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

Seminar

Deciphering the Molecular Landscape of Vesicle-Mediated Signal Transduction

Aniruddha Panda

Yale University, USA

Understanding the intricate interplay between membrane proteins (MPs) and lipids is crucial for deciphering the molecular landscape of various cellular processes and signalling cascades. Traditional methods often necessitate the dissolution of cellular membranes, potentially altering the native structure and dynamics of the complexes. Addressing this technological gap, I have developed a novel tunable lipid-vesicle native-mass spectrometry (nMS) platform, coupled with ion mobility-mass spectrometry (IM-MS). This innovative approach enables the direct determination of the organisation and stability of membrane protein-lipid complexes directly from customisable membranes, resembling the physiological environment.

By applying this platform to study the SNARE machinery involved in synaptic vesicle (SV) fusion, I reveal how neurotransmitter release is regulated by VAMP2-induced lipid clustering at the SV-plasma membrane contact site. These advancements offer profound insights into the dynamics of membrane protein-lipid interactions, advancing our understanding of cellular signalling and processes.

Tuesday, Mar 19th 2024

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

Auditorium, TIFR-H