



The Chinese University of Hong Kong

Department of Biomedical Engineering



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Seminar Link:

<https://cuhk.zoom.us/j/91220644747?pwd=Rm10eUpDR3VIRIZCNnJrdVhkZ3Z6UT09>

Developing Innovative Biomaterials with Molecular Dynamics for Biomedical Applications



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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. On 2D biomaterial interfaces, cellular adhesion is controlled by the dynamic ligation process of surface receptors, such as integrin, to adhesive motifs, such as Arg-Gly-Asp (RGD). Dynamic control of adhesive ligand presentation on biomaterial surfaces at molecular level can offer benefits in regulating cell-implant interactions, thereby immune responses or tissue regeneration in vivo. We have developed strategies for modulating nanoscale ligand presentation on 2D biomaterial substrates via dynamic polymer-nanomaterial hybrid structures to modulate the adhesion and specialization of stem cells and macrophages. Furthermore, to investigate the impact of 3D dynamic biomaterial matrix on cellular developments, 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.

Biography

Prof. Bian Liming is currently an Associate Professor in the Department of Biomedical Engineering at the Chinese University of Hong Kong. Prof. Bian completed his Ph.D. study in Biomedical Engineering at Columbia University in 2009. Prof. Liming Bian then conducted his postdoctoral research in the Department of Bioengineering, the University of Pennsylvania from 2009 to 2012. In 2012, Prof. Bian joined the Chinese University of Hong Kong as an Assistant Professor. Prof. 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. Prof. Bian's

research work has been published in the leading journals including Science Translational Medicine, PNAS, JACS, Nano Letters, Biomaterials, Nature Communications, Science Advances, Advanced Materials, Advanced Functional Materials, Advanced Science, ACS Nano, Macromolecules, ACS Central Science, and Chemistry of Materials.

***** ALL ARE WELCOME *****

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