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Two UC San Diego Scientists Receive Stem Cell Technology Grants

Funding targets development of 3D bioprinting of cardiac tissue and improved function of transplanted stem cells

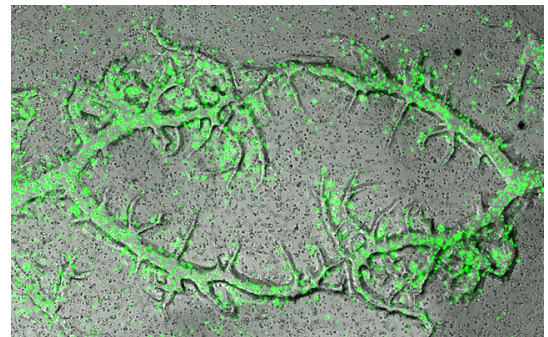
The governing board of the California Institute for Regenerative Medicine (CIRM) has awarded two University of California, San Diego researchers almost \$3 million in combined funding to pursue new technologies intended to accelerate advances moving stem cell therapies out of the lab and into the clinic.

The funding was part of almost \$30 million in new Tools and Technologies awards announced at CIRM's monthly meeting in San Francisco.

"Sometimes even the most promising therapy can be derailed by a tiny problem," said Jonathan Thomas, JD, PhD, chair of the CIRM Board. "These awards are designed to help find ways to overcome those problems, to bridge the gaps in our knowledge and ensure that the best research is able to keep progressing and move out of the lab and into clinical trials in patients."

Shaochen Chen, PhD, professor in the Department of Nanoengineering in the Jacobs School of Engineering and a member of the Institute of Engineering in Medicine at UC San Diego, received a \$1.3 million in CIRM funding for development of 3D bioprinting techniques using human embryonic stem cell-derived heart muscle cells to create new cardiac tissue.

Millions of Americans suffer from cardiovascular disease, specifically congestive heart failure in which a heart valve ceases to work properly. Current treatment often calls for a valve transplant, but donor availability does not meet need.



Human umbilical vein endothelial cells co-cultured with human embryonic stem cell-derived cardiomyocytes in 3D-printed hydrogel. Image courtesy of Shaochen Chen, UC San Diego.

Chen and colleagues are exploring the possibility of engineering healthy cardiac tissues bioprinted from heart muscle cells, called cardiomyocytes, created from human embryonic stem cells. These tissues could then be implanted in a damaged heart, restoring function.

Shyni Varghese, PhD, associate professor in the Department of Bioengineering at the Jacobs School of Engineering and director of the Bio-Inspired Materials and Stem Cell Engineering Laboratory, received a \$1.4 CIRM grant to improve *in vivo* function of transplanted stem cells.

Varghese's lab focuses upon the complex interactions of cells with their surrounding microenvironment, and how the conditions necessary to promote normal, healthy survival and growth occur.

Recently, the promise of stem cell therapies has dramatically advanced toward clinical application. Late last year, three first-in-human, stem cell-based phase one safety trials were launched under the auspices of Sanford Stem Cell Clinical Center at UC San Diego Health. The trials are investigating therapies to treat spinal cord injuries, diabetes and leukemia.

UC San Diego is one of three sites in the CIRM Alpha Clinics network. Designation as an Alpha Clinic provides additional funding and support to speed clinical development of potential stem cell therapies. The CIRM Alpha Clinic at UC San Diego is the home for cell therapy development at the Sanford Center.

The new grants raise UC San Diego's total to more than \$150 million in CIRM funding since the first awards in 2006.

MEDIA CONTACT

Daniel Kane, 858-534-3262, dbkane@ucsd.edu

Scott LaFee, 858-249-0456, slafee@ucsd.edu

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