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EMERGING COMPANY PROFILE

ACCELERATING STEM CELLS

By Stephen Parmley, Senior Writer

Growing human pluripotent stem cells on adherent surfaces is inefficient, expensive and often doesn't yield homogeneous cell preparations. Accellta Ltd. has suspension-based, feeder-free methods that produce homogeneous pluripotent stem cells and differentiate them in sufficient quantities for multiple research and therapeutic applications.

Adherent culture systems are often unwieldy because they require feeder cells to provide growth factors, animal serum-derived supplements in the medium, enzymes to detach the cells from the adherent surfaces and multiple changes of culture medium. Accellta CEO Itzchak Angel said the company has two technologies that eliminate the need for all those requirements: Singles, for growing large numbers of stem cells in single-cell suspension; and Maxells, for growing small clumps of cells and rapidly differentiating them in suspension.

The technologies were discovered by CTO Michal Amit and Joseph Itskovitz-Eldor at the Technion - Israel Institute of Technology. In a 2010 *Stem Cell Reviews and Reports* study, the duo showed that medium supplemented with FGF and a soluble chimeric cytokine enabled undifferentiated stem cells to proliferate as floating clumps and expand without losing stem cell markers or pluripotency. They later optimized the formulation with additional growth factors and serum replacements, and the Alfred Mann Institute at the Technion Ltd. (AMIT) spun out the technology into Accellta in 2012.

Amit is co-founder and CTO of Accellta and senior scientist at the Technion. Itskovitz-Eldor is director of the Technion's Stem Cell Center.

Accellta has adapted the technology to maximize the quantities of cells produced while minimizing the time and medium needed. For example, Angel said, expanding stem cells to 10 billion cells in an adherent culture system takes about 40 days and 70 liters of medium, but Accellta can produce the same number of cells in 14-16 days using only 1 liter of medium and at about 2% of the cost. Moreover, the resulting stem cells also can be differentiated to tissue progenitors or the final cell type in suspension.

ACCELLTA LTD., Haifa, Israel
Technology: Scalable production of stem cells in feeder-free, carrier-free suspension
Disease focus: Gene/Cell therapy, Supply/Service
Clinical status: NA
Founded: 2012 by Michal Amit and the Alfred Mann Institute at the Technion Ltd. (AMIT)
University collaborators: Technion - Israel Institute of Technology, iPS Academia Japan Inc.
Corporate partners: StemCell Technologies Inc. and Tokyo Electron Ltd.
Number of employees: 15
Funds raised: $4 million
Investors: Horizons Ventures, AMIT and Technion - Israel Institute of Technology
CEO: Itzchak Angel
Patents: 7 issued covering methods and media for growth and differentiation of stem cells in feeder-free suspension cultures

He added that Accellta cultivates cells in bioreactors that can produce 100 billion cells in one batch and the methods allow continuous medium flow and cell harvesting.

Additionally, induced pluripotent stem (iPS) cells and embryonic stem cells (ESCs) grown with Singles or Maxells are more homogeneous and have a higher degree of pluripotency (>95%) than cells grown under adherent conditions (~80%).

Angel said stem cells produced by Accellta can be used for drug screening and toxicology studies, and could accelerate advancements in 3D organ printing by generating the large quantities of homogeneous tissue progenitor cells needed to produce the organs.

At least two other companies have developed methods for growing stem cells in suspension bound to hydrogels or microcarriers, but no other companies have methods that enable feeder-free and completely carrier-free growth of stem cells in suspension.

Accellta has non-exclusively licensed its technologies to several media supply companies and is now seeking pharma

partners interested in using its technology, expertise and in-house GMP stem cell manufacturing facility.

The company is also raising $5-$8 million in a series B round to enable further development of its technologies and manufacturing capabilities and expects to complete this round by 1Q16.

COMPANIES AND INSTITUTIONS MENTIONED

Accellta Ltd., Haifa, Israel

Alfred Mann Institute at the Technion Ltd. (AMIT), Haifa, Israel

Technion - Israel Institute of Technology, Haifa, Israel

TARGETS

FGF - Fibroblast growth factor

REFERENCES

Amit, M., et al. "Suspension culture of undifferentiated human embryonic and induced pluripotent stem cells." *Stem Cell Reviews and Reports* **(2010)**

BIOCENTURY PUBLICATIONS, INC.

NEWSROOM
pressreleases@biocentury.com

SAN CARLOS, CA
+1 650-595-5333; Fax: +1 650-595-5589

CHICAGO
+1 312-755-0798; Fax: +1 650-595-5589

WASHINGTON, DC
+1 202-462-9582; Fax: +1 202-667-2922

UNITED KINGDOM
+44 (0)1865-512184; Fax: +1 650-595-5589