

BCHM 421/422 Project – 2022-23

Project Outline: The primary cilium, a tubulin-based signaling organelle expressed by most cells, acts as an autonomous signaling hub to integrate multiple extracellular signals distinctly from what occurs in the bulk cellular environment. In this project, the student will use a cilium-specific probe to measure protein-protein interactions. Briefly, a cilia-targeted proximity labeling enzyme (cilia-APEX) will be expressed in a pre-adipose cell types (3T3-L1 and human mesenchymal stem cells) and used to isolate and identify proteins in the cAMP-signaling system specifically expressed in the cilium. The rationale for these experiments relates to the critical role played by cAMP-signaling in adipogenesis and our desire to regulate this process therapeutically.

Supervisor: Professor Donald Maurice

Project Title: The Primary Cilium: A Hyper-localized Compartment for cAMP Signaling-1

Project Goals: Isolate and identify proteins in the cAMP-signaling system specifically expressed in the cilium

Experimental Approaches: Proximity labelling, immunoblot analysis, proteomics

References: 1) Maurice et al., *Nature Reviews Drug Discovery*, 2014, 13, 290-314

2) Higendorf et al., *Cell*, 2019, 179:1289