

## BioTime and Subsidiary LifeMap Sciences Announce Data Mining Collaboration

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**LifeMap Sciences' discovery platform will be used to evaluate approximately 100 million proprietary gene expression data points relating to human embryonic stem cells generated by BioTime scientists**

ALAMEDA, Calif.--(BUSINESS WIRE)--Mar. 4, 2013-- BioTime, Inc. (NYSE MKT: BTX) and its bioinformatics subsidiary LifeMap Sciences, Inc. ("LifeMap") today announced that they have entered into a definitive collaboration agreement to utilize LifeMap's computer-based tools to extract information relating to novel potential commercial products from nearly 100 million proprietary gene expression data points generated and owned by BioTime. The assembled data relate to BioTime's proprietary *PureStem*<sup>™</sup> progenitor cell lines derived from human embryonic stem cells. The two companies will share revenues resulting from commercialization of successful product candidates that are discovered via the collaboration. BioTime has the right of first refusal to advance, either directly or via any of its other subsidiaries, selected products under a milestones and royalty arrangement with LifeMap. LifeMap will have an exclusive option to advance those products that BioTime chooses not to pursue itself or via its other subsidiaries.

### Background

Human pluripotent stem cells such as human embryonic stem (hES) and induced pluripotent stem (iPS) cells have the important distinction of being the first human cells ever discovered that are capable of indefinite scale-up in the stem cell state, with the potential to then become any of the thousands of different cell types that make up the human body. The discovery of hES cells in the late 1990s led to the emerging field called regenerative medicine. BioTime's mission is to lead in the commercial application of pluripotent stem cell technology in regenerative medicine by utilizing a number of novel cell manufacturing platforms such as *PureStem*<sup>™</sup> human progenitor cell lines. These hES- or iPS-derived cell lines are relatively pure and scalable lines of cells that allow the industrial scale-up of sufficiently large numbers of cells to be potentially useful in treating a wide array of degenerative diseases including those afflicting an aging population.

BioTime scientists have performed thousands of differentiation protocols with these novel *PureStem*<sup>™</sup> cell lines using a technology called "fate space screening". A video describing the novel technology is now available for viewing at [www.biotimeinc.com/corporate-videos/](http://www.biotimeinc.com/corporate-videos/). This large amount of accumulated data provides deep insights into the molecular processes involved in human development and advances our understanding of how to utilize the cells clinically to regenerate tissues afflicted with disease. While a limited amount of this data has been published, the majority of the intellectual property is proprietary to BioTime and will be shared with LifeMap under the new agreement.

Under the collaboration, BioTime and LifeMap scientists will work closely together to extract from the approximately 100 million proprietary gene expression data points information expected to lead to new patent applications for cell-based regenerative therapies. Examples of cellular therapies needed in medicine include those for the repair of cartilage, bone, tendon, heart muscle, the vascular system, the retina, and many others. A brief overview of the proprietary discovery process invented by LifeMap scientists is shown as part of the video that describes the fate space screening, which can also be found at [www.lifemapsc.com/TherapeuticDiscovery](http://www.lifemapsc.com/TherapeuticDiscovery).

The *PureStem*<sup>™</sup> cell lines are a diverse library of purified cell lines representing young cells intermediate in their differentiation between the hES cells and the final, mature cells. Each *PureStem*<sup>™</sup> cell line has a unique gene expression "signature". This signature is altered in novel ways when a *PureStem*<sup>™</sup> cell line is exposed to different experimental conditions utilizing protein growth and differentiation factors.

The *LifeMap Discovery*<sup>™</sup> platform provides the road map that enables "navigating" each of the *PureStem*<sup>™</sup> cell lines to the desired "destination" of a certain mature cell type for use in treatment. It includes reference gene expression signatures of thousands of embryonic and mature cell types. LifeMap's scientists match the signatures of *PureStem*<sup>™</sup> cell lines to the cells in its database using tailored bioinformatics computer tools and determine the identity of *PureStem*<sup>™</sup> cell lines before and after they are exposed to various growth and differentiation conditions. In the next step, *PureStem*<sup>™</sup> cell lines that may potentially replace, or rejuvenate, diseased tissues can be identified and later tested for their therapeutic potential for selected diseases.

Recently, BioTime and LifeMap Sciences, along with another BioTime subsidiary, OrthoCyte Corporation, reported in the peer-reviewed journal *Regenerative Medicine* a means of manufacturing distinct types of cartilage, bone, and tendon cells from seven of BioTime's proprietary *PureStem*<sup>™</sup> human embryonic progenitor cell lines, with potential applications for the repair of different types of bone, cartilage, and tendon for the treatment of degenerative diseases afflicting these tissue types such as non-healing bone fractures, osteoarthritis and degeneration of intervertebral discs, and tendon tears. The data mining collaboration is expected to yield many additional *PureStem*<sup>™</sup> cell lines with various clinical applications for the treatment of degenerative diseases.

"LifeMap Sciences, through its online databases such as *GeneCards*<sup>®</sup>, *MalaCards*, and *LifeMap Discovery*<sup>™</sup>, as well as its internal research team, has assembled one of the world's most powerful molecular analysis capabilities," said Michael West, PhD, CEO of BioTime and Chief Scientific Officer of LifeMap. "We have already filed for patent protection on inventions jointly made by the teams and look forward to accelerating the pace of development of cures for the deadly degenerative diseases of aging."

"The BioTime and LifeMap teams collectively believe that this collaboration has the potential to generate a robust pipeline of important stem-cell-based treatments for commonly occurring degenerative diseases," said David Warshawsky, PhD, President and CEO of LifeMap. "However, it would take the emergence of only a single significant treatment from this collaboration to make this a seminal event for both companies."

### About BioTime, Inc.

BioTime, headquartered in Alameda, California, is a biotechnology company focused on regenerative medicine and blood plasma volume expanders.

Its broad platform of stem cell technologies is enhanced through subsidiaries focused on specific fields of application. BioTime develops and markets research products in the fields of stem cells and regenerative medicine, including a wide array of proprietary *PureStem*<sup>™</sup> cell lines, *HyStem*<sup>®</sup> hydrogels, culture media, and differentiation kits. BioTime is developing *Renovia*<sup>™</sup> (formerly known as *HyStem*<sup>®</sup>-Rx), a biocompatible, implantable hyaluronan and collagen-based matrix for cell delivery in human clinical applications. BioTime's therapeutic product development strategy is pursued through subsidiaries that focus on specific organ systems and related diseases for which there is a high unmet medical need. BioTime's majority owned subsidiary Cell Cure Neurosciences Ltd. is developing therapeutic products derived from stem cells for the treatment of retinal and neural degenerative diseases. BioTime's subsidiary OrthoCyte Corporation is developing therapeutic applications of stem cells to treat orthopedic diseases and injuries. Another subsidiary, OncoCyte Corporation, focuses on the diagnostic and therapeutic applications of stem cell technology in cancer, including the diagnostic product *PanC-Dx*<sup>™</sup> currently being developed for the detection of cancer in blood samples. ReCyte Therapeutics, Inc. is developing applications of BioTime's proprietary induced pluripotent stem cell technology to reverse the developmental aging of human cells to treat cardiovascular and blood cell diseases. BioTime's subsidiary LifeMap Sciences, Inc. markets *GeneCards*<sup>®</sup>, the leading human gene database, as part of an integrated database suite that also includes the *LifeMap Discovery*<sup>™</sup> database of embryonic development, stem cell research and regenerative medicine, and *MalaCards*, the human disease database. LifeMap Sciences also markets BioTime research products and *PanDaTox*, an innovative, recently developed, searchable database that can aid in the discovery of new antibiotics and biotechnologically beneficial products. BioTime Acquisition Corporation is a new subsidiary being used to acquire the stem cell assets of Geron Corporation, including patents and other intellectual property, biological materials, reagents, and equipment for the development of new therapeutic products for regenerative medicine. BioTime's lead product, *Hextend*<sup>®</sup>, is a blood plasma volume expander manufactured and distributed in the U.S. by Hospira, Inc. and in South Korea by CJ CheilJedang Corporation under exclusive licensing agreements. Additional information about BioTime can be obtained at [www.biotimeinc.com](http://www.biotimeinc.com).

#### **About LifeMap Sciences, Inc.**

LifeMap Sciences' ([www.lifemapsc.com](http://www.lifemapsc.com)) core technology and business is based on its integrated database suite, the discovery platform for biomedical and stem-cell research. This platform includes *GeneCards*<sup>®</sup>, the leading human gene database; *LifeMap Discovery*<sup>™</sup>, the database of embryonic development, stem cell research and regenerative medicine; and *MalaCards*, the human disease database. LifeMap Sciences also markets *PanDaTox*, an innovative, recently developed, searchable database that can aid in the discovery of new antibiotics and biotechnologically beneficial products.

In addition to database offerings, LifeMap Sciences is BioTime's principal internet marketing subsidiary for research products, including *PureStem*<sup>™</sup> human progenitor cell lines, GMP human embryonic stem (hES) cell lines, *ESpan*<sup>™</sup> growth media for progenitor cell lines, and cell differentiation media for non-therapeutic uses, via its *LifeMap BioReagents*<sup>™</sup> portal. LifeMap Sciences utilizes its databases as part of its online marketing strategy to reach life sciences researchers at biotech and pharmaceutical companies and at academic institutions and research hospitals worldwide.

In a therapeutic discovery collaboration with BioTime, LifeMap's scientists utilize LifeMap's proprietary platform, including *LifeMap Discovery*<sup>™</sup>; its stem cell database along with the *GeneCards*<sup>®</sup> and *MalaCards* integrated database suite, to aid in the development of BioTime's proprietary *PureStem*<sup>™</sup> human progenitor cell lines into products for the treatment of human diseases, especially degenerative diseases that might be treatable with cell replacement therapies. The *LifeMap Discovery*<sup>™</sup> platform will be used to select the progenitor cell lines that are most likely to be useful in developing cell-based regenerative medicine therapies for a wide range of diseases.

#### **Forward-Looking Statements**

Statements pertaining to future financial and/or operating results, future growth in research, technology, clinical development, and potential opportunities for BioTime and its subsidiaries, along with other statements about the future expectations, beliefs, goals, plans, or prospects expressed by management constitute forward-looking statements. Any statements that are not historical fact (including, but not limited to statements that contain words such as "will," "believes," "plans," "anticipates," "expects," "estimates") should also be considered to be forward-looking statements. Forward-looking statements involve risks and uncertainties, including, without limitation, risks inherent in the development and/or commercialization of potential products, uncertainty in the results of clinical trials or regulatory approvals, need and ability to obtain future capital, and maintenance of intellectual property rights. Actual results may differ materially from the results anticipated in these forward-looking statements and as such should be evaluated together with the many uncertainties that affect the business of BioTime and its subsidiaries, particularly those mentioned in the cautionary statements found in BioTime's Securities and Exchange Commission filings. BioTime disclaims any intent or obligation to update these forward-looking statements.

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