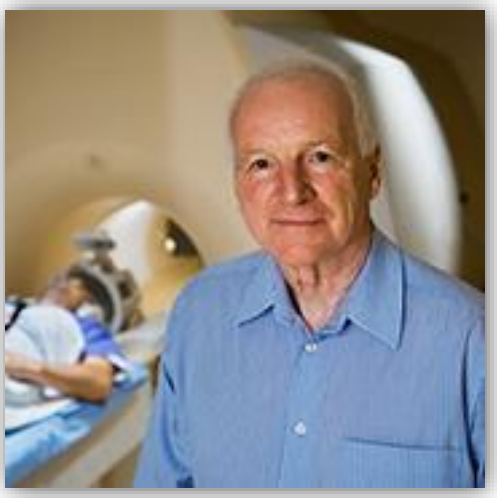
Parkinson Society British Columbia

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

Research Profile:
Professor Alex MacKay



Research Project:
Assessment of “normal appearing” white matter in Parkinson's disease and its association with cognitive dysfunction.

Project Grant: $45,000

Project Description:
Measuring the Brain’s White Matter and How it Affects Thinking in Parkinson’s Disease

“Myelin (white matter) speeds things up by a factor of 100, but if you have a problem with myelin, this speeding-up doesn't happen. People don't think as well.”

One of the substances in the central nervous system that appears critical for healthy thinking and reasoning is myelin – the fatty tissue known as white matter in neurons, which connects and conducts the signals cells send to one another. The more myelin, the faster those connections among cells.

At the University of British Columbia, physicist Alex MacKay and his colleagues have created a new technique using Magnetic Resonance Imaging (MRI) to measure the myelin in people's brains. Now, they're testing the theory that the breakdown or loss of myelin within the brain contributes to the problems in thinking and reasoning that many people with Parkinson's disease experience, sometimes before the stiffness, rigidity and tremors that more commonly flag their diagnosis.

MacKay and his team have demonstrated that people with multiple sclerosis have less myelin and also have cognitive problems, and drug companies are already testing medications that can either reduce or prevent the breakdown of myelin. If MacKay can demonstrate that the same process occurs in people with Parkinson's, the new drugs under development for MS and other

diseases could ultimately help people with Parkinson's disease too. The companies will also have a way to tell if their drugs are repairing myelin or stopping its loss.

“It's a very exciting time,” says MacKay. “Clinical trials are happening as we speak.”
McKay will use this non-invasive imaging technique to measure the myelin in the brains of people with Parkinson's disease, particularly in the frontal lobe, which controls judgment, reasoning and other forms of executive functioning. The people participating in the imaging study will also undergo cognitive testing, so the researchers can correlate their thinking and reasoning skills to their myelin measurements.

This is the first time researchers have used MRI scans to investigate a link between myelin and Parkinson's, and there is still a lot of work necessary to understand how myelin breakdown is related to the death of dopamine-producing cells, MacKay cautions. But he hopes this new line of enquiry will explain one portion of the Parkinson's puzzle – a puzzle in which he has a personal stake.

“I have two very good friends who have Parkinson's disease,” says MacKay. “I relate very much to this disease and how rough it is on those who have it.”

Biography:
Dr. MacKay is a physicist who trained at Dalhousie, UBC and Oxford University. Dr. MacKay is a full professor at the University of British Columbia with a joint appointment in the Radiology and Physics & Astonomy departments. He directs the UBC MRI Research Centre and is co-Director of the Graduate Medical Physics Program at the University of British Columbia.

His entire research career has involved working with magnetic resonance techniques. Early on, he worked with the nuclear magnetic resonance in model membrane preparations and wood. Since 1988, he has been working on the development of advanced magnetic resonance imaging techniques for medical application.

Two decades ago, his research group pioneered a magnetic resonance technique which makes images of the myelin component of white matter. Myelin water imaging has by now been applied to a wide variety of neurodegenerative diseases, including multiple sclerosis, schizophrenia and phenylketonurea. This Parkinson Society grant will support the first application of myelin water imaging to Parkinson's disease.