

Seminar

Investigating the role of matrix stiffness in mitochondrial morphodynamics and function

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The stiffness of the extracellular matrix (ECM), modulates cellular forms and functions predominantly via remodelling of the cytoskeleton. In contrast, very little is known about how the intracellular organelles such as mitochondria respond to matrix stiffness. To this end, we show that matrix stiffness alters mitochondrial morphodynamics. At the molecular level, we identify Drp1 GTPase activity and perinuclear aggregation of filamin as key mechano-players driving these stiffness-sensitive mitochondrial adaptations. Subsequently, we observe similar alterations in mitochondrial form and location in highly mechanosensitive mesenchymal stem cells. In particular, we uncover the importance of perinuclear mitochondrial clustering for the nuclear localisation of RUNX2, the master regulator of osteogenesis. Taken together, our work makes a significant contribution to the field of organelle mechanotransduction and proposes a novel role of mitochondrial positioning in stem cell fate determination.

Tuesday, May 28th 2024

16:00 Hrs (Tea / Coffee 15:45 Hrs)

Auditorium, TIFR-H