

Queen's Gazette Media Centre



News Release - Queen's University researchers show how eye movement could help diagnose diseases including Parkinson's

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Queen's University researchers Douglas Munoz and Jay Jantz have uncovered new processes to enhance the knowledge and treatment of various basal ganglia disorders including Parkinson's and Huntington's.

The basal ganglia, located toward the centre of the brain, control a variety of functions including voluntary motor movements, learning, routine behaviours and emotion.

"As average lifespans increase, developing an age-related basal ganglia disease such as Parkinson's is increasingly likely," says Dr. Munoz. "These profoundly affect the lives of patients and their families. Despite this, treatment options and early-stage biomarkers are still limited by gaps in our knowledge of the brain regions involved. This means a disease will often be only diagnosed in its middle or late stages after extensive brain damage, when therapeutic interventions are much less effective."

Dr. Munoz runs the [Queen's Eye Movement Laboratory](#) located at Queen's University.

The current research shows how the basal ganglia network influences eye movements during different behaviours, which adds critical support to the development of eye movement biomarkers to probe diseases in basal ganglia function. Dr. Munoz says analyzing eye movement enables more accurate and extensive biomarkers to increase early interventions of diseases such as Parkinson's. It has also uncovered critical new insight into how these brain areas actually function.

"Basal ganglia disorders are some of the most widespread neurodegenerative diseases in the world, including Parkinson's disease, Huntington's disease, and several others," says Dr. Jantz. "We discovered that there is a fundamental switch in how these brain areas communicate that occurs during different types of behaviour. This may explain why some basal ganglia treatments can have specific side effects particular to some behaviours and everyday tasks."

These new findings open a new avenue of research into environment-aware treatments of basal ganglia disorders, particularly via deep brain stimulation. Dr. Jantz, as the principal scientist at Nurable Inc., is leading a research team to develop these strategies using virtual reality environments and brain-computer interface technologies.

Simultaneously, Dr. Munoz, Canada Research Chair in Neuroscience, is leading national and international studies to collect eye movement behaviours from multiple patient groups to develop new eye movement biomarkers of basal ganglia dysfunction.

The research was published in [Nature Communications](#).

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