Parkinson Society British Columbia

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

Principal Investigator:
Kota Mizumoto

Institution:
University of British Columbia

Research Project:
Genetic Dissection of Neuronal Pattern Formation

Award Type:
Scholar Award

Amount Awarded:
$318,750 over 5 years, co-funded by Parkinson Society British Columbia and Michael Smith Foundation for Health Research. Each organization will contribute $159,375 over this period.

Project Description:
Neurological diseases and disorders have been estimated to affect 3.6 million Canadians living in the community and over 170,000 Canadians living in long-term care facilities, including in British Columbia. However, we have limited information about the molecular mechanisms that cause many of those neurological conditions, largely because of the complexity of our nervous system. Therefore, understanding the mechanical processes that impart precise neural circuit formation using a simple model organism is critical to try to find ways to prevent neurological diseases and cure patients.

Toward this goal, Dr. Mizumoto will use nematode *Caenorhabditis elegans* as a model system to investigate the mechanisms that underlie neuronal circuit development. *C. elegans* has a short life cycle (3 days/generation) with a simple nervous system consisting of only 302 neurons, making it a great genetic model system to study the fine neural circuit formation. Most importantly, countless studies have shown that mechanisms and molecular machineries underlying the development of the nervous system are remarkably conserved between *C. elegans* and humans. It is likely that the knowledge obtained from our research will be directly applicable to the human nervous system and to diseases associated with nervous system defects.

Using *C. elegans*, Dr. Mizumoto will explore how neurons communicate with their neighboring neurons/cells to form a stereotyped neuronal pattern at the level of single synapse, which is a specialized interface between neurons or between neurons and other type of cells (such as muscle cells), to transmit electrical signals. Using a combination of *C. elegans* genetics, molecular biology and microscopy, this research will move towards an understanding of the fundamental principles of neural network formation. These studies will advance health-related knowledge by providing direct targets for other researchers to test in fruit fly (Drosophila) and mammalian models of neurodevelopmental disorders affected by Sema/Plexin signaling and others, and ultimately the development of therapeutic strategies for the treatment of these disorders.

Parkinson Society British Columbia

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