



As part of our “Nano & Micro-environments for Cell Biology” seminar series, we are delighted to invite you to attend this seminar to be given in english by :

Benoit LADOUX

Institut Jacques Monod
Université Paris Diderot

Thursday 31 October 2013
11am



Large scale behaviors of living cells: from rigidity mechanosensing of single cells to collective cell migration

Salle des séminaires - LIPhy
Bât E - 140 Avenue de la Physique
Campus St Martin d'Hères

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Large scale behaviors of living cells: from rigidity mechanosensing of single cells to collective cell migration

One of the important feature of cell adhesion and migration is the ability to generate active forces. I will first present recent experiments describing single cell responses to substrates of various stiffnesses and the implication of various internal mechanosensitive components such as the actin cytoskeleton and adhesion complexes. Then I will focus on collective cell behaviors which plays a pivotal role in biological systems in regulating various processes such as gastrulation, morphogenesis and tissue organization.

By combining experimental approaches and numerical modeling, we explore how physical constraints modulate collective behavior within epithelial cell sheets. We show that the geometrical properties of the environment regulate the formation of collective cell migration patterns through cell-cell interactions. Using micro patterning methods to restrict cell migration to well-defined geometries (lines or circles), we identified the modes of collective migration in response to such constraints. Finally, I will present how these approaches can be used to probe the mechanical responses of various epithelial tissues.

With a background in Physics, Prof Ladoux started his career at Curie Institute working on single molecule biophysics. He worked on two main problems combining statistical physics, microfabrication and molecular biology: 1) chromatin condensation in real time; 2) fluctuations of a single polymer under shear flows. After a post-doc on cell mechanics, he used his knowledge in biophysics and microfabrication to develop original systems to characterise the mechanical interactions of cells with their migration support. Introduced to Singapore by Prof Sheetz whom he collaborates with, he is now involved as a Principal Investigator in the MechanoBiology Institute of Singapore.

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