

BCHM 421/422 Project – 2023-24

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 FRET-based probe to measure cAMP levels in this compartment in cells. Briefly, a cilia-targeted FRET-based probe (Arl13b-H187) will be expressed in pre-adipose cell types (3T3-L1 and human mesenchymal stem cells) and used to measure cAMP changes specifically within this cellular compartment. 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

Project Goals: Measure hyper-localized changes in cAMP in the primary cilium

Experimental Approaches: Microscopy, transient transfection, protein expression

References: 1) Maurice et al., Nature Reviews Drug Discovery, 2014, 13, 290-314
2) Hilgendorf et al., Cell, 2019, 179:1289