BCHM 421/422 – 2019/2020

Project Outline: Mitochondria are commonly understood as the energy source for the cell, using acetyl-CoA to produce ATP. While mitochondria are typically drawn as oval-shaped tubes containing cristae, these organelles are much more dynamic, undergoing fission to split into smaller units, or fusion to form a large network. As cells become energetically stressed, mitochondria show extensive re-modelling and part of this may be to interact properly with the cell autophagy pathway. Autophagy is the process whereby cells degrade portions of their cytoplasm as a homeostatic mechanism. In this way, autophagy plays a critical role in degrading damaged mitochondria, a process termed mitophagy.

We have been investigating mechanisms that coordinate mitochondrial dynamics and mitophagy. This project aims to further study roles for key regulatory proteins that coordinate these 2 processes to control downstream cell survival and growth. Findings could suggest potential targets to modulate mitochondrial function and reduce growth in hyperproliferative diseases including cancer.

Supervisor: Edmond Chan

Project title: Role for mitochondria dynamics in cancer cell growth

Keywords: Mitochondria, Cell metabolism, Signal transduction, Cell growth

Project Goals: To define the signalling events linking mitochondrial membrane dynamics and cell growth.

Experimental Approaches: You will learn how to culture mammalian cells. These cell models will be treated with gene targeting constructs to target mitochondrial pathways. Mitochondrial effects will be measured using microscopy and computer-based analysis. Cell growth and cell death pathways will be monitored in parallel using biochemistry and live cells.

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