



SEMINAR

Cell Mechanotransduction and Force Transmission

Date: 27 July, 2026 (Monday)
Time: 10:30 a.m.
Venue: Room 7-34 & 7-35, Haking Wong Building
HKU

Speaker: Professor Qiang Wei
College of Polymer Science & Engineering,
State Key Laboratory of Advanced Polymer Materials
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Abstract:

Cells generate traction forces via the actomyosin cytoskeleton to sense the mechanical properties of their microenvironment, translating these physical cues into gene transcription activities that dictate phenotypic adaptation. Here, we demonstrate that beyond conventional intracellular force transmission and mechanotransduction pathways, the deactivation rate of phosphorylated signaling proteins within these cascades serves as a critical rate-limiting factor in regulating signal activation. Furthermore, we show that the translocation of cytoplasmic actin into the nucleus elevates nuclear tension and promotes chromatin accessibility, thereby driving mechanosensitive cellular phenotypes. By modulating these cellular mechanotransduction pathways, we successfully controlled the senescence and differentiation of mesenchymal stem cells (MSCs), facilitating their application in tissue engineering. Integrating cell mechanoregulation with three-dimensional (3D) culture systems, we achieved the first successful mass production of human extracellular matrix (ECM) proteins, yielding products that exhibit outstanding clinical efficacy in tissue regeneration.

Biography:

Prof. Qiang Wei is a full professor at College of Polymer Science & Engineering, State Key Laboratory of Advanced Polymer Materials in Sichuan University. He received a bachelor degree in Polymer Materials & Engineering at Sichuan University in 2008 and a master degree in Biomedical Engineering at the same university in 2011. He earned his Ph. D. Degree at the Institute of Chemistry and Biochemistry, Free University of Berlin (FUB) in 2014. He became a postdoctoral fellow at Max Planck Institute for Medical Research (MPGMF) from 2015 and the project leader of FUB-MPGMF joint project for cell mechanotransduction from 2017. Since June 2019, He has become a full professor in Sichuan University and focus on mechanobiology. His research aims to elucidate how cells sense and decode physical and mechanical cues from their microenvironment, to clarify the mechanisms by which these forces are transmitted and transduced within cells, and to understand how mechanical signals regulate gene transcription and cell fate determination. By leveraging synergistic mechanochemical signaling regulation strategies, a human stem cell protein expression system was established, resulting in the co-founding of Maybio Tech Co., Ltd. and enabling the large-scale production and clinical translation of human extracellular matrix for tissue regeneration. He has published numbers of papers in the leading journals such as Cell Stem Cell, Cancer Discovery, PNAS, Nature Communications, Science Advances, Research, Nano Letters and so on. He is also the Associate Editors of Translational Research.

ALL INTERESTED ARE WELCOME

For further information, please contact Professor L. Xu at 3917 2628.