



**MATTHEW HINTERMAYER**, Class of 2027

Education: BSc (Psychology), University of Waterloo, MSc (Pathology and Laboratory Medicine), Western University

Supervisor(s): Alyson Fournier

Dpt: Neurology and Neurosurgery

Work location: The Neuro (Montreal Neurological Institute-Hospital)

Project: Identifying and modulating pro-regenerative micro-RNA signalling networks to promote neuronal recovery following axonal injury

Selected Award(s): Vanier Scholarship, Fond de Recherche du Québec – Santé (FRQS)

### Research Description:

Following spinal cord injury (SCI), damaged neuronal axons fail to regenerate. As a result, individuals with SCI can permanently lose the ability to move their limbs, and can have issues with bladder or bowel incontinence, leading to disability, health complications, and premature death. Despite the permanent nature of SCI being apparent as early as 1550 BCE, there are currently no approved treatments that promote the regrowth of CNS axons. Interestingly, some neuronal populations outside of the CNS do regenerate following injury. The goal of my research is to identify the molecular differences between neurons that regenerate and those that do not. This molecular signature can then be recapitulated in CNS neurons to promote regeneration after injury. To do this, I am investigating a group of molecules called micro RNAs, which regulate hundreds of genes simultaneously (a gene program). This powerful approach will identify critical molecular players in the repair of damaged neurons that can be targeted in treatments for SCI and other diseases involving damage to neuronal axons, such as traumatic brain injury and multiple sclerosis.

### Why did you decide to pursue both MDCM and PhD degrees? What are your career aspirations?

I believe that the collaboration between clinical medicine and basic science is critical, especially when approaching neurological diseases. Incredible scientific advancements have improved the treatment options for many diseases, but despite these scientific advancements the development of treatment options for neurological diseases has been comparatively slow. There are many reasons for this, including the lack of drug accessibility of the nervous system, the incredible morphological complexity and diversity of neurons, and a lack of fundamental understanding of how the nervous system functions (from individual cells to neural networks). I believe that for progress to be made in the treatment of neurological diseases in particular, it is necessary for individual doctors to be informed about both the clinical and basic sciences. My desire to be comfortable approaching neurological diseases from both of these perspectives motivated me to pursue a combined MD-PhD degree.

### Why did you choose to study at McGill University?

My desire to study at McGill was fueled by the history of pioneering research conducted at the Montreal Neurological Institute. It's inspiring to now be completing my PhD at The Neuro along with the next generation of researchers studying neural function and disease.

### What do you like to do in your spare time?

For fun I enjoy spending time outside running and biking or going rock climbing with friends. I also brew craft beer in my apartment and I really enjoy experimenting with new recipes and sharing the final product with friends.