currently no plans to raise money at this time.

Conclusion

In addition to showing that NurOwn™ treatment was safe and well tolerated, the results from the Phase 2 clinical trial were described by one investigator as showing "clinically meaningful beneficial response" and another was "very encouraged and excited by the trial results" having conducted clinical studies in ALS for 30 years. Thus, it appears as though clinicians who work with ALS patients are excited about the data.

In our opinion, the most encouraging data may have to do with the cohort of patients whose disease was progressing the fastest in the pre-treatment period, as these are the patients most in need of an effective treatment and who appeared to respond best to NurOwn™ treatment. However, we do not know whether the company will restrict the upcoming Phase 3 study to only those patients who are progressing most rapidly, as that would then likely result in a restriction to the label for NurOwn™ upon approval. We anticipate learning more about the final trial design once it gets closer to initiating.

These results are also highly supportive of the notion that multiple doses of NurOwn™ will be necessary to see an extended clinical benefit, as the positive effects seemed to wane over time. The company will be utilizing multiple doses of NurOwn™ in the upcoming Phase 3 trial, and we anticipate that there could be an even greater treatment effect than that seen in the Phase 2 trial.

From a valuation standpoint, we continue to believe BrainStorm's shares remain highly attractive, particularly from a comparison standpoint with the recent announcement that Bayer and Versant Ventures were seeding a new startup, BlueRock Therapeutics, with $225 million to develop best-in-class induced pluripotent stem cell (iPSC) therapies. The initial focus of the company will be CNS and cardiovascular disease areas. This deal indicates that cell-based therapies are highly sought after by larger pharmaceutical companies, and makes BrainStorm's current market cap of approximately $50 million look perplexingly low, especially since NurOwn™ is ready to enter Phase 3.

Before becoming generic, Riluzole® cost $50,000 per year and was shown to only extend survival of ALS patients by two to three months. The results shown above indicate that NurOwn™ may be able to slow down the progression of ALS, and for some patients it may even lead to disease stabilization. Multiple doses of NurOwn™ could increase these effects. As such, we currently model for NurOwn™ to cost $100,000 per year. However, once we learn more about the Hospital Exemption, particularly how much the treatment costs under this program, we may modify our pricing assumptions. We continue to believe that upon approval NurOwn™ could generate peak revenues of over $1 billion. Our current valuation for BrainStorm is $12 per share.

PROJECTED FINANCIALS

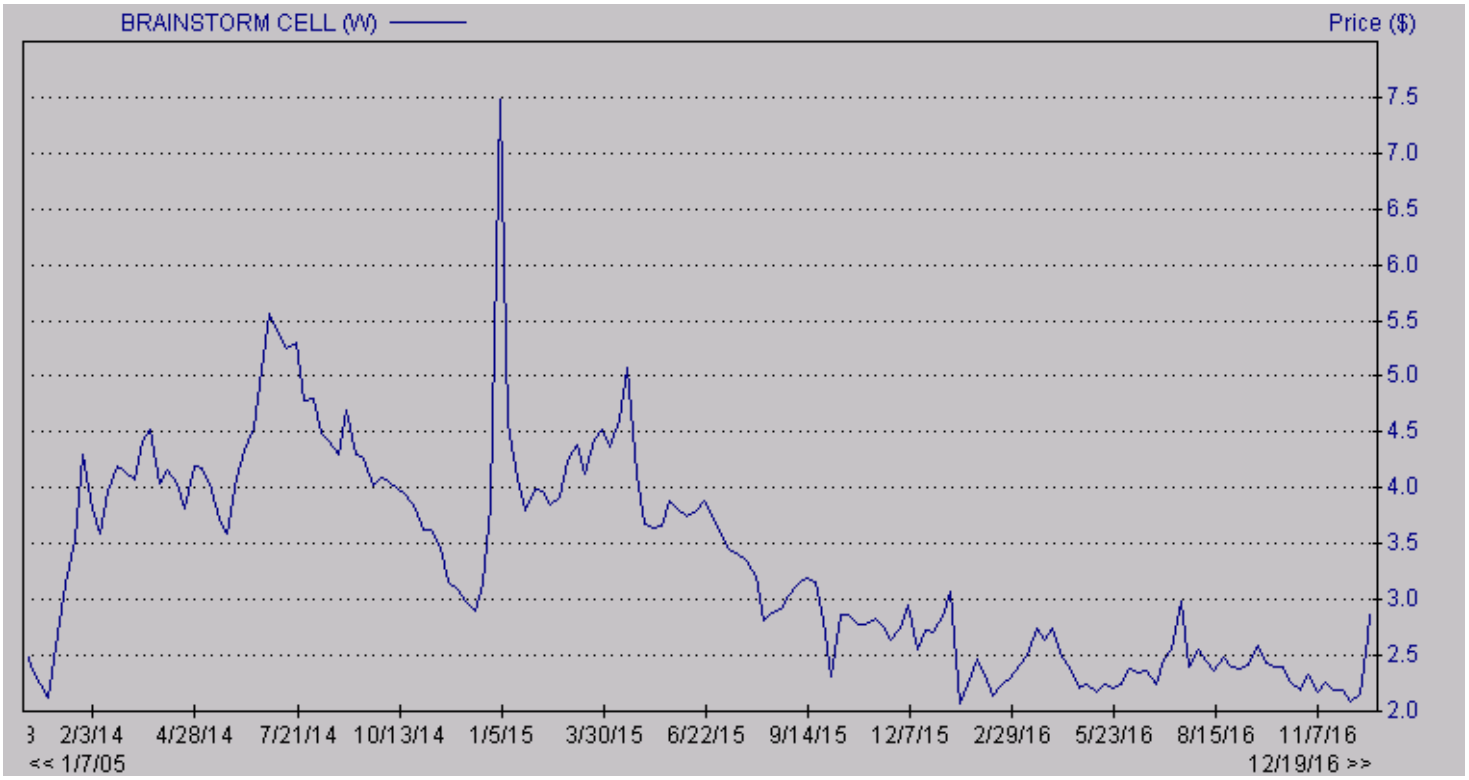
BrainStorm Cell Therapeutics, Inc.
Income Statement

Brainstorm Cell Therapeutics	2015 A	Q1 A	Q2 A	Q3 A	Q4 E	2016 E	2017 E	2018 E
MSC-NTF Stem Cells	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
YOY Growth	-	-	-	-	-	-	-	-
Total Revenues	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
YOY Growth	-					-	-	-
Cost of Goods / Services	$0	$0	$0	$0	$0	$0.0	$0.0	$0.0
Product Gross Margin	-	-	-	-	-	-	-	-
R&D	$4.9	$1.0	$0.2	$0.8	$1.0	$2.9	$5.5	$7.0
% R&D	-	-	-	-	-	-	-	-
SG&A	$3.6	$0.8	$0.8	$0.8	$0.8	$3.3	$3.6	$4.0
% SG&A	-	-	-	-	-	-	-	-
Operating Income	($8.5)	($1.8)	($1.0)	($1.6)	($1.8)	($6.2)	($9.1)	($11.0)
Net Other Income	$0.0	$0.0	($0.0)	$0.0	($0.0)	$0.0	($0.0)	($0.0)
Pre-Tax Income	($8.5)	($1.8)	($1.0)	($1.6)	($1.8)	($6.2)	($9.1)	($11.0)
Taxes	$0	$0	$0	$0	$0	$0	$0	$0
Tax Rate	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*	*0%*
Net Income	($8.5)	($1.8)	($1.0)	($1.6)	($1.8)	($6.2)	($9.1)	($11.0)
Net Margin	-	-	-	-	-	-	-	-
Reported EPS	**($0.46)**	**($0.10)**	**($0.05)**	**($0.09)**	**($0.10)**	**($0.33)**	**($0.48)**	**($0.57)**
YOY Growth	-	-	-	-	-	-	-	-
Wt. Ave Shares Outstanding	18.4	18.7	18.7	18.7	18.8	18.7	19.2	19.5

Source: Zacks Investment Research, Inc. *David Bautz, PhD*

© Copyright 2016, Zacks Investment Research. All Rights Reserved.

HISTORICAL STOCK PRICE



© Copyright 2016, Zacks Investment Research. All Rights Reserved.

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.

ANALYST DISCLOSURES

I, David Bautz, PhD, hereby certify that the view expressed in this research report accurately reflect my personal views about the subject securities and issuers. I also certify that no part of my compensation was, is, or will be, directly or indirectly, related to the recommendations or views expressed in this research report. I believe the information used for the creation of this report has been obtained from sources I considered to be reliable, but I can neither guarantee nor represent the completeness or accuracy of the information herewith. Such information and the opinions expressed are subject to change without notice.

INVESTMENT BANKING AND FEES FOR SERVICES

Zacks SCR does not provide investment banking services nor has it received compensation for investment banking services from the issuers of the securities covered in this report or article.
Zacks SCR has received compensation from the issuer directly or from an investor relations consulting firm engaged by the issuer for providing non-investment banking services to this issuer and expects to receive additional compensation for such non-investment banking services provided to this issuer. The non-investment banking services provided to the issuer includes the preparation of this report, investor relations services, investment software, financial database analysis, organization of non-deal road shows, and attendance fees for conferences sponsored or co-sponsored by Zacks SCR. The fees for these services vary on a per-client basis and are subject to the number and types of services contracted. Fees typically range between ten thousand and fifty thousand dollars per annum. Details of fees paid by this issuer are available upon request.

POLICY DISCLOSURES

This report provides an objective valuation of the issuer today and expected valuations of the issuer at various future dates based on applying standard investment valuation methodologies to the revenue and EPS forecasts made by the SCR Analyst of the issuer's business.
SCR Analysts are restricted from holding or trading securities in the issuers that they cover. ZIR and Zacks SCR do not make a market in any security followed by SCR nor do they act as dealers in these securities. Each Zacks SCR Analyst has full discretion over the valuation of the issuer included in this report based on his or her own due diligence. SCR Analysts are paid based on the number of companies they cover. SCR Analyst compensation is not, was not, nor will be, directly or indirectly, related to the specific valuations or views expressed in any report or article.

ADDITIONAL INFORMATION

Additional information is available upon request. Zacks SCR reports and articles are based on data obtained from sources that it believes to be reliable, but are not guaranteed to be accurate nor do they purport to be complete. Because of individual financial or investment objectives and/or financial circumstances, this report or article should not be construed as advice designed to meet the particular investment needs of any investor. Investing involves risk. Any opinions expressed by Zacks SCR Analysts are subject to change without notice. Reports or articles or tweets are not to be construed as an offer or solicitation of an offer to buy or sell the securities herein mentioned.