Tata Institute of Fundamental Research
Survey No. 36/P, Gopanpally Village, Serilingampally, Ranga Reddy Dist., Hyderabad – 500 046

Comprehensive Seminar

Impact of Extracellular Matrix Remodelling on Epithelial Defence against Cancer

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Cell competition is a critical tissue surveillance mechanism through which transformed or less fit cells are eliminated by their neighbouring normal cells. This process plays key role in epithelial homeostasis and epithelial defence against cancer. While traditionally viewed through a genetic or cellular lens, recent studies highlight the importance of mechanical properties of the tissue microenvironment in shaping cell competition outcomes. One major mechanical perturbation is fibrosis – a pathological condition marked by excessive extracellular matrix (ECM) deposition and persistent tissue stiffening.

Fibrotic stiffening of the ECM not only disrupts normal tissue architecture but also contributes to disease progression and is increasingly recognised as a risk factor for cancer. In vitro studies suggest that increased ECM stiffness impairs the ability of normal epithelial cells to extrude transformed neighbours, indicating that stiff environments can compromise epithelial defence against cancer.

Building on this background, my work aims to investigate the impact of fibrotic ECM stiffening on cell competition, in a more physiologically relevant pathological setting. Specifically, I seek to understand whether the fibrotic microenvironment facilitates the survival and clonal expansion of transformed cells that would otherwise be eliminated under normal mechanical condition. This study integrates the concepts of cell competition, fibrosis, and mechanotransduction to explore how altered mechanical cues may tip the balance from tumour suppression toward tumour promotion. Understanding this interplay may offer new insights into cancer initiation within chronically fibrotic tissues and uncover potential therapeutic avenues to restore mechanical regulation of epithelial homeostasis.

Monday, May 19th 2025

11:00 Hrs (Tea / Coffee 10:45 Hrs)

Seminar Hall, TIFRH