Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, March 3, 2017 in SSC 1511 @ 12:45 p.m.

presented by:

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Investigating the Role of Nkd1 in Wnt Signaling using Knockout Zebrafish

The Wnt signaling pathway is an essential developmental pathway that controls a variety of different processes ranging from cell proliferation to body axis patterning. It involves binding of an extracellular ligand to a receptor, after which cytoplasmic β-catenin is stabilized. This transcriptional co-activator then translocates into the nucleus to allow for transcription of Wnt target genes. Being highly conserved in nearly all metazoans, the pathway is regulated via several mechanisms to ensure homeostatic levels. One of the ways this is achieved is by using target genes as antagonists, thereby creating a negative feedback loop. The Naked Cuticle Homolog 1 (Nkd1) is an obligate Wnt signaling target gene that has been shown to interact with cytoplasmic β-catenin to attenuate the Wnt pathway; however, evidence for this effect is predominantly seen in cases where the pathway has been over-activated. The advent of the CRISPR/Cas9 system provides an excellent opportunity to further characterize Nkd1's role in Wnt signaling by creating true genetic null organisms. Using this approach, complete *Nkd1* knockout zebrafish will be generated after which the subsequent effect on the phenotype, target gene expression, and cytoplasmic β-catenin will be determined. Based on the known characteristics of Nkd1, I propose that the effects of *Nkd1* knockouts will only be seen in cases where the intensity of Wnt signaling is over stimulated.