

presents the seminar series in **Cancer Biology,
Biotherapy and Nanomedicine**

**“Engineering the molecular dynamics of polymeric
biomaterials for regulating cellular functions”**

Prof. Bian Liming

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The Chinese University of Hong Kong**

Date : 10 August 2018

Time : 11:00 am - 12:30 pm

Venue : Meeting Room 2-130, 1/F, Block 2, To Yuen Building

Abstract

The dynamic properties of polymeric biomaterials at molecular level impart significant impact on the cellular behaviors. Developing tunable molecularly-dynamic polymeric biomaterials is highly instrumental to the fundamental investigation on cellular responses to the dynamic cues in extracellular environment. For example, cellular adhesion is controlled by the dynamic ligation process of surface receptors, such as integrin, to adhesive motifs, such as Arg-Gly-Asp (RGD). Remote control of adhesive ligand presentation on biomaterial surfaces can offer benefits in regulating cell-implant interactions, thereby immune responses or tissue regeneration in vivo. Herein we present a strategy for modulating nanoscale ligand oscillations on 2D biomaterial substrates by adjusting the frequency of an oscillating magnetic field to modulate the adhesion and specialization of stem cells and macrophages. To investigate 3D culture of cells in hydrogels with dynamic network structures, we have developed a series of dynamic hydrogels based on reversible crosslinks with unique properties such as resilient mechanical property, fast relaxation, self-healing, bioadhesiveness, injectability, and promoting recruitment of endogenous cells. These hydrogel properties are not only desirable for potential clinical applications of these hydrogels but also useful for studying the effect of microenvironmental mechanical cues on stem cell behaviors.

About the Speaker

Dr. Bian received his B.Eng and M.Sc degree from the National University of Singapore in 2002 and 2004, respectively. Dr. Bian completed his Ph.D. study in Biomedical Engineering at Columbia University in 2009. Dr. Liming Bian then conducted his postdoctoral research in the Department of Bioengineering, the University of Pennsylvania from 2009 to 2012. In 2012, Dr. Bian joined the Chinese University of Hong Kong as an assistant professor. Dr. Bian's research focuses on the development of novel multiscale biomaterials not only for investigating the role of cell microenvironment factors on stem cell behaviors but also for facilitating the regeneration of diseased or injured tissues and organs. Dr. Bian's research work has been published in the leading journals including PNAS, JACS, Nano Letters, Biomaterials, Advanced Functional Materials, ACS Nano, Macromolecules, Chemistry of Materials, etc.

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All are welcome!