Department of Molecular and Cellular Biology

Graduate Seminar MCB*6500

Friday, March 31, 2017 in SSC 1511 @ 12:45 p.m.

presented by:

Morgan Stykel

Understanding and Improving Cell Replacement Therapy for the Parkinson's Diseased Brain

Parkinson's disease (PD) is the second most prevalent neurodegenerative disease worldwide, typically affecting 1% of individuals over 60 years of age. The symptomatic expressions of PD include motor dysfunctions such as rigidity, tremors, and bradykinesia. However, many patients develop non-motor symptoms including psychosis, irregular sleep, pain, and/or depression, with nearly 30% of patients eventually being diagnosed with dementia. Behavioural and cognitive impairments displayed by PD patients, appear to correlate with progressive loss of dopaminergic neurons in the substantia nigra, making it a hallmark of PD pathology. For these reasons, focused cell replacement therapy targeting nigral striatal neurons, presents a promising treatment for PD patients through the restoration of cellular function with the ultimate goal of improving patient quality of life. However, cell replacement therapy using fetal ventral mesencephalic tissue, has recently been demonstrated to accumulate alpha-synuclein (α-syn), a candidate protein responsible for PD pathology, which is thought to spread in a cell-to-cell prion-like manner. As such, α-syn may propagate disease pathology to grafted cells and compromise cell replacement therapy. The proposed project examines the mechanism(s) whereby α-syn propagation occurs and α-syn CRISPER-Cas9 knockout cells will be used to test whether grafted cells can protect against PD pathology. Overall, this study has far reaching implications for regenerative medicine and the treatment of PD.