Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, March 8, 2024 @ 12:00 p.m.

presented by:

Alexandra Law

(Advisor: Dr. Angela Scott)

"Implications of Astrocyte Purinergic Dysregulation in a Human Model of Fragile X Syndrome"

Fragile X syndrome (FXS) is the leading monogenic cause of intellectual disability and autism spectrum disorder (ASD). Extensive research has found that dysregulated connections between neurons and astrocytes has led to the development of FXS characteristics. Astrocyte and neuronal communication can be facilitated by purinergic signaling pathways. Previous research has demonstrated that purinergic signaling is dysregulated in the Fmr1 knockout (KO) mouse model, which correlates with increased calcium levels in astrocytes activity driving the aberrant neuronal circuitry. My research aims to investigate whether purinergic signaling is dysregulated within a human-based FXS model of astrocytes derived from human neural progenitor cells (NPCs). Additionally, I am to determine whether astrocyte purinergic dysregulations contributes to the neuronal pathology. The experimental approaches include western blot analysis to confirm purinergic receptor expression, assessment of astrocyte activity via calcium imaging, and exploration of potential changes in neuronal circuit development using microelectrode arrays. Additionally, the study seeks to determine whether FXS astrocytes mediate these changes. Overall, this study could contribute to the foundational insight into the molecular mechanisms underlying FXS pathology within a human model needed to develop therapeutic approaches.

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