UW-Madison: To partner in $20 million in cell-based therapy center

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CONTACT: Sean Palecek, sppalecek@wisc.edu, 608-262-8931

MADISON – The National Science Foundation has awarded nearly $20 million to a consortium of universities, including the University of Wisconsin-Madison, to support a new engineering research center that will develop transformative tools and technologies for the consistent, scalable and low-cost production of high-quality living therapeutic cells. Such cells could be used in a broad range of life-saving medical therapies now emerging from research laboratories.

The new NSF Engineering Research Center for Cell Manufacturing Technologies (CMaT) will be led by the Georgia Institute of Technology. Working closely with industry and clinical partners, CMaT could help revolutionize the treatment of cancer, heart disease, autoimmune diseases and other disorders.

UW-Madison was selected as a major partner in CMaT, a consequence of the university's pioneering efforts in stem cell engineering and a long history of collaboration between its College of Engineering and School of Medicine and Public Health, says Sean Palecek, professor in chemical and biological engineering and CMaT's associate director for research. Additional partners include the University of Georgia and the University of Puerto Rico, Mayaguez campus.

The UW-Madison team includes professors of biomedical engineering William Murphy, Randolph Ashton and Krishanu Saha; cardiology Professor Timothy Kamp; medical history and bioethics Professor Linda Hogle; and Mary Fitzpatrick, director of diversity research and initiatives for the College of Engineering.

The UW-Madison researchers will focus on two disease applications: induced

pluripotent stem cells for making heart muscle, and engineered T cells to combat cancer.

In July, the Food and Drug Administration's Oncologic Drugs Advisory Committee endorsed the use of T cells, a type of immune cells in the blood, for treating certain types of blood cancer.

"Engineering the patient's own T cells to recognize and kill tumor cells is one of the new frontiers in cancer research," says Palecek. "But more work is needed to prevent a massive immune response in the patients who receive these modified T cells, and to learn how this type of therapy may eventually be applied to solid tumors as well."

To realize the promise of stem-cell-derived heart muscle cells for survivors of a heart attack, who typically lose about 25 percent of their pump's muscle mass, researchers need to go from making millions of cells to billions while ensuring uniformly high quality.

"Cell therapy is today where biotechnology was in the 1980s," Palecek says. "It is a field with a ton of promise that we know will be big. But since we don't yet have a cure for anything, we need to make plans for a manufacturing process while we don't exactly know yet the specific cell type we're going to manufacture."

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