

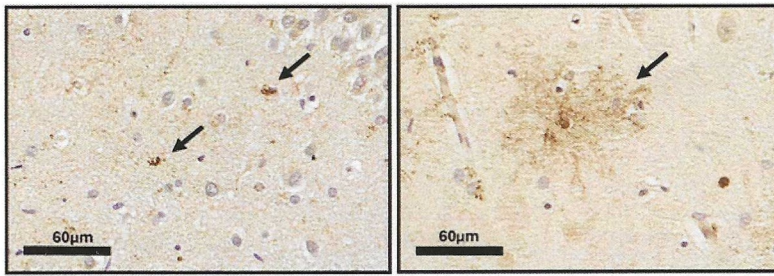


ALS Society of (Windsor) Essex County Endowment in Support of Students in ALS Research

The generous support from the ALS Society of (Windsor) Essex County allows us to support a young scientist to learn what research is, how it is done and open the door for that young scientist to experience what it means to be an ALS researcher.

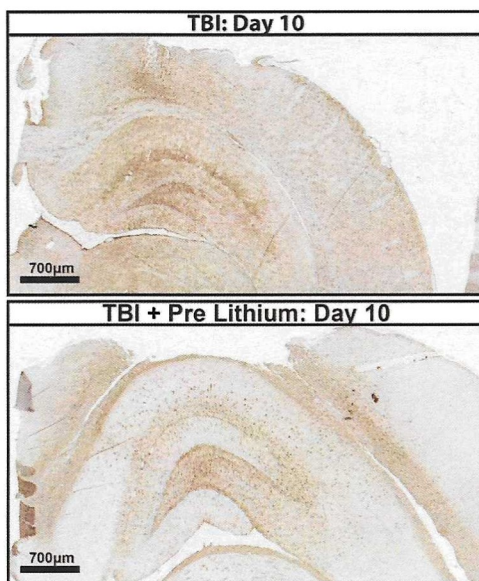
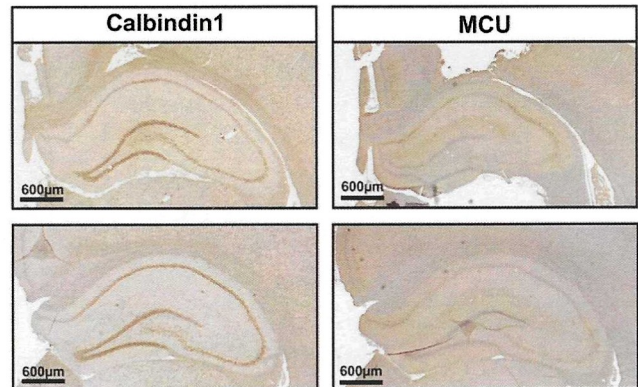
Our lab aims to train the next generation of ALS researchers, excite students about research and teach them scientific method while supporting them in beginning their journey into a career of ALS research. Students work alongside more senior researchers, graduate students and postdoctoral fellows, and have a very important role in performing work that enables the research to progress more quickly. In return, the students bring so much positive energy and a fresh perspective to the lab and the work which energizes everyone.

In 2024-2025, funds were utilized to support an undergraduate student in the lab that you may remember from previous reports - Jacqueline has stayed with the lab for this entire year furthering the work she has been engaged in for the previous two years. Jacqueline has contributed directly to our investigations in the use of lithium to help treat traumatic brain injury in a rat model, and also helped determine what cell type in the hippocampus shows pathological changes in expression of DnaJC7, a protein that is responsible for ensuring proper tau protein folding. This cell type is involved in memory formation and, very interestingly, not only are they showing pathological processes in the injured rat, but also in ALS with cognitive impairment. These data are on the leading edge of the research Dr Strong's lab engages in and answer critical questions about how injury in the brain can alter tau structure and lead to irreversible changes in cellular function, that in turn lead to cognitive changes. These data also support the future study of using a drug already used for other disorders (lithium) to help prevent damage to the brain after injury. For patients it is of the utmost importance to figure out what is causing the disease and find a way to either prevent or at the minimum, slow down the progression of the disease.



(Left) DnaJC7 expression in basket cells (arrows) from the hippocampus of an ALS patient with cognitive impairment (left) is compared with those from neuropathologically normal hippocampus (right). Scale bar=60µm

(Right) Expression of calcium signaling proteins in the hippocampus of injured rats (top row) or control (bottom row) show decreased expression of Calbindin1, and increased expression of the mitochondrial calcium uniporter (MCU).



(Left) Administration of lithium chloride prior to traumatic brain injury reduces neuroinflammation. Note the decreased immunoreactivity (brown) in the pre-injury treated rat hippocampus (bottom panel) when compared to no lithium treatment (top panel).

"The Strong lab greatly appreciates the ongoing generosity of ALS Society of (Windsor) Essex County through the Endowment in Support of Students in ALS Research. The funds make such a difference for a student learning what research is, and experiencing what basic research entails, as well as how supportive the entire ALS research community is. From a more senior point of view, this fund's support is absolutely instrumental in helping us raise the next generation of ALS researchers, as well as help progress the research more quickly. Thank you for supporting our research and our next generation of ALS researchers." - Dr. Michael Strong

Basic research such as this lays the groundwork for identifying druggable targets that can be translated into direct patient care.

As mentioned previously, Jacqueline has been a member of the lab for two years, working as a summer student and then as a 4th year thesis student alongside our "tau team". Her work with us in the past two years has been outstanding and led to her receiving a Canada Graduate Research Scholarship with which she will continue her ALS research at the University of British Columbia working with our colleague Dr Eric Pioro. This is as the program was designed – to encourage bright, young individuals to pursue a career in ALS research.

Beyond this, Jacqueline proved invaluable in advancing our research program. With her assistance, it became clear that calcium signaling is altered in the hippocampus after injury in an animal model of the pathology observed in the dementia that can be found in ALS patients. She provided key support in the experiments and interpretation of the results that demonstrated that treatment with lithium either before or immediately after the injury can significantly reduce the neuroinflammation that occurs and the tau pathology. Using this same injury model, Jacqueline also assisted our Senior Research Associate (Kathy) with staining to identify a cell type that appears to be instrumental in modulating cognition changes in brain injury, these cells are a type of "basket cell" which are involved in making and recalling memories. With injury there is a large change in the expression of a protein that modulates the folding of tau proteins, and this change is also seen in the same cells in patients with cognitive impairment in ALS.

The generous funds provided by ALS Society of (Windsor) Essex County allowed us to send Jacqueline to several meetings where these data were presented. Jacqueline received experience in presenting (and winning a poster competition) which will be invaluable for her as she leaves this year to begin her MSc.

See the following pages for images and information about our research.

Thank you for supporting Western.

