

# Translational molecular biology research program in Parkinson's disease

## Significance of Parkinson's disease

Parkinson's disease (PD) is the fastest growing neurological disorder in the world. Between 1990 and 2015, the overall number of people affected by PD was estimated to have more than doubled. In the next 20 years, 12 million people worldwide will be living with the disease. Parkinson's disease results from a process called neurodegeneration, in which brain cells, especially ones that produce the chemical dopamine, die more rapidly than normal. Loss of these cells can lead to tremors, muscular rigidity, and difficulties with moving and walking. Symptoms such as anxiety, depression, and sleep disturbances can also occur. Current treatments for PD may alleviate some of these symptoms, but they cannot prevent progression of the underlying neurodegeneration or halt the disease.

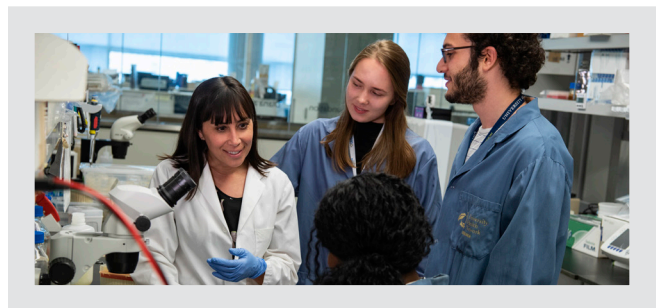
## Movement Disorders Clinic at Toronto Western Hospital

Established in the 1980s, the Edmond J. Safra Program in Parkinson's Disease is home to the Morton and Gloria Shulman Movement Disorders Clinic at Toronto Western Hospital, and has grown from a single neurologist to become the largest clinic of its kind in Canada. There are nine faculty neurologists working with a number of trainees and nurses. It is a designated Parkinson's Foundation Centre of Excellence, with an outstanding international profile and

reputation for excellence in patient care, teaching and research. Dr. Lorraine Kalia and Dr. Suneil Kalia, partners in work and in life, are leading our unique translational molecular biology research program, which is aimed at discovering and developing novel disease-modifying therapies that slow or stop the progression of PD.

## ABOUT DR. LORRAINE KALIA

Dr. Lorraine Kalia completed her combined MD/PhD training at the University of Toronto (U of T) in 2006, and obtained a FRCPC in neurology in 2011. She pursued postdoctoral research at the MassGeneral Institute for Neurodegenerative Disease at Harvard University, where she studied molecular mediators of PD. She returned to further her training with a clinical and research fellowship in movement disorders at Toronto Western Hospital, and was recruited by Dr. Anthony Lang to become a faculty member in the Movement Disorders Clinic in 2013.



Dr. Lorraine Kalia (left) works with her research team in her lab at the Krembil Discovery Tower.

## ABOUT DR. SUNEIL KALIA

Dr. Suneil Kalia received his BSc at McGill University and his MD and PhD degrees from the U of T. In 2006, he entered the neurosurgery residency program at U of T, during which he completed a postdoctoral research fellowship at the MassGeneral Institute for Neurodegenerative Disease at Harvard University. After obtaining his FRCSC in neurosurgery, he undertook subspecialty training in stereotactic and functional neurosurgery at Toronto Western Hospital.



Dr. Suneil Kalia,  
MD, PhD, FRCSC  
Neurosurgeon, Krembil  
Neuroscience Centre,  
and Scientist, Krembil  
Research Institute

## Goals of the translational molecular biology research program

The broad goal of the research program is to discover disease-modifying therapies for PD by first understanding the critical molecular events that cause neurodegeneration. In parallel, Dr. Lorraine Kalia and Dr. Suneil Kalia are developing novel tools and approaches for both drug discovery and drug delivery into the brain to rapidly translate them into new treatments. Their ultimate goal is to discover a cure for PD that stops degeneration of brain cells. This will have a tremendous impact on patients, as discoveries from this research program will inform our understanding and treatment of other debilitating neurological conditions.

The research program focuses on three key areas:

- **Identifying molecular targets which slow neurodegeneration in PD.** In PD and other neurodegenerative diseases, certain proteins form clumps in the brain and lead to degeneration of brain cells. A class of molecules called chaperones, which exist in brain cells and have the capability to reduce clumps of harmful proteins, are being studied in the Kalia lab for their potential to stop neurodegeneration.
- **Developing new tools to study key molecular pathways involved in PD.** Dr. Lorraine Kalia and Dr. Suneil Kalia are developing unique preclinical models of PD to investigate newly discovered molecular pathways that may contribute to neurodegeneration. These models are also used to test promising compounds to see if they can halt the loss of dopamine neurons.
- **Developing novel therapeutics and methods for safe delivery in the brain.** It has become clear that safe and effective delivery methods for therapeutics do not yet exist. The Kalia lab is developing ways to safely translate new molecular therapeutics into patient treatments.

## Support opportunity

PD causes significant disability, incurs major costs, and is increasing in prevalence and there is an urgent need to develop disease-modifying therapies. It is critically important that we seek the support of donors in helping us advance our cutting-edge status for research, education and patient care in PD and other movement disorders. Help us to ensure that pioneering advances continue to be made at UHN.

### ABOUT TORONTO GENERAL & WESTERN HOSPITAL FOUNDATION

Toronto General & Western Hospital Foundation raises funds for research, education and the enhancement of patient care at Toronto General and Toronto Western hospitals, as well as the Michener Institute of Education at UHN. Together with our donors, we are helping UHN pursue the knowledge that makes all our lives better.

### TO LEARN MORE OR MAKE A DONATION, PLEASE CONTACT:

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