Parkinson Society British Columbia

600-890 West Pender Street
Vancouver, BC V6C 1J9
604 662 3240 | 1 800 668 3330 | www.parkinson.bc.ca

Research Profile:
Austen Milnerwood
Assistant Professor
University of British Columbia

Research Project: The physiology of LRRK2 & the pathophysiology of Parkinson's disease: LRRK2 silencing as a treatment strategy for PD.

Project Grant: Pedalling for Parkinson's New Investigator Award: $90,000 over two years

Project Description:
Silencing defective genes: a possible treatment strategy
In the last 15 years, researchers have made significant advances in identifying several genetic causes of familial Parkinson's disease. Genes are the blueprint for proteins, the biological machines that make our cells work. By understanding the function of the proteins that these genes make, and learning what goes wrong when mutations are present, investigators are beginning to unravel the processes that cause Parkinson's to develop.

Basic research into how brain cells communicate with each other is critical, says Austen Milnerwood, a translational neuroscientist at the University of British Columbia. Traditionally, treatment for Parkinson's has focused on alleviating the symptoms of Parkinson's. If Milnerwood and his colleagues can correct the changes different mutations induce in the brain, they hope eventually to reverse or prevent the onset of the disease.

"We look at the fundamental alterations to brain cell communication that are induced by the presence of these (genetic) mutations, and then try to correct them," Milnerwood says.

Working with cells cultured from genetic mouse models, Milnerwood studies how the proteins that contain mutations within them affect communication between one brain cell and the next. Mutations in LRRK2 (the most common cause of familial Parkinson's disease), for example, cause brain cells to become hyperactive, transmitting information too rapidly.

Eliminating the activity of the LRRK2 protein appears, so far, to improve communication among brain cells containing the mutation, by reversing the hyperactive transmission of information. Milnerwood and his colleagues have already administered these compounds to mice without any adverse effects. Now they're testing to see if the compounds are safe and beneficial to mice that have Parkinson's disease mutations.

Similar compounds are already being tested in human trials to reverse Huntington's disease. Milnerwood's long-term goal is to test whether these drugs will improve the dysfunctional behaviour of brain cells involved in Parkinson's disease.

"I believe Parkinson's is a whole brain disorder, and in order to stop the progression of this devastating disease, we have to understand what causes it, not just look at the consequences," Milnerwood says.

He's encouraged by the progress researchers around the world have made in just five years on understanding the biological processes involved in Parkinson's disease. Charting those processes will enable the intelligent design of therapies to stop the disease or protect the brain from its onslaught, Milnerwood says.

"We've learned so much over the last five years, that what happens in the next five years will be very exciting."