

UC San Diego Researchers Receive New CIRM Funding

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Stem cell grants covers heart failure, Alzheimer's disease, ALS and spinal cord injuries

Five scientists from the University of California, San Diego and its School of Medicine have been awarded almost \$12 million in new grants from the California Institute for Regenerative Medicine (CIRM) to conduct stem cell-based research into regenerating spinal cord injuries, repairing gene mutations that cause amyotrophic lateral sclerosis and finding new drugs to treat heart failure and Alzheimer's disease.

The awards mark the third round of funding in CIRM's Early Translational Awards program, which supports projects that are in the initial stages of identifying drugs or cell types that could become disease therapies. More than \$69 million in awards were announced yesterday, including funding for first-ever collaboratively funded research projects with China and the federal government of Australia.

"With these new awards, the agency now has 52 projects in 33 diseases at varying stages of working toward clinical trials," said Jonathan Thomas, JD, PhD and CIRM governing board chair. "Californians should take pride in being at the center of this worldwide research leading toward new cures. These projects represent the best of California stem cell science and the best international experts who, together, will bring new therapies for patients."

The five new UC San Diego awards are:

- → With a \$1.8 million award, **Lawrence Goldstein**, PhD, professor in the Department of Cellular and Molecular Medicine, Howard Hughes Medical Institute Investigator and director of the UC San Diego Stem Cell Program, and colleagues will continue their work developing new methods to find and test drug candidates for Alzheimer's disease (AD). Currently, there is no effective treatment for AD. The researchers screen novel candidates using purified human brain cells made from human reprogrammed stem cells. Already, they have discovered that these human brain cells exhibit a unique biochemical behavior that indicates early development of AD in a dish.
- → **Mark H. Tuszynski**, MD, PhD, professor of neurosciences and director of the Center for Neural Repair at UC San Diego, and colleagues seek to develop more potent stem cell-based

treatments for spinal cord injuries. By combining grafts of neural stem cells with scaffolds placed at injury sites, the researchers have reported substantial progress in restoring functional improvement in impaired animal models. The new \$4.6 million grant will fund work to identify the optimal human neural stem cells for preclinical development and, in an unprecedented step, test this treatment in appropriate preclinical models of spinal cord injury, providing the strongest validation for human translation.

- → Amyotrophic lateral sclerosis or ALS (Lou Gehrig's disease) is a progressive neurological condition that is currently incurable. **Gene Yeo**, PhD, assistant professor in the Department of Cellular and Molecular Medicine, and colleagues will use a \$1.6 million grant to exploit recent discoveries that specific mutations in RNA-binding proteins cause neuronal dysfunction and death. They will use neurons generated from patient cells containing the mutations to identify the unique RNA "signature" of these doomed neurons and screen for drug-like compounds that bypass the mutations to correct the RNA signature to obtain healthy neurons.
- → **Eric David Adler**, MD, an associate clinical professor of medicine and cardiologist, studies heart failure, including the use of stem cells to treat it. His \$1.7 million award will fund research into Danon disease, a type of inherited heart failure that frequently kills patients by their 20s. Adler and colleagues will turn stem cells created from skin cells of patients with Danon disease into heart cells, then screen hundreds of thousands of drug candidates for beneficial effects. The most promising drugs will subsequently be tested on mice with a genetic defect similar to Danon disease, with the ultimate goal of identifying a suitable candidate for human clinical trials. The research may have broader applications for other conditions with similar pathogenesis, such as cancer and Parkinson's disease.
- → **Yang Xu**, PhD, a professor in the Division of Biological Sciences at UC San Diego, also investigates heart failure, which currently has limited, effective therapeutic options. His grant for \$1.8 million will support research into using human embryonic stem cells to produce a renewable source of human cardiomyocytes (heart muscle cells) to replace cells damaged or destroyed by disease. Xu's work will specifically focus upon overcoming immunological resistance to the new cells.

CIRM was established in November 2004 with the passage of Proposition 71, the California Stem Cell Research and Cures Act. The statewide ballot measure provided \$3 billion in funding for stem cell research at California universities and research institutions and called for the establishment of an entity to make grants and provide loans for stem cell research, research facilities, and other vital research opportunities.

The May 24 grants bring UC San Diego's total to more than \$112 million in CIRM funding since the first awards in 2006.

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Media Contact: Scott LaFee, 619-543-6163, slafee@ucsd.edu

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