Taking cancer cells out of circulation and other feats of biomechanical engineering

July 30 2014

It might seem unlikely for a mechanical engineer to receive research funding from the American Heart Association (AHA), but in 2013 Weiqiang Chen, one of the newest members of the Department of Mechanical and Aerospace Engineering, was awarded a pre-doctoral fellowship from the respected organization.

Chen, a recent graduate of the University of Michigan and a vital member of that school's Integrated Biosystems and Biomechanic Lab (IBBL), caught the attention of the AHA because of his work on developing a new microfluidic platform for monitoring the immune system of heart patients after cardiac bypass. Explaining that post-operative infection poses a serious risk for such patients, Chen says, "That project is a good example of how engineers and doctors can collaborate across disciplines. You have probably heard the term translational medicine, which refers to the process of 'translating' research into practical tools and treatments for patient care. Engineers and doctors are working together to get discoveries from [lab] bench to [patient] bedside as quickly as possible."

Chen, who also won a Baxter Young Investigator Award, has been engaged in several other studies as well. Among the most celebrated of these has been the IBBL's discovery that a glass plate with nanoscale topography can be used to capture and examine the circulating tumor cells that carry cancer through the bloodstream. The system, which is effective regardless of the cells' surface proteins or size, will allow researchers to isolate live circulating tumor cells from blood samples in order to study them in unprecedented detail—an ability that may one day lead to improved diagnostic tools.

Chen has also attracted attention for his part in developing a cutting-edge method of cultivating stem cells that allows scientists to quickly and accurately predict differentiation (the process by which the cells morph into other types of cells). The discovery—which involves building a stem-cell scaffold whose stiffness can be controlled mechanically rather than chemically—is expected to open up myriad possibilities for regenerative therapies and drug treatments. (The scaffolding is made of polydimethylsiloxane, an elastic polymer that also happens to be a key component in Silly Putty.)

He expects to continue his bioengineering research here and is excited about the opportunities for collaboration that the school provides. "There are many faculty members I'm looking forward to working with from across the university," he says. "I'm eager to get started."

Provided by New York University

Citation: Taking cancer cells out of circulation and other feats of biomechanical engineering (2014, July 30) retrieved 23 April 2024 from https://medicalxpress.com/news/2014-07-cancer-cells-circulation-feats-biomechanical.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.