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

Seminar

Membrane fusion machineries control the organelle dynamics

Subba Rao Gangi Setty

IISc, Bangalore

Membrane-bound compartments deliver their materials through membrane fusion, mediated by SNAREs (soluble-N-ethylmaleimide-sensitive-factor accessory-protein receptors), essential for cargo delivery, degradation, and organelle maturation. Eukaryotes contain around 38 SNAREs and are classified into four groups: Qa-, Qb-, Qc- (or Qbc) and R- SNAREs. During membrane fusion, two or three specific Q-SNAREs form a trans-SNARE complex by interacting with cognate R-SNARE, which brings the two membranes in proximity and promotes fusion. The role of neuronal Qa-SNARE STX1A in secretory vesicle fusion has been well studied; however, its function in non-neuronal cells is poorly defined. Here, we tested the localisation and function of STX1A in HeLa cells. Immunofluorescence microscopy and membrane fractionation studies showed STX1A localises majorly to lysosomes, and its overexpression causes reduced lysosome number and dispersion. Depletion of STX1A in HeLa cells enhanced the distribution of peripheral lysosomes and reduced proteolytical activity without affecting the lysosome content or acidity. These lysosomes accumulated beneath the cell surface and showed decreased lysosome exocytosis. Overall, our studies highlighted that lysosomal localised STX1A contributes to their exocytosis. This process occurs by pairing STX1A with SNAP23 and plasma membrane localised VAMP2. Thus, these studies showed a novel intracellular function to STX1A in regulating lysosomal exocytosis, which is important for the repair of damaged plasma membrane or lysosomes.

Tuesday, Feb 17th 2026

11:30 Hrs (Tea / Coffee 11:15 Hrs)

Auditorium, TIFRH