

# Scientist of the Month

## Gabriel Miller

Gabriel Miller is a second-year BLaST Scholar and plans to graduate in May 2024 with a BS in Biological Sciences with a concentration in Cell and Molecular Biology. He is from the small village of Ninilchik, Alaska where he has lived all his life. His hobbies include drawing, hiking, insect collecting, and any other activities outside in nature. Miller's career goal is to enter the biomedical research field after graduate school. He recently was accepted to the University of Virginia's Neuroscience PhD program where he plans to focus in neuroimmunology.

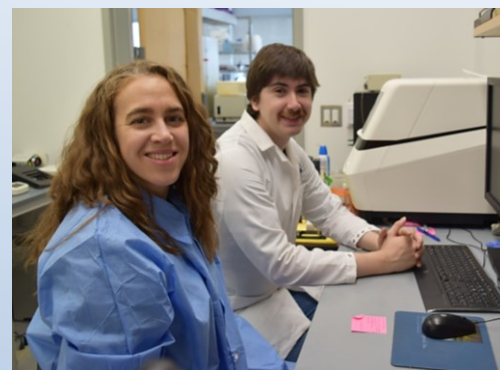
## Research

Miller's current research project, "Effects of Rabies Viral Glycoprotein Binding on Human and Dog  $\alpha 7$  Nicotinic Receptors," assesses whether the glycoprotein is selective for a specific host, human or canine, nicotinic receptor. The rabies virus enters the nervous system by interacting with molecular targets on host cells to modify behavior, and trigger

virion receptor-mediated endocytosis by poorly understood mechanisms. This study examines the activity of the rabies virus glycoprotein on nicotinic acetylcholine receptor subtypes that are expressed on the plasma membrane of neurons in brain regions involved in rabid animal behavior. Miller's work is related to a larger, NIH-funded project under UAF Assistant Professor Maegan Weltzin (former 2018-2020 BLaST Faculty Pilot Project FPP awardee) which examines a modified rabies glycoprotein that facilitates the virus' interaction with the nicotinic receptor on neurons to improve drug delivery. Miller's previous project focused on the "Effects of siRNA silencing on VDR expression and Oxidative Stress Tolerance in Microglia," where he assessed the targeted silencing of hydrogen sulfide which produced metabolic pathways that would impact microglial cells' ability to tolerate oxidative stress. Miller shared, "My interest in neuroimmunology comes from being exposed to a medical environment at an early age and seeing firsthand the shortcomings in current treatments in neurological conditions. My mom works as a medical coder, and we often traveled to the Alaska Native Medical Center, the statewide Native Health hospital in Anchorage, for treatment of several chronic medical conditions in our family. Further understanding how the nervous system reacts to damage, affecting the immune pathways, and why it can lead to worsened recovery in disease and traumatic injury is key to developing better treatments to meaningfully improve the living conditions of patients." Miller presented initial findings at the September 2023 Alaska IDEa Network of Biomedical Research Excellence (INBRE) Retreat in Talkeetna, AK; and at the Alaska Interior Medical Education Summit in February 2024.

## Mentoring

Miller thanks Emily Sousa, his former BLaST RAMP, who helped him in his first year as a BLaST Scholar and assisted him applying to graduate school. Nikola Nikolic, his current BLaST RAMP, has been immensely supportive in navigating challenges, especially moving from the Badiei lab to the Weltzin lab. "He [Nikola] has been a great resource for advice about graduate school." Miller also thanks Dr. Alireza Badiei and graduate student Alex Cornwell in his initial training of molecular techniques and processing and analyzing western blots. Miller also thanks Dr. Maegan Weltzin especially, "being the single most influential person in my development as a researcher who helped me gain a stronger basis and appreciation for neuroscience. I was able to gain a thorough understanding of the skills needed to go further in this area. She encouraged me to apply for the NSF Graduate Research Fellowship Program, and helped me make the most out of attending the 2023 Society for Neuroscience (SFN) Conference in D.C. These experiences allowed me to be a competitive and well-prepared applicant for graduate school and is the reason why I was accepted into my top school." Miller further thanks the graduate students of the Weltzin lab for their support in training him in other research techniques, especially to UAF graduate student Brittany O'Brien as the primary lead in his research journey.



**Top left:** BLaST Scholar Gabriel Miller in the Weltzin Lab, March 2024. **PC:** Amy Topkok. **Above:** Miller with his faculty mentor Dr. Maegan Weltzin, UAF, March 2024. **Left:** Miller sharing one of his samples, Fairbanks, AK.

