

Research Profile:

Chelsie Kadgien, PhD student
University of British Columbia

Research Project: Vacuolar protein sorting 35 (VPS35) neurobiology: Novel retromer cargo trafficking, synapse maintenance, and plasticity in the context of Parkinson's disease mutations.

Project Grant: Dr. Robert Lorne Alexander Graduate Student Award of \$30,000 over two years



Project Description:

Tracking the Transportation Gene

Discovering the function of specific genes is a critical step in the search for the cause of Parkinson's disease. At the University of British Columbia, neuroscientist Chelsie Kadgien focuses on a particular gene called VPS35 that, when mutated, causes late-onset Parkinson's.

Using a thin layer of brain cells grown on a glass culture, Kadgien, a PhD student, investigates the function of VPS35. So far, she and her colleagues believe this gene is involved in transporting proteins within brain cells. Some of the other proteins that VPS35 moves around are important links in the way brain cells communicate – a critical function that keeps the cells, and the entire brain, healthy.

“Neurons have an ideal amount of communication that they receive from other cells,” Kadgien says. If brain cells don't get enough communication, they can die. If they get too much, they use up so much energy trying to interpret that communication that they become exhausted, which can also kill them.

Kadgien believes brain cells that contain mutant forms of VPS35 have too many receptors on their surface, causing them to receive too much communication. If she can confirm her theory, using not only cell cultures but animal models, she will open up avenues for new drugs that might disrupt or correct this particular pathway in the brain that is damaging communication and killing brain cells.

“We want to understand how this particular mutation is affecting cells,” she says. “Ideally, we would like to find a good target for a therapeutic intervention.”

Kadgien’s interest in Parkinson’s disease began when she interviewed people with dementia and their caregivers as part of her work on a B.C. study on medication for neurodegenerative diseases. “I got really frustrated with my lack of ability to help those people,” she says. “They would call me looking for some sort of hope, and there wasn’t really anything I could give them.”

So Kadgien decided to focus her energy on biological research to develop a solution. One of her grandmothers and a grandfather had different forms of dementia, so she has also seen the effects first-hand.

“I find it very motivating,” she says.