# Relationship between serotonergic innervation, dopaminergic deficit and levodopa induced dopamine release patterns in PD treatment-related complications: a longitudinal imaging study

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Canada

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Relationship between serotonergic innervation, dopaminergic deficit and levodopa induced dopamine release patterns in PD treatment-related complications: a longitudinal imaging study

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CIHR

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5.0

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Parkinson's disease & PD-related disorders

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**Research Abstract**

Parkinson’s disease (PD) is the second most common neurodegenerative disorder and is estimated to affect on average 300/100,000 of the general population. The main clinical symptoms are slowness of movement, tremor and rigidity, attributed to the loss of the neurons responsible for the synthesis of dopamine, a neurotransmitter involved in motor control. There is at present no cure for PD and treatment is based on pharmacological therapies aimed at replicating the action of dopamine in the brain. Unfortunately for most PD patients the benefits of dopaminergic treatment are short lived; they start experiencing treatment-related side effect either of motor nature (aggravating involuntary movements) or psychiatric (often compulsive behavior) within 4 to 6 years after initiation of treatment. Although there is convincing evidence that such complications might be related to abnormal signaling of the dopaminergic system, the mechanisms underlying such complications are not completely understood. Recent studies suggest that in addition to the dopaminergic system, the serotonergic system (related to mood, sleep, appetite regulation) is also affected in PD and that it might play an important role in the origin of treatment- related complications as well as in some non-motor deficits associated with PD. We hypothesize that there are specific patterns associated with the deterioration of the dopaminergic neurons and PD- induced alteration of the serotonergic nerve terminals that, while improving response to levodopa therapy early in the disease, predispose to the occurrence of treatment-related complications. We will use longitudinal in-vivo imaging to investigate the existence of such patterns and their evolution as a function of disease progression. Identification of such patterns will lead to new avenues of treatment that will minimize deleterious side effects and will help design optimal patient specific treatment strategies.

**Lay Summary**

**Further information available at:**

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Investments > €500k

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Canada

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Parkinson's disease & PD-related disorders

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