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Using automated touchscreen tasks for cognitive assessment in a novel model of Parkinson's disease

Background

Parkinson's disease (PD) is the second most common age-related brain disorder after Alzheimer's Disease. It is estimated that more than 100,000 Canadians over 40 years old are living with PD and this number will increase by 65% by 2031.

We now know that PD is more than a motor disease - as well as the common decline in control of muscles and limbs, there is also cognitive decline and dementia amongst the most common non-motor symptoms. In fact, alterations in brain function are reported in nearly 50% of PD patients and this kind of cognitive decline can occur even before the start of classical motor symptoms.

The major cognitive abilities that we see affected are executive function (the mental processes related to mental control, self regulation and achieving a goal), visuospatial function (our ability to process and interpret visual information), memory and attention. However, treatment for cognitive decline in PD is currently an unmet need.

The Problem

Unfortunately, current models of PD do not always reproduce the early symptoms of the disease well and we don't yet know whether mouse models show the same kinds of cognitive impairments as observed in humans. If we can show this through our work, however, it will help to derisk the drug discovery process.

The Project

We propose to use the translational, highly sensitive and automated touchscreen tests for assessing executive function in PD models as a platform for the development of PD treatments. Our hypothesis is that, using the touchscreen technology, we are able to detect early cognitive deficits in PD models which can serve for drug testing and prediction of clinical efficacy for PD - it will enable earlier go-no-go decisions when testing compounds in clinical trials, which then helps to focus resources and efforts on the candidates most likely to succeed in clinical trials.

This research will focus specifically on evaluating cognitive flexibility (the ability to respond and adapt behaviours to changes in the environment), cognitive dysfunction (changes in the intellectual processing and reasoning that impact daily functions, to a greater severity than what might be expected from typical age-related decline) and long-term memory in a PD model using touchscreens.

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