

## **McGill University - Imperial College London Student Exchange**

### **Training opportunity within the Murai Laboratory at the Centre for Research in Neuroscience at McGill University**

#### **Background**

A major research program in the laboratory aims to understand mechanisms that underlie neural plasticity in the brain. We are interested in factors that regulate the structural and molecular properties of synapses and their role in synaptic physiology. In line with this, we are focusing our efforts on identifying mechanisms that control local protein synthesis in dendritic spines as it has been demonstrated that protein translation at individual synapses is important for regulating synapses. However, the mechanisms behind this process remain poorly understood. To address this, we are working with members of the Fragile-X Mental Retardation Family of proteins including FMRP, FXR1P (Fragile X-related protein 1), and FXR2P (Fragile X-related protein 2). To study the role of these proteins, we are combining molecular biology, biochemical analysis, and time-lapse confocal imaging of neurons to investigate their properties at synapses.

#### **Opportunity**

We are currently investigating association of these proteins with translation machinery located near synapses, and combining in vitro and in vivo analysis to dissect their role in synaptic morphology and plasticity. These studies have potential to reveal fundamental knowledge regarding normal brain function and may lead to novel strategies for treating neurological and psychiatric disorders.

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