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FOR IMMEDIATE RELEASE

Pitt Researchers Developing Liver and Joint "Tissue Chips" to Better Predict Drug Safety

PITTSBURGH, Date – Researchers at the University of Pittsburgh School of Medicine have been awarded federal grants to create micro-models of the liver and the arthritic joint as part of a national effort to build 3-D chips of cells and tissues that could provide a more rapid and accurate method of predicting toxicity of experimental therapies, as well as foster greater understanding of myriad diseases.

Of the 17 projects that are being funded by the National Institutes of Health (NIH), two are being led by Pitt researchers and could receive more than $10 million over the next five years. NIH plans to commit up to $70 million over five years for the Tissue Chips for Drug Screening program, which was launched by its new National Center for Advancing Translational Sciences (NCATS). Other awardees include Johns Hopkins University, Harvard University and Duke University.

"Tissue chips could provide a more accurate and less expensive way of testing new drugs and reduce our reliance on animal studies, which often don't reliably reflect toxicity profiles later seen during human testing," noted Arthur S. Levine, M.D., senior vice chancellor for the health sciences and dean, School of Medicine. "It is terrific that our stellar scientists will be able to build two of these chips here and contribute to the evolution of drug testing."

The Pitt projects are:

- **3-D Micro-Liver**: D. Lansing Taylor, Ph.D., Allegheny Foundation Professor of Computational and Systems Biology, and director, University of Pittsburgh Drug Discovery Institute, will lead a team at Pitt and Harvard University to create a three-dimensional microfluidic structure made entirely of human cells that will mimic the acinus, the smallest functional unit of the liver. The team also will develop a panel of sentinel "biosensor cells" that will indicate liver toxicity with exposure to different drugs.

  "The current gold standard of testing is not very gold," Dr. Taylor said. "In humans, the liver plays a key role in processing drugs, and many experimental agents have failed in the late stages of human testing because preclinical studies didn't predict their impact on the liver. This project aims to solve that problem so that we have greater success in drug discovery."

- **3-D Micro-Arthritic Joint System**: Rocky Tuan, Ph.D., the Arthur J. Rooney Sr. Professor of Sports Medicine and executive vice chair for research, Department of Orthopaedic Surgery, will lead a team to create a tissue chip that includes stem cell-produced bone and cartilage cells that simulate joint surfaces to better understand how arthritis develops and how to prevent it.

  "This system will allow us to explore the effects of not only inflammatory molecules and the wear-and-tear of aging on the entire joint, but also mechanical injuries, such as a hit or a sprain, both immediately and over time in molecular detail, which is not feasible with existing techniques," said Dr. Tuan, who also

is director of the Center for Military Medicine Research, director of the Center for Cellular and Molecular Engineering in the Department of Orthopaedic Surgery, and co-director of the McGowan Institute for Regenerative Medicine.

According to NIH, the Tissue Chips program is the result of collaboration between NIH, the Defense Advanced Research Projects Agency (DARPA) and the U.S. Food and Drug Administration, and was established by the NIH's Common Fund and the National Institute of Neurological Disorders and Stroke.

"Serious adverse effects and toxicity are major obstacles in the drug development process," said Thomas R. Insel, M.D., NCATS acting director. "With innovative tools and methodologies, such as those developed by the tissue chip program, we may be able to accelerate the process by which we identify compounds likely to be safe in humans, saving time and money, and ultimately increasing the quality and number of therapies available for patients."

About the University of Pittsburgh School of Medicine
As one of the nation's leading academic centers for biomedical research, the University of Pittsburgh School of Medicine integrates advanced technology with basic science across a broad range of disciplines in a continuous quest to harness the power of new knowledge and improve the human condition. Driven mainly by the School of Medicine and its affiliates, Pitt has ranked among the top 10 recipients of funding from the National Institutes of Health since 1997. In rankings recently released by the National Science Foundation, Pitt ranked fifth among all American universities in total federal science and engineering research and development support.

Likewise, the School of Medicine is equally committed to advancing the quality and strength of its medical and graduate education programs, for which it is recognized as an innovative leader, and to training highly skilled, compassionate clinicians and creative scientists well-equipped to engage in world-class research. The School of Medicine is the academic partner of UPMC, which has collaborated with the University to raise the standard of medical excellence in Pittsburgh and to position health care as a driving force behind the region's economy. For more information about the School of Medicine, see www.medschool.pitt.edu.

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