BIOMEDICAL ENGINEERING
Carnegie Mellon University

Thursday, November 1, 2018
10:30 – 11:30 a.m.
Baker Hall 136A

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Engineering Biomaterials for Cell Reprogramming

Abstract: Cell reprogramming into induced pluripotent stem cells or into a completely different lineage has wide applications in regenerative medicine, disease modeling and drug screening. Although the roles of transcriptional factors and chemical compounds in direct reprogramming have been widely studied, the effects of biophysical factors on cell reprogramming are not well understood. We engineered micro-structured materials that modulated cell nucleus and epigenetic state, which in turn enhanced cell reprogramming efficiency. In addition, we identified chemical cocktails for cell reprogramming, and developed nanoparticles for a controlled release of these chemicals that selectively expanded and differentiated endogenous progenitors into functional cells for tissue regeneration in situ. Our work demonstrates that functionalized biomaterials can be tailored with desirable biophysical and biological properties and have tremendous potential for stem cell engineering, cell reprogramming and regenerative medicine applications.