WINTER SEMESTER 2025 / 2026

RTG 2756 CYTAC SEMINAR SERIES

TUESDAY, DECEMBER 2
17:00 IN HS5

CYTAC
RTG 2756

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REGULATION OF PLASMA MEMBRANE TENSION THROUGH HYDROSTATIC PRESSURE AND ACTIN PROTRUSION FORCES

The plasma membrane and its associated proteins form a critical signaling hub, mediating communication between the extracellular environment and the intracellular space. Previous research suggests that both membrane trafficking and signaling activity are influenced by mechanical tension in the plasma membrane. Despite its importance, the mechanisms by which cells regulate membrane tension remain poorly understood.

Using the optical tension sensor FliptR and AFM-assisted tether force measurements, we investigate plasma membrane tension regulation in mitotic cells by measuring tension changes following cytoskeletal and cell shape perturbations. Our findings show that in both assays, reported tensions are critically influenced by the cytoskeleton, however, with partially deviating trends highlighting the conceptual differences between bare and apparent membrane tension. By integrating experimental data with theoretical modeling, our results suggest that the actin cytoskeleton regulates bare membrane tension through two distinct mechanisms: (i) modulation of intracellular hydrostatic pressure and (ii) adjustment of polymerization forces in actin-rich finger-like protrusions.