



## Margaret Fahnestock, PhD



**HEALTH SCIENCES**  
Psychiatry & Behavioural  
Neurosciences

### Research Work

The neurotrophic factors nerve growth factor (NGF) and brain-derived neurotrophic factor (BDNF) are essential for survival, proper function and connectivity of neurons in the CNS and PNS, and their dysregulation contributes to many neurological diseases including neurodegenerative and neurodevelopmental disorders. My lab studies the biosynthesis and expression of NGF and BDNF and their role in neurological disorders such as Alzheimer's disease and autism. We investigate the levels of mRNA and protein for NGF and BDNF and their receptors as well as their signaling pathways, transcriptional and translational regulators and proteases that affect their expression in human postmortem tissue and biological fluids such as blood and CSF, in rodent models and in cell culture systems. Our methods include qRT-PCR, Western blotting, ELISA, primary cell culture and rodent behavioural assays. Current questions in the lab include: Which receptor is responsible for proNGF retrograde transport in basal forebrain neurons, and how does Alzheimer's disease pathology affect that transport? Which pathological form of tau down-regulates BDNF, and what is the mechanism? What causes the imbalance in isoforms of BDNF and its receptor, TrkB, in autism? What is the mechanism of exercise-induced increases in BDNF expression?

### Engagement Opportunities

#### Introductory Level

- N/A

#### Intermediate Level

- N/A

#### Advanced Level

- Perform Western blots for one protein (100 hrs)
- Perform qRT-PCR assay for one mRNA (100 hrs)

*If you are interested in learning more, please leave your contact information with the Research Office and/or contact Margaret Fahnestock (fahnest@mcmaster.ca).*