Internal Webinar

A minimal model for structure, dynamics, and Rigidity transition of monolayerd cell colonies

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The collective dynamics of cells play the key role in many fundamental biological processes like morphogenesis, tissue repair etc. Madin-Darby canine kidney (MDCK) cells have been established as one model system to study collective cell migration. On the substrates, cells grow in roughly circular colonies, expanding with time and displaying fascinating motile behaviour. Two aspects of their motion lie at the heart of this study: (a) Cells move throughout the colony; reflecting a fluid like behaviour. At the same time, (b) the colonies are extremely cohesive. We propose a minimalistic particle based model which results a fluid like colony while remaining cohesive at the same time. Moreover these collective migrations of cells often exhibit a transition from jammed to unjammed phase and vice-versa. To understand the dynamics, we propose an elastic vesicle model of the cell monolayer which gives some insight physics behind this rigidity transition.

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