CDB SEMINAR

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Friday, June 1, 2012
16:00~17:00 A7F Seminar Room

Microfabricated substrates as a tool to study cell mechanotransduction & collective cell migration

Summary

Cell interactions with their microenvironment affect many cellular functions such as spreading, migration and even differentiation. These interactions can be studied by incorporating micro- and nanotechnology-related tools. The design of substrates based on these technologies offers new possibilities to probe the cellular responses to changes in their physical environment. The investigations of the mechanical interactions of cells and their surrounding matrix can be carried out in well-defined and near physiological conditions. In particular, this includes the transmission of forces as well as rigidity and topography sensing mechanisms. Here, I will first present our study on the single cell response to substrate stiffness. In particular, I will show how cell traction forces are regulated by substrate stiffness. Our results, backed by a phenomenological model based on active gel theory, suggest that rigidity-sensing is mediated by a large-scale mechanism originating in the cytoskeleton instead of a local one. We show that large-scale mechanosensing leads to an adaptative response of cell migration to stiffness gradients.
I will then show that such techniques based on nano- and micro-fabrication can be used to study cell-cell interactions. I will first focus on the mechanosensitivity on cadherin mediated adhesions and then discuss our recent results on the influence of physical constraints on cell-cell rearrangements and collective cell movements within epithelial cell sheets.

Host:
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