

Department of Molecular and Cellular Biology  
**Graduate Seminar MCB\*6500**

Friday, September 22, 2023 @12:00 p.m.

*presented by:*

**Jason Cousineau**

*(Advisor: Dr. Melanie Alpaugh)*

**"Assessing the relationship between cardiovascular disease, blood-brain barrier breakdown, and neuronal dysfunction"**

Neurological diseases are the number one cause of disability globally as well as the second leading cause of death. These diseases can be long-lasting, difficult to treat, and hard to predict. Finding biomarkers associated with disease progression and severity could therefore contribute to better disease identification and management. Hypertension, a risk factor for cardiovascular disease, is one potential candidate as it has previously been linked to the development of dementia and stroke. Specifically, Alzheimer's disease and vascular dementia have been described to be more prevalent in individuals with mid-life hypertension. Additionally, hypertension is known to independently alter cerebral blood flow, to change cerebral vascular morphology, and to compromise the blood-brain barrier. However, the impact of hypertension on other neurological diseases such as Huntington's disease, a rare neurodegenerative disorder, and Schizophrenia, a rare neuropsychiatric disorder, is not yet known, although, both have been previously described to have changes to the cerebral vasculature. In my project, we aim to assess the effect that hypertension has on the cerebral vasculature in Huntington's disease and Schizophrenia. Thus, we will evaluate human postmortem brain tissue and microfluidic cellular models. Through these systems we will assess if hypertension is associated with changes to the structure of 1) the cerebral vasculature and 2) the blood-brain barrier. Finally, we will determine if hypertension and cardiovascular disease result in 3) more pronounced neuro-dysfunction. Together these experiments will help to increase our understanding of the impact that hypertension and cardiovascular disease have on the exacerbation of neurological diseases.