

SUMMER SEMESTER 2024

RTG 2756 CYTAC SEMINAR SERIES

TUESDAY, MAY 14
17:00 IN HS3

CYTAC

RTG 2756

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UNRAVELING THE MYSTERIES OF KINESIN MOTORS:

INSIGHTS FROM CRYOEM AND SINGLE-MOLECULE STUDIES

Kinesin motors are integral to numerous cellular processes, yet their molecular functions remain unclear. This talk delves into our investigations on two distinct kinesin family members, shedding light on their functions and structural dynamics. We first explore the neuronal kinesin-3 motor KIF1A, unveiling its distinctive motility and force generation characteristics using optical tweezers. CryoEM reveals distinct conformations of its two motor domains, suggesting the importance of head-head coordination in KIF1A motility. Additionally, our mutagenesis studies underscore the significance of the K-loop in KIF1A's superprocessivity, offering potential avenues for treating KIF1A-related neurological disorders. Finally, we examine the Kinesin-14 motors HSET and KlpA, elucidating their non-processive motility and force generation mechanisms in isolation, as well as their collaborative behavior in teams. Our findings not only deepen the understanding of the structure-function relationships in kinesin motors but also underscore the importance of cooperative activity in their cellular functions. Collectively, our work provides valuable insights into the molecular mechanisms of kinesin motors, paving the way for future therapeutic interventions and drug-design strategies.

