

2016 EXTERNAL SPEAKER PROGRAM

Australian Regenerative Medicine Institute

Systems Mechanobiology in bone tissue engineering and skeletal regeneration

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Abstract

Mechanical forces play a central role in determining the 3D spatial organisation of biological tissues. Bone tissue, for example, utilizes mineralized collagen to resist both tensile and compressive stresses. Various elements such as cell migration, shape change, orientation or matrix synthesis can be explained in terms as cell attachment sites, matrix anisotropy, stress-shielding, force vectors or rates of strain. The research field investigating how cells interpret external loads imposed on their extracellular environment and how cell-substrate interactions are converted into biochemical signals in mechanically active tissues such as bone is referred to as Mechanobiology. The importance of Mechanobiology in tissue engineering is constantly growing; an understanding of the effect of mechanical stimuli on tissue growth is increasingly seen as the next major research focus in this area. As part of this lecture, emerging as well as state-of-the-art experimental and computational techniques will be presented and how these techniques might be used in a mechanical system biology approach to further our understanding of the mechanisms governing bone remodeling and repair.

Bio

Dr Müller is currently a Professor of Biomechanics at the Department of Health Sciences and Technology and heads the laboratory for Bone Biomechanics at ETH Zürich in Switzerland. Prior to his tenure at ETH Zürich, he served as an Assistance Professor at Harvard University and as an SNF Professor at ETH Zürich. The research he has completed and is currently pursuing employs state-of-the-art biomechanical testing and simulation techniques as well as novel bio-imaging and visualization strategies for musculoskeletal tissues. He is an author of over 300 peer-reviewed ISI listed publications in international scientific journals and conference proceedings. He has also received a number of awards, including the Inaugural John Haddad Young Investigator Award from the American Society of Bone and Mineral Research.



DATE: 07 December 2016

TIME: 10 – 11 am

**VENUE: Seminar Room
Level 3
15 Innovation Walk
Monash University
Clayton Campus**