

Department of Molecular and Cellular Biology
Graduate Seminar MCB*6500

Wednesday, April 12, 2017 in SSC 1511 @ 12:45 p.m.



presented by:

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Investigating the role of Staufen1 in asymmetric neural precursor cell divisions in the developing cerebral cortex

Neocortical development in mammals is imperative for higher order processes, such as decision-making, reasoning and conscious thought. Furthermore, abnormal cortical development has been implicated in neurodevelopmental disorders such as schizophrenia and autism spectrum disorder and therefore crucial to study the underlying molecular mechanisms involved.

Neural Progenitor cells (NPCs) give rise to both the neurons and glia of the mature brain via a tightly controlled cell division and differentiation program. Differentiation of NPCs occurs via asymmetric divisions resulting in one identical NPC and one differentiated neuron or glia. Asymmetric divisions occur in part by differentially localizing molecular constituents, such as mRNA, between daughters, thus each cell inherits a different molecular profile, ultimately contributing to their cell fate. RNA-binding proteins facilitate these divisions by binding to their RNA targets, temporally inhibiting its translation while spatially localizing the RNA within the dividing cells.

Staufen proteins are a class of RBPs that have been shown as critical regulators of mRNA localization. Furthermore, there is evidence to suggest that isoforms Staufen1 and Staufen2 have differential and opposing functions in the nervous system. While Staufen2 is well characterized to promote neuron differentiation during asymmetric divisions, I hypothesize that Staufen1 functions in NPC renewal, through localizing alternative RNA targets associated in maintaining pluripotency in NPCs. The proposed project will characterize endogenous Staufen1 expression, knockdown Staufen1 in NPCs to examine its effect on differentiation, while also uncovering its RNA and protein interactors.