Parkinson Association of Alberta

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University of Alberta

Fellowship Award

My research journey began as a PhD student in Belgium at the VIB Center for Brain and Disease Research, under the supervision of Dr. Rose Goodchild and Dr. Patrik Verstreken. I studied how subtle cellular changes can lead to brain disorders, initially focusing on dystonia, a rare movement disorder. In this work, I discovered how Torsins regulate lipids, the fats that form cell membranes, store energy, and ultimately influence the structure and health of neurons. These findings sparked my long-term passion for understanding how lipids impact brain function and set the stage for my research on Parkinson's disease (PD).

A hallmark of the disease is the spread of a harmful protein, α-synuclein, between neurons in the brain. At the same time, changes in brain lipids are observed, but their role in the spread of α-synuclein has remained unclear. Understanding this connection is crucial for uncovering new ways to slow or stop disease progression.

As a postdoctoral researcher at the University of Alberta in Dr. Maria Ioannou's lab, I address this question by combining cutting-edge imaging with molecular biology to observe how lipids and proteins interact in living neurons from PD patients. I discovered that changes in lipids trigger neurons to release small "bubbles" called ectosomes, which carry α-synuclein to neighbouring cells, promoting the spread of pathology. Certain fats, called sphingolipids, further increase ectosome release, and neurons from people with PD release more vesicles than those from healthy individuals, revealing a previously unrecognized mechanism contributing to disease progression.

I am now investigating which specific fats and enzymes, particularly sphingomyelinases, drive this process and whether targeting them could slow or halt the spread of α-synuclein. I am deeply grateful to the Parkinson Association of Alberta for supporting this work, which will sustain and advance these studies and help translate these discoveries into therapeutic strategies.

My ultimate goal is to establish a lab dedicated to uncovering how lipids drive Parkinson disease and to translate these insights into novel therapies. By understanding the lipid-dependent mechanisms underlying α-synuclein spread, I aim to identify new targets that can improve outcomes and quality of life for patients and families worldwide. This work not only advances fundamental neuroscience but also brings us closer to interventions that can meaningfully slow or prevent the progression of this devastating disease.