April 13, 2018

The Japan Society of Mechanical Engineers
Hokkaido Branch
"Biomechanics Research Meeting"
32nd Seminar

Chairman: Toshiro Ohashi

The Biomechanics Research Meeting will sponsor presentations by Prof. Mohammad R. K. Mofrad from niversity of California Berkeley, USA. Faculty members, graduate students, and undergraduates are encouraged to participate in the seminar.

Date&Time: April 20, 2018, 13:30 - 14:30

Place: Room#A1-17, Faculty of Engineering, Hokkaido University

Speaker: **Prof. Mohammad R. K. Mofrad**

Departments of Bioengineering and Mechanical Engineering, University of California Berkeley, USA

Title: **Nanobiomechanics of Cellular Mechanotransduction**

Living cells sense mechanical signals, and respond actively by changing their phenotype. This process, termed as cellular mechanotransduction, is mediated by a combination of biochemical and biophysical mechanisms via mechanically induced changes in the structure and function of specific molecules and molecular complexes. Our specific attention is on the role of three macromolecular systems in cellular mechanotransduction, namely the integrin-mediated focal adhesions bridging the cell with the extracellular matrix (ECM), and linkers of the nucleoskeleton and cytoskeleton (LINC complexes), and the nuclear pore complex (NPC) at the interface between the cytoplasm and nucleus. Focal adhesions are the immediate sites of cell interaction with the ECM, and as such they play a key role in mechanosensing and mechanotransduction at the edge of the cell. LINC complexes physically link the cytoskeleton and nucleoskeleton to regulate force transmission to the nucleus; their direct associations with focal adhesions through filamentous actin bundles results in ultrafast mechanotransduction. Nuclear pores could also play a role in the overall process of cellular mechanotransduction by exquisitely controlling the material transport in and out of the nucleus, thereby regulating gene expression and protein synthesis. In this seminar, I will present some of our recent efforts aimed at better understanding of these interconnected molecular systems in the context of cellular mechanotransduction.

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