Cell and Molecular Biology

Cellular powerhouses on the move: using imaging approaches to answer open questions about actin-based mitochondrial dynamics

**ABSTRACT**

Mitochondria are pleomorphic organelles that have central roles in cell physiology. Defects in their localization and dynamics lead to human disease. Myosins are actin-based motors that power processes such as muscle contraction, cytokinesis, and organelle transport. My research students and I have spent the last 8 years characterizing myosin-XIX (Myo19), the founding member of a novel class of myosin that associates with mitochondria. The 970 aa heavy chain consists of a motor domain, three IQ motifs, and a short tail. Myo19 mRNA is expressed in multiple tissues, and antibodies to human Myo19 detect an approximately 109 kDa band in multiple cell lines. Both endogenous Myo19 and GFP-Myo19 exhibit striking localization to mitochondria. Expressing full-length GFP-Myo19 in A549 cells reveals a remarkable gain of function where the majority of the mitochondria move continuously. We have used quantitative microscopy-based approaches to begin to dissect how Myo19 associates with mitochondria, the motor properties of the Myo19 motor domain, and under which cellular circumstances Myo19 activity is important. Our work suggests that this novel myosin functions as an actin-based motor for mitochondrial movement.

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Friday March 14. 12:00 – 12:50. Room HM-150   Refreshments/Pizzas