

Students' Annual Seminar

Mechano-signalling in cell competition: What does stiffening of extracellular matrix lead to?

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Multicellular organisms have developed the ability to maintain tissue fitness in spite of random mutations. Epithelial cells are best known to display a defence mechanism called cell competition that removes transformed or aberrant individuals. Failure of this surveillance mechanism leads to formation of cancerous tissue overgrowth, developmental abnormalities, and premature ageing. While there are some examples where researchers have shown that cellular mechanical forces influence cell competition, how the mechanical microenvironment of a tissue, primarily represented by the stiffness of its extracellular matrix (ECM), affects this process remains elusive. We have discovered that ECM stiffening acts in an inhibitory manner towards mutant cell elimination. Further, we have identified compressive stress due to mechanical imbalance as the underlying cause of cell competition and shown that stiffening of ECM attenuates this competition-induced compressive stress. Trying to uncover a molecular mechanism, we have found that the actin-binding protein Filamin acts as a mechanical sensor for stiffness-driven cell competition. Together, our results elucidate how mechanical microenvironment and cellular mechanical forces can influence cell competition.

Friday, Apr 12th 2019

3:00 PM (Tea/Coffee at 1:30 PM)

Seminar Hall, TIFR-H