UNIVERSITY of GUELPH

COLLEGE of BIOLOGICAL SCIENCE

DEPARTMENT OF MOLECULAR AND CELLULAR BIOLOGY

Announcement:

All interested members of the university community are invited to attend the Final Oral Examination for the degree of ***Master of Science*** *of*

JENNIFER DROLET

on Monday, December 10, 2018 at 9:30 a.m. in SSC 2315

Thesis Title: **Investigating the omega-3 fatty acid DHA in acting as an exogenous regulator of the antioxidant response pathway in Parkinson's disease**

Examination Committee:

Dr. J. Yankulov, Dept. of Molecular and Cellular Biology (Exam Chair)
Dr. S. Ryan, Dept. of Molecular and Cellular Biology
Dr. D. Ma, Dept. of Human Health and Nutritional Sciences
Dr. G. Harauz, Dept. of Molecular and Cellular Biology

Advisory Committee:
Dr. S. Ryan (Adv)
Dr. R. Lu
Dr. D. Ma

Abstract: Parkinson's disease is characterized by aggregation and accumulation of α-synuclein and mitochondrial dysfunction, both of which can lead to oxidative stress through the production of reactive oxygen species (ROS) in excess. Nrf2 is the master regulator of the antioxidant response as it regulates the transcription of hundreds of cytoprotective genes that have roles in either directly or indirectly removing ROS from the cell. However, endogenous activation of the antioxidant response is not sufficient in providing protection from the disease. Accordingly, focus has shifted to exogenous activation of this pathway. Omega-3 fatty acids, with particular emphasis on DHA, have been demonstrated to provide neuroprotection from models of neurodegenerative disease, including PD. However, the specific mechanisms underlying these responses remain to be elucidated. To investigate this, wildtype and transgenic *fat-1* mouse brains were analyzed for basal changes in gene expression associated with endogenously high omega-3 fatty acids. In addition, immortalized and primary cell cultures were assessed following α-synuclein preformed fibril (PFF) incubation and DHA treatment. It was shown that PFFs and DHA have additive effects on activation of the antioxidant response, rescuing the cell from oxidative stress.

Curriculum Vitae: Jennifer obtained her Bachelor of Science (Hons.) at Queen's University in 2016, and then began her M.Sc. in the lab of Dr. Scott Ryan in the fall of the same year.