



**Announcement:**

*All interested members of the university community are invited to attend the Final Oral Examination for the degree of **Master of Science** of*

**DUNCAN RASMUSSEN**

**on Wednesday, January 15, 2020 at 1:30 p.m. in SSC 2315**

**Thesis Title:** Effect of ketamine treatment on neuronal oscillatory activity in the nucleus accumbens and hippocampus in an animal model of treatment-resistant depression.

**Examination Committee:**

Dr. A. Nassuth, Dept. of Molecular and Cellular Biology (Exam Chair)

Dr. M. Perreault, Dept. of Molecular and Cellular Biology

Dr. T. Van Raay, Dept. of Molecular and Cellular Biology

Dr. J. Lalonde, Dept. of Molecular and Cellular Biology

**Advisory Committee:**

Dr. M. Perreault (Adv)

Dr. T. Van Raay

**Abstract:** Depression is a globally prevalent disorder characterized by negative symptoms including amotivation and suicidality. While treatments exist, the etiology of the disorder is complicated by sex differences and treatment resistance. Ketamine is a novel treatment that can provide rapid, long-lasting antidepressant effects. However, ketamine also exhibits harsh psychomimetic side effects that greatly hinder its accessibility and tolerability. The mechanisms of action that underlie the therapeutic versus negative aspects of the drug are poorly understood. Macroscopic neuronal oscillations are essential for communication with the brain and are dysregulated in several neuropsychiatric disorders including depression. This study therefore used the Wistar-Kyoto (WKY) animal model of treatment resistant depression to examine the effects of ketamine on neural oscillatory activity in two brain regions highly implicated in the pathophysiology of depression, the nucleus accumbens (NAc) and hippocampus (HIP). Compared to the Wistar parent strain at baseline, WKY males showed abnormalities in delta and theta power in the NAc and HIP, but not NAc-HIP coherence. Female WKY rats showed the same abnormalities in HIP, but not NAc, and increased NAc-HIP theta coherence. Ketamine administration, after 24 hours, normalized the delta and theta power in NAc of males and theta coherence between NAc-HIP in females.

**Curriculum Vitae:** Duncan completed his Bachelor of Science (Hons.) at the University of Guelph in April 2017, and then began his M.Sc. in the lab of Dr. Melissa Perreault in the fall of the same year.