Séminaire de biophysique

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

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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.