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2014

Vitro Biopharma
Harnessing the Power of Cells™

2014 North American Stem Cell Tools and Technologies Industry Technology Innovation Leadership Award

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50 Years of Growth, Innovation & Leadership

Background and Company Performance

Industry Challenges

Stem cells hold great promise for both cell-based research and advances in the understanding of diseases, with the subsequent development of new drugs and therapies. Nevertheless, Frost & Sullivan notes that specific challenges around the realization of the full potential of stem cells need to be overcome. Stem cell technology has been dramatically accelerated with the discovery of embryonic stem cells (ESCs), due to their capability to differentiate into any cell type. The proper utilization of ESCs in research and development involves the destruction of embryos, with consequent ethical issues.

Adult stem cells (ASCs) or mesenchymal stem cells (MSCs), on the other hand, can be obtained from a wide range of biological sources and thus elude the moral concerns traditionally associated with ESCs. In fact, ASCs have been approved for clinical use with a successful efficacy and safety profile for the treatment of numerous immunological conditions and blood disorders, constituting one of the most advanced sectors of the stem cell industry. The advent of stem cell products and associated technology based on MSCs as a non-ethically controversial source of pluripotent stem cells (PSCs) is correlated with a number of factors. Such factors include the extensive availability of these cells from numerous tissue sources and their robust clinical results in terms of efficacy and safety in a broad range of indications in cell therapeutics. However, cell-based product manufacturing and upscaling, in addition to their translation to clinics, remain matters of concern among the scientific and clinical communities.

MSCs are known to play a fundamental role in the treatment of a wide range of conditions, including cancer. These cells can be successfully modified under different patterns to render specific cells. MSCs clinical effectiveness is basically associated with the replacement and/or regeneration of specific cells types, thereby providing competent solutions in regenerative medicine and cell therapy.

On the other hand, the application of MSCs in the treatment of cancer is completely different, mostly attending to complex regulatory pathways and cell signaling routes through an intricate system of chemical signals, receptors, and chemotactic movements of MSCs to specific sites in the body. MSCs migrate into certain regions exhibiting inflammatory behavior, such as cancer stem cells. MSCs are thus developed with the aim to specifically deliver anti-cancer agents especially indicated for highly drug resistant traditional therapies.

Frost & Sullivan feels that newer developments involving MSCs with the aim to provide novel solutions for stem cell research and therapeutics are crucially needed.

Technology Excellence of Vitro Biopharma

Criterion 1: Commitment to Innovation

Frost & Sullivan appreciates the fact that Vitro Biopharma has excelled in the development of tools and technologies to support stem cell research and clinical studies of MSCs. The company works with both native MSCs and fluorescent-labeled MSCs. Among the cell-based products, Vitro Biopharma offers different cell culture media for the maintenance and differentiation of growing MSCs. Similarly, the company has expanded its line of products to measurement tools and technologies in order to determine and differentiate the potency, quality, and response and behavior of MSCs against chemical agents.

Together with other institutions, Vitro Biopharma has discovered that under specific circumstances, the over-expression of certain genes in ASCs also may cause the induction of a pluripotent state in the cell. Due to this discovery, the number of steps and complexity of the reprogramming experiments are significantly reduced and simplified, allowing the achievement of the functional properties of ESCs in a remarkably simpler manner.

In accordance with this discovery, Vitro Biopharma produces not only native MSC lines, but also fluorescent-labeled MSC lines with the purpose of being utilized in tracking studies and *in vivo* live cell imaging, along with native fibroblast or transfected MSC lines to test functional properties of reprogrammed ASCs emulating ESC behavior. A proprietary read-out system for accurate and highly sensitive measurement of cellular ATP content has been also developed by the company and its partner Hemogenix, Inc. to test cellular functionality - including proliferation and differentiation capacity. Based on the HALO® assay platform used for high sensitivity analysis of hematopoietic stem cells (HSCs), this technology platform constitutes one of the most sensitive bioluminescent read-out assays and includes fluorescent and absorbance-based cellular functionality analyses.

Criterion 2: Commitment to Creativity

Vitro Biopharma has developed a proprietary MSC line culture media, MSC-Gro™, which has been optimized to support growth and differentiation of MSC lines. Frost & Sullivan independent analysis indicates that the major competitive advantages of this media in comparison with those provided by Vitro Biopharma's other competitors are increased rate of growth and superior quality and potency of the MSC lines. Registered yields reach 2 to 3 times the number of cells utilizing MSC-Gro media culture. Moreover, stability has been significantly improved when compared with competitors' solutions. MSC-Gro media formulations can be stored for over 1 year at 2 degrees C to 8 degrees C without alterations.

Diversity is the other important advantage. Additional formulations can be prepared according to the requirements of various primary cells, such as neurons, hepatocytes, and fibroblasts, among other cell lines. The level of serum in the media (serum-containing or

serum-free) represents an exciting alternative for customers, so that a broader spectrum of applications can be designed. In fact, customers can select different media options according to each application, under liquid or powder formulations, so that chemically-defined, serum-free media for clinical applications, such as expansion of MSC lines and biotherapeutic production, can be selected.

Criterion 3: Stage Gate Efficiency

Beyond commercial products based on stem cell life sciences tools and technologies, Vitro Biopharma is pursuing white space innovation through its proprietary intellectual property set to specific inventions and medical applications. Vitro Biopharma entered into a license agreement 3 years ago with Dr. James Posillico, a world-renowned authority in women's healthcare, including the intellectual rights of the production and purification of the pituitary hormone, FSH, to be used in fertility treatments. Similarly, the rights for the use of a stem cell line for the treatment of infertility have been acquired by the company. This technology has advanced to preclinical stage, and Vitro Biopharma is looking for partners to develop and launch different commercial products. The company is also advancing toward the design of a new cell reprogramming technique, with a pending patent application related to novel methods for generation of induced PSCs (iPSCs) from ASCs.

Criterion 4: Commercialization Success

A current strategic initiative of Vitro Biopharma is based on the development and commercialization of ASC or MSC technology for their wide range of applications in stem cell research and drug discovery and development, including candidate therapeutic product screening for the treatment of a variety of diseases and conditions. Vitro Biopharma is committed to promoting the development of stem cell research and clinical applications through the utilization of MSCs and optimization of life science tools and technologies, including media, measurement instruments, and read-out systems. A series of stem cell-based assays are being commercialized for osteoporosis drug discovery and discovery of stem cell activation agents through assays of ASC proliferation, migration and reprogramming.

With regard to financial activity, Vitro Biopharma's revenues continue to grow, and near-term profitable operations are expected this year. Compared to the same period in 2013, total revenue increased 3-fold (300%) in the first 6 months of 2014. The increased collaboration between Vitro Biopharma and Neuromics Inc. has allowed both companies to profitably grow their revenue and earnings. Furthermore, remarkable increments in product sales and revenues from contract research services have been registered. The multiple formulation alternatives and applicability diversification provided by the company around stem cell tools and technologies enabling their growth and differentiation have allowed Vitro Biopharma to occupy a leadership position in the North American stem cell sector.

Robust competitive advantages, as well as the extension of cell lines and stem cell media products for animal care, are responsible for product revenue rising 70% over the first 6

months of the past fiscal year. In addition, the expansion of contract research services has contributed about 40% of the total revenue. Similarly, new collaboration during this period with European medical clinic networks generate new opportunities for treating patients affected by different disorders, in particular autoimmune diseases, autism, and chronic fatigue syndrome.

Measurement tools utilizing laser scanning to obtain quantitative data from antibody arrays enable detecting up to 40 or 50 different biological molecules, cytokines, growth factors, and other signaling molecules. These data enable clinicians to generate different molecular profiles for every condition and also establish methodic comparisons among the molecular signatures of the disease during the evaluation of the effects of selected treatments for every patient.

Through this new collaboration, Vitro Biopharma may penetrate European geography with proven efficiency. First initiatives are designed to control macro and micro blood levels evaluating commonly measured agents, with the strategy to correct problems related to toxic levels of metals, infectious agents, and low levels of trace elements. An analysis performed at the company's facilities will enable the increase of the level of detail in terms of molecular profiling, hence guaranteeing a more precise profile of the patient's condition.

Criterion 5: Application Diversity

Vitro Biopharma continues expanding the range and diversity of application of its products. Such diversification comprises the commercialization of bio-analytical services and the initial stage in its expansion as a contract research organization (CRO). Among the most relevant services currently offered by the company, of note is the customized biomarker panel analysis to quantify the levels of multiple biological molecules in biological samples. Indeed, under Vitro Biopharma's new business perspective, the assay of human serum samples collected from patients from multiple European clinical treatment centers constitutes a powerful resource to make the company a leading provider of serial bio-analytical tools (for research purposes) and technologies (to monitor status and indicate therapeutic effectiveness), not only in the United States and Canada, but also in Central Europe.

Vitro Biopharma is advancing with the development of its stem cell-based products and services for drug discovery and is anticipating the commercialization of an initial series of assays during 2014. The plan is mainly focused on cell-based toxicology assays and drug discovery analytical procedures for candidate osteoporosis and osteoarthritis agents, to then be expanded for other disorders.

Vitro Biopharma is also working on accelerating healing of bone fractures by using MSCs and strengthening bones by activating certain protein signals and molecules. Although optimal signaling of pathways to activate MSCs with the goal of repairing or regenerating bone tissue is still under development, preliminary studies demonstrate significant potential for the development of new drugs to treat osteoporosis. The company has recently launched its initial line of osteoblasts derived from human MSCs for use in drug discovery and

development. A vast spectrum of cellular assays for assisting the development of novel regenerative bone tissue therapies is expected to be developed through this innovative MSC-based technology platform.

Criterion 6: Unmet Needs

The activation of endogenous stem cells to differentiate into specific cell types appears as an alternative to mitigate the significant remaining regulatory obstacles to adult stem cell transplantation in the United States. Vitro Biopharma is aligning its scheduled stages of clinical trials to test mobilization of endogenous stem cells in the treatment of traumatic brain injury and autism spectrum disorders (ASD), in which pre-clinical research strongly suggests the activation of certain biochemical pathways to increase proliferation, migration, and differentiation performance. Vitro Biopharma's approach does not require stem cell transplantation, while providing a non-controversial, cost- and time-effective alternative to the current methodologies of competitors. The company is planning Phase II trials to determine pharmacodynamics by quantitatively measuring multiple biomarkers selective to stem cell activation. To advance in this direction, the company is designing additional custom panels leveraging the expansion of its bio-analytical services.

Criterion 7: Use of Mega Trends

Vitro Biopharma's technology platform allows generation of iPSCs from ASCs, including MSCs and other subclasses, avoiding the utilization of transfection mechanisms through environmental conditions and small molecules to induce the expression of some reprogramming factors - such as Oct3/4 - through promoter activation. Vitro Biopharma is advancing the assessment of this novel method of iPSC generation and determining the reprogramming capacity of endogenous ASC's as part of its emerging clinical trials of TBI.

Criterion 8: Pioneering Best Practices

Vitro Biopharma is strongly committed to provide the best-in-class solutions in the market, while following the strictest regulations. The utilization of ASCs, including MSCs, represents a powerful, efficient, and safe alternative to ESCs derived from embryos.

Criterion 9: Blue Ocean Strategy

One of the most successful decisions of Vitro Biopharma has been the company's planned merger with Neuromics Inc. to accelerate growth in the near term. Indeed, revenues from research products have been immediately increased by 2 to 3 times and are continuing to show robust growth. Vitro Biopharma's research products are primarily focused on ASCs and derivative products, while Neuromics' product lines have enabled its expansion including antibodies and biomarkers, as well as an impressive number of products for proteomics and genomics, apoptosis assays, molecular biology reagents, and complementary assays products.

In this manner, Vitro Biopharma can focus on the development of its own pipeline of drug discovery and development products, along with its discovery/toxicology stem cell-based assays replicating *in vivo* cellular systems for high throughput screening and analysis.

The result of this significant expansion in Vitro Biopharma's core product offerings can be observed in its improved revenue. According to the company's managers, this acceleration in revenue is due to Vitro Biopharma's innovative business model, which allows the establishment of diversified sources and well-implemented sales strategies to successfully penetrate research and clinical development markets with its unique stem cell-based technology platform.

Criterion 10: Aspirational Ideals

Vitro Biopharma's business strategy involves the participation of biopharmaceutical firms, large distributors, and contract research organizations.

Conclusion

Vitro Biopharma is a biotechnology company focused on the development and commercialization of adult stem cell technology for applications in stem cell research, drug development, and cell-based therapeutics to treat a variety of diseases and conditions. The company presently offers a series of tools and technologies to promote the development of stem cell research and clinical applications focusing on mesenchymal stem cells. Vitro Biopharma's current operational strategy is aimed at increasing the market penetration of its proprietary MSC-based research products, while extending its stem cell segment to include differentiated cells derived from MSCs, such as chondrocytes, endothelial cells, and osteoblasts, ideally prescribed for high throughput screening in drug discovery and development.

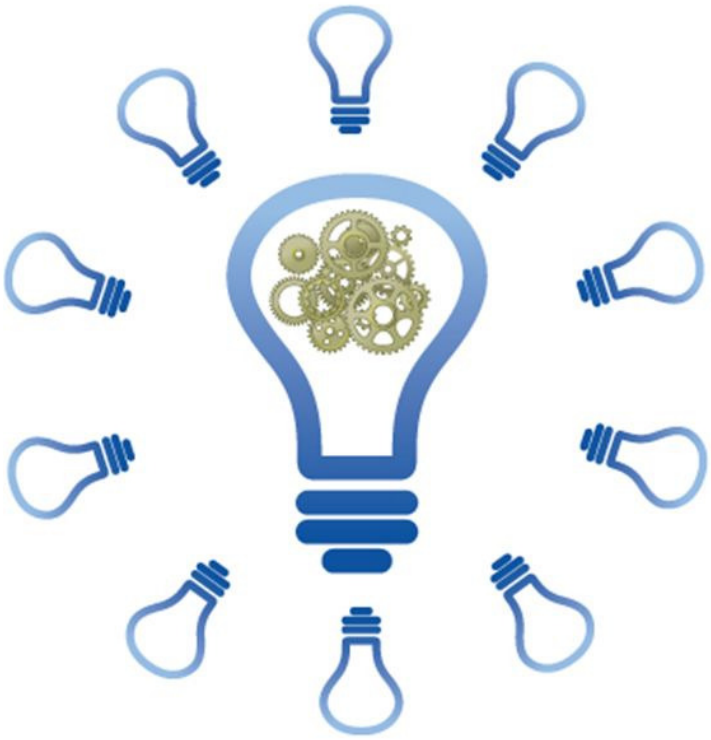
Frost & Sullivan is proud to recognize Vitro Biopharma with the 2014 Technology Innovation Leadership Award due to its outstanding performance and excellent business strategy.

Significance of Technology Innovation Leadership

Ultimately, growth in any organization depends upon finding new ways to excite the market, and upon maintaining a long-term commitment to innovation. At its core, Technology Innovation Leadership is therefore about three key things: understanding demand, nurturing the brand, differentiating from the competition.

Understanding Technology Leadership

Demand forecasting, branding, and differentiation all play a critical role in achieving growth through technology leadership. This three-fold focus, however, is only part of the journey. Ultimately, technology leadership begins with an idea: with a spark of creativity that is systematically pursued, developed, and commercialized.



Key Benchmarking Criteria

For the Technology Innovation Leadership Award, Frost & Sullivan analysts indepedently evaluated the total client experience and strategy implementation excellence according to the criteria detailed below.

Technology Excellence

Criterion 1: Commitment to Innovation
Criterion 2: Commitment to Creativity
Criterion 3: Stage Gate Efficiency
Criterion 4: Commercialization Success
Criterion 5: Application Diversity

Visionary Innovation

Criterion 1: Unmet Needs
Criterion 2: Use of Mega Trends
Criterion 3: Pioneering Best Practices
Criterion 4: Blue Ocean Strategy
Criterion 5: Aspirational Ideals

The Intersection between 360-Degree Research and Best Practices Awards

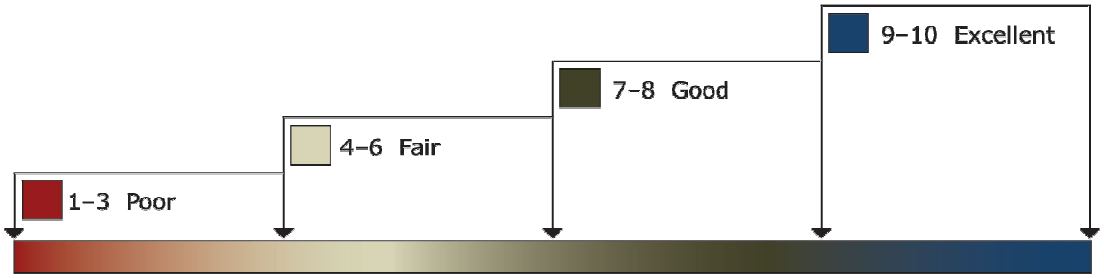
Research Methodology

Frost & Sullivan's 360-degree research methodology represents the analytical rigor of our research process. It offers a 360-degree-view of industry challenges, trends, and issues by integrating all 7 of Frost & Sullivan's research methodologies. Too often, companies make important growth decisions based on a narrow understanding of their environment, leading to errors of both omission and commission. Successful growth strategies are founded on a thorough understanding of market, technical, economic, financial, customer, best practices, and demographic analyses. The integration of these research disciplines into the 360-degree research methodology provides an evaluation platform for benchmarking industry players and for identifying those performing at best-in-class levels.

360-DEGREE RESEARCH: SEEING ORDER IN THE CHAOS

Decision Support Scorecard and Matrix

To support its evaluation of best practices across multiple business performance categories, Frost & Sullivan employs a customized Decision Support Scorecard and Matrix. This analytical tool compares companies' performance relative to each other. It features criteria unique to each award category and ranks importance by assigning weights to each criterion. The relative weighting reflects current market conditions and illustrates the associated importance of each criterion according to Frost & Sullivan. This tool allows our research and consulting teams to objectively analyze performance, according to each criterion, and to assign ratings on that basis. The tool follows a 10-point scale that allows for nuances in performance evaluation; ratings guidelines are illustrated below.



Best Practice Award Analysis for Vitro Biopharma Inc.

Decision Support Scorecard: Technology Excellence

The Decision Support Scorecard the relative importance of each criterion and the ratings for each company under evaluation for the Technology Innovation Leadership Award. The research team confirms the veracity of the model by ensuring that small changes to the ratings for a specific criterion do not lead to a significant change in the overall relative rankings of the companies.

Finally, to remain unbiased and to protect the interests of all organizations reviewed, we have chosen to refer to the other key players in as Company 2 and Company 3.

DECISION SUPPORT SCORECARD FOR TECHNOLOGY INNOVATION LEADERSHIP AWARD (ILLUSTRATIVE): TECHNOLOGY EXCELLENCE

Measurement of 1–10 (1 = poor; 10 = excellent)	**Award Criteria**					
Technology Excellence	Commitment to Innovation	Commitment to Creativity	Stage Gate Efficiency	Commercialization Success	Application Diversity	**Weighted Rating**
Relative Weight (%)	**20%**	**20%**	**20%**	**20%**	**20%**	**100%**
Vitro Biopharma	**9.7**	**9.8**	**9.8**	**9.9**	**9.7**	**9.8**
Company 2	5.3	5.6	5.4	5.5	5.8	5.5
Company 3	5.0	4.6	4.4	3.5	6.0	4.8

Criterion 1: Commitment to Innovation

Requirement: Conscious, ongoing development of an organization culture that supports the pursuit of groundbreaking ideas

Criterion 2: Commitment to Creativity

Requirement: Employees known for pushing the limits of form and function, and who are unafraid to pursue "white space" innovation

Criterion 3: Stage Gate Efficiency

Requirement: A process that moves creative, groundbreaking concepts quickly and profitably from early-stage investments to late-stage prototyping

Criterion 4: Commercialization Success

Requirement: A proven track record of taking new technologies to market with a high rate of success

Criterion 5: Application Diversity

Requirement: The development of technologies that serve multiple purposes and can be embraced by multiple user types

Decision Support Scorecard: Visionary Innovation

DECISION SUPPORT SCORECARD FOR TECHNOLOGY INNOVATION LEADERSHIP AWARD (ILLUSTRATIVE): VISIONARY INNOVATION

Measurement of 1–10 (1 = poor; 10 = excellent)	**Award Criteria**					
Visionary Innovation	Unmet Needs	Use of Mega Trends	Pioneering Best Practices	Blue Ocean Strategy	Aspirational Ideals	**Weighted Rating**
Relative Weight (%)	**20%**	**20%**	**20%**	**20%**	**20%**	**100%**
Vitro Biopharma	**9.8**	**9.7**	**9.6**	**9.9**	**9.7**	**9.7**
Company 2	5.6	5.4	5.3	5.5	5.5	5.4
Company 3	4.9	4.4	4.5	3.0	4.0	4.2

Criterion 1: Unmet Needs

Requirement: A clear understanding of customers' desired outcomes, the products that currently help them achieve those outcomes, and where key gaps may exist

Criterion 2: Use of Mega Trends

Requirement: Ability to incorporate long-range, macro-level scenarios into strategic plans, thereby anticipating and preparing for multiple futures that could occur

Criterion 3: Pioneering Best Practices

Requirement: A nothing-ventured-nothing-gained approach to strategy implementation that results in processes, tools, or activities that generate a consistent and repeatable level of success.

Criterion 4: Blue Ocean Strategy

Requirement: Proven track record of creating new demand in an uncontested market space, rendering the competition obsolete

Criterion 5: Aspirational Ideals

Requirement: A willingness to look beyond the simple goal of generating a profit to embrace a more powerful ideal of bringing greater value to customers or the planet

About Frost & Sullivan

Frost & Sullivan, the Growth Partnership Company, enables clients to accelerate growth and achieve best in class positions in growth, innovation and leadership. The company's Growth Partnership Service provides the CEO and the CEO's Growth Team with disciplined research and best practice models to drive the generation, evaluation and implementation of powerful growth strategies. Frost & Sullivan leverages almost 50 years of experience in partnering with Global 1000 companies, emerging businesses and the investment community from 31 offices on six continents. To join our Growth Partnership, please visit http://www.frost.com.