

**Name**

Ruby Muzzatti

**Academic Program and Year of Study**

BSc Biology (Honours), minor in Biochemistry

**Hometown**

Oakville, Ontario

**Project Title**

The effect of repeated stress on excitatory neurons in the female rat dorsomedial hypothalamus.

**Supervisor/Advisor**

Dr. Karen Crosby

**Highlights of my ISRG Experience.**

My research focused on the effect of stress, both acute (one time) and chronic (repeated), on excitatory neurons in the dorsomedial hypothalamus (DMH) of female rats. This region of the brain is critical for the stress response, and the regulation of appetite and body weight, making it the ideal region to study the relationship between stress and appetite. This project is still in progress, but we have exciting findings regarding acute stress. We used young, female Sprague-Dawley rats, as our animal models, since the similarities between the human and rat brain allow us to gain insight into the human brain, and whole-cell patch clamp electrophysiology, which allowed us to record from living neurons. Female rats who experienced acute stress have a decrease in transmission of the excitatory neurotransmitter, glutamate, onto DMH neurons (measured by looking at current amplitude) compared to female rats who did not experience any stress. This contrasts with previous data (unpublished) on males, which did not see this decrease. We further investigated the mechanism of this decrease, using an endocannabinoid-CB1 receptor blocker. When CB1 receptors were blocked, there was no longer a decrease in transmission, indicating that the stress-induced decrease in glutamate transmission is a result of the

endocannabinoid system. Endocannabinoids are signalling molecules produced naturally by the body, the most famous (external) cannabinoid being cannabis. This system works to maintain homeostasis in the body but can be altered by external factors.

I was drawn to this research because of my longstanding interest in neurology, shaped by my personal experience with neuropathy. That experience inspired me to learn about how neurons communicate and how external factors, like stress, influence that communication. When I learned about Dr. Crosby's research while in her first-year biology class, I knew I wanted to get involved. This led me to doing my honours under her supervision.

This research has strengthened my foundation in neuroscience, critical thinking, and communication. Skills that I will carry forwards beyond my time at Mount Allison. It highlighted how scientific discovery translates into human health, particular in managing stress and eating behaviours. I ultimately plan to become a family medicine physician, and my research experience has given me the chance to expand my scientific communication skills to a variety of audiences, while also allowing me to contribute to knowledge on stress and appetite, challenges with which many Canadians face.

### **Message of Thanks.**

I am deeply grateful to the donors and organizations who made this grant possible. My ISRG was partially funded by an NSERC USRA and would not be possible without the generous support of Mount Allison donors. Having the opportunity to fully immerse myself in my research, without worrying about living expenses, not only supported my research and contribution to scientific advancement but gave me the chance to grow as a scientist and person. This experience strengthened my curiosity, inquiry skills, and scientific communication, all of which I will carry forward as I prepare for a future in medicine.



**INDEPENDENT STUDENT RESEARCH GRANTS**  
Certification of Grant Completion  
**(TO BE COMPLETED and SUBMITTED BY SEPTEMBER 15<sup>TH</sup>)**

The University and funders of the Independent Student Research Grant program require certification that the student grant holder has completed the activities associated with the grant. **Both the student and the advisor** are required to sign this form.


Student Grant Holder: Ruby Muzzatti

Faculty Advisor: Dr. Karen Crosby

Year: 2025

Name of Grant Award: Independent Student Research Grant, funded by NSERC USRA

*I herewith attest that I have completed my grant project activities during the period associated with the grant named herein, and that I have submitted to the Deans' office a report or other tangible evidence of the scholarly output from this grant project.*

Student signature: 

Date: Thursday, September 4, 2025

*I herewith attest that I have advised and mentored the above named student and that they have completed the grant project activities associated with the grant named herein.*

Faculty Advisor: 

Date: Sept 4/25

**Once completed and signed, please scan, attach, and upload in ROME0 with your ISRG Report. For assistance please contact Lois Wood, Dean's Office - 2<sup>nd</sup> Floor Centennial Hall, 506-364-2302 or [lwood@mta.ca](mailto:lwood@mta.ca)**