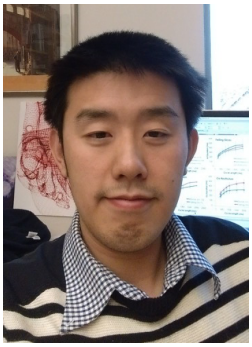
Biomedical Engineering Department Journal Club

Human Organotypic Cultured Cardiac Slices: New Platform for High Throughput Preclinical Human Trials



Chaoyi Kang is a BME Ph.D. student in the Efimov Cardiovascular Engineering Lab. His research entails investigating the remodeling of sympathetic pathways in adult human hearts that occur during heart failure. To that end, he has developed a novel technology for rapid electrophysiology phenotyping of human cardiac tissue.

DATE: **Monday, March 7th, 2016**
TIME: **10:00-10:30 AM**
PLACE: **SEH Room 2000**

ABSTRACT

Translation of novel therapies from bench to bedside is hampered by profound disparities between animal and human genetics and physiology. The ability to test for efficacy and cardiotoxicity in a clinically relevant human model system would enable more rapid therapy development. We have developed a preclinical platform for validation of new therapies in human heart tissue using organotypic slices isolated from donor and end-stage failing hearts. Major advantage of the slices when compared to human iPS-derived cardiomyocytes is that native tissue architecture and extracellular matrix are preserved, thereby allowing investigation of multi-cellular physiology in normal or diseased myocardium. To validate this model, we used optical mapping of transmembrane potential and calcium transients. We found the normal human electrophysiology is preserved in slice preparations when compared with intact hearts, including slices obtained from the region of the sinus node. Physiology is maintained in slices during culture, enabling testing acute and chronic effects of pharmacological, gene, cell, optogenetic, device, and other therapies. This methodology offers a powerful high-throughput platform for assessing physiological response of the human heart to disease and novel putative therapies.

For questions or more information:

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