
Seminar

Collective behavior of cells and cytoskeletal networks and the spatial patterning of *Drosophila* epithelia

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The morphogenesis and maintenance of tissues relies on dynamic and often heterogeneous cell behaviors. Using *Drosophila* dorsal closure as a model, we investigate the origin of these heterogeneities as well the basis for their coordination that results in the robust stereotypical dynamics of the participating tissues. Using targeted (single cell) genetic and nanoscale laser perturbations, 4D live confocal microscopy and quantitative morphometry, we characterize the nature of these heterogeneities and the spatiotemporal evolution of precision in tissue dynamics. We show that differences in cell behavior result from differences in the spatial organization of cell-cell adhesion and the actomyosin and microtubule cytoskeleton. These anisotropies are in turn generated by stochastic fluctuations in signaling and mechanical stresses that can act cell autonomously and non-autonomously. Our findings are beginning to provide insights into the local control of cell behavior and their influence on the spatial patterning of tissues during morphogenesis. They also provide an explanation for compromised tissue integrity in metabolic and oncological pathologies and hint at the intricate interplay between mechanical and chemical cues in multicellular sensing.

Wednesday, Oct 7th 2015

4:00 PM (Tea/Coffee at 3:45 PM)

Seminar Hall, TCIS