

BioSyM Seminar Series 2017

Nanoscale architecture and molecular mechanosensing of cadherin mediated adhesion

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Venue : Level 5, Perseverance Room



Abstract

At the molecular scale, the structure-function paradigm has been one of the key guiding principles in biology. However, our understanding of the structure-function relationship at the nanoscale (10-200 nm) has long been very sparse. Technological bottlenecks have limited our understanding of biological systems at such nanoscale, as this length scale is too small for light microscopy, which is unable to resolve features smaller than ~250 nm due to the diffraction limit. With the development of superresolution microscopy, this length scale has recently been opened up for fluorescence-based imaging. We have been using this technology to decipher the nanoscale architecture of a complex protein-based machine, such as cadherin-mediated adhesion. The underlying molecular architecture of the cadherin-mediated adhesion that orchestrates the complex regulation, maintenance and mechanosensitivity of the cell-cell adhesions was difficult to infer, due to its characteristic depth in the cell monolayer. Using superresolution fluorescence microscopy associated to biomimetic cadherin substrate, we mapped key protein of the cadherin mediated adhesion, revealing a surprisingly well-organised multi-compartment molecular architecture and its nanoscale modulation, thus providing the blueprint of cadherin-mediated adhesion protein organization with an unprecedented resolution.

Short Biography

Dr. Cristina Bertocchi is Senior Research Fellow at the Mechanobiology Institute (NUS). She received her MSc in Biology at the University of Milan (Italy) in 2002 and her PhD in Physiology at the University of Innsbruck (Austria) in 2008. She joined the Mechanobiology Institute (NUS) in 2011. Her research interest is to understand the molecular basis and dynamics regulating complex physiological function, in particular how cells communicate, interact and sense mechanical stimuli.