UCLA Engineering

HENRY SAMUELI SCHOOL OF ENGINEERING AND APPLIED SCIENCE

BIOENGINEERING

PRESENTS Mechanobiology of Cell Reprogramming



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ABSTRACT:

It has largely been accepted that biophysical cues can regulate a variety of cell functions, including signal transduction from the cell membrane through the cytoplasm to the nucleus. The regulation of signaling molecules by biophysical factors represents the early responses of cells, which can lead to the activation of transcriptional factors resulting in differential gene expression and cell functions. On the other hand, recent studies have also demonstrated that biophysical factors have a long-term effect on phenotypic changes, modulating stem cell differentiation and cell reprogramming. The change of cell phenotype stems from the modulation of its epigenetic state, the "memory" of a cell. By using cell reprogramming into induced pluripotent stem cells and neurons as models, I will discuss how biophysical cues such as microtopography, substrate stiffness and fluid shear stress can modulate the cell reprogramming process, through either epigenetic modifications or transcriptional regulation. These findings will lead to new cell engineering approaches for the applications in regenerative medicine, disease modeling and drug screening.

BIOGRAPHY:

Dr. Song Li got B.S. and M.S. from Beijing University, and had his Ph.D. and postdoctoral training at UC San Diego. He was a Professor of Bioengineering at UC Berkeley between 2001-2015, and he recently moved to UC Los Angeles as a Chancellor Professor of Bioengineering and Medicine. His research is focused on stem cell engineering, mechanobiology and tissue engineering. His recent work help elucidate the mechanisms of cell reprogramming regulated by biophysical factors and the roles of stem cells in tissue regeneration. Dr. Li has published about 150 papers in various journals including Nature Materials, Nature communications, PNAS, etc. He is activley involved in the translation of research findings to bioengineering applications. Dr. Li has been elected as a Fellow of American Institute of Medical and Biological Engineering, a Fellow of Biomedical Engineering Society, and a Fellow of the International Academy of Medical and Biological Engineering.