Investigating the Role of Calcium Signaling on Brain Cell Function

Anna Toth, Medical Scientist Training Program

Anna Toth, a seventh-year student in the Medical Scientist Training Program (MSTP), studies calcium signaling in the laboratory of Murali Prakriya, PhD, professor of Pharmacology.

Q&A

Where is your hometown?
I have called many places home! I was born in Budapest, Hungary, and my family moved to the U.S. when my parents won a green card in the lottery. We've lived on Long Island and New Jersey and finally settled in Midland, Michigan, where I spent much of my childhood.

What are your research interests?
Since high school, I have been fascinated with the brain and how it works. I first got involved in research during college, where I was very interested in brain development and the signals that are exchanged between neurons to direct proper synapse formation. In graduate school, I got really interested in the molecular mechanisms by which cells in the brain are able to transform cues from their environment into changes in their functioning, which led me to study calcium signaling in Murali Prakriya's lab. Calcium is a ubiquitous intracellular signaling messenger regulating an enormous range of functions in cells including gene expression and the secretion of important molecules. Specifically, we study calcium signals arising from a type of calcium channel called the CRAC channel. We hope to gain a mechanistic understanding of the basic, essential signaling pathways that neural cells use to properly function and communicate, with the long-term goal of illuminating various diseases in which aberrant calcium signaling is involved.

What exciting projects are you working on?
My main project in the Prakriya lab focuses on astrocytes, a type of support cell in the brain that is also an essential active contributor to brain development, physiology and disease. The goal of my work is to understand how calcium signaling through CRAC channels regulates important astrocyte functions and allows astrocytes to communicate with their neuron partners. Because dysregulated calcium signaling in astrocytes has been implicated in a number of neurological disorders, including epilepsy, schizophrenia and ALS, this research could help provide new insight into the etiology of these diseases and delineate possible targets for future therapeutic intervention.

What attracted you to the PhD program?
As an MD/PhD candidate, I was drawn to Northwestern both for its exceptional medical environment and topnotch research. Both the MSTP and the Northwestern University Interdepartmental Neuroscience NUIN programs are supportive and committed to training the next generation of leaders in medicine and research. When I visited, I saw that Northwestern had an outstanding, interdisciplinary neuroscience research community with an environment that I knew I could excel in scientifically and professionally. I also love the wonderful, vibrant city that is Chicago!

What has been your best experience at Feinberg?
While at Feinberg, I've had the opportunity to attend several conferences, both in the U.S. and abroad. Last year, I attended the FASEB Science Research Conference on Calcium and Cell Function in Lisbon, Portugal, with Dr. Prakriya and another lab member. It was a phenomenal experience to present my research, talk with and learn from leading scientists in the field from around the globe. And it didn't hurt that the meeting was in one of the most beautiful cities I've ever seen!

How would you describe the faculty at Feinberg?
Very collaborative. I have worked with multiple other labs on various projects and have always found that faculty members are willing to give advice, teach techniques, share materials and join forces to answer interesting questions. We have had very fruitful collaborations and the expertise from other faculty and laboratories has really helped push my research forward.

What do you do in your free time?
I love to travel and see the world! While I am at home in Chicago, I enjoy doing yoga, trying new recipes and performing and teaching magic to children at the Ann and Robert H. Lurie Children's Hospital through an amazing volunteer organization.

What are your plans for after graduation?
After I complete my PhD thesis work, I will return to medical school to finish my clinical studies. After graduation, I plan to complete residency training. I'm not sure yet which medical specialty I'd like to pursue, but since I love the brain, I'm naturally gravitating towards neurology or neurosurgery. My ultimate goal is to become a physician-scientist and use my training to help transform discoveries from the basic science laboratory to clinical practice.