

# Frances Evelyn Feinberg Clinical Neuroscience Research Institute Parkinson's Disease and Movement Disorders Center



# Parkinson's Disease and Movement Disorders Center

## Northwestern University Feinberg School of Medicine

The Parkinson's Disease and Movement Disorders Center at Northwestern University Feinberg School of Medicine is a world-class, thriving program that unites dedicated physicians, scientists, trainees, and other allied health professionals who want to make a positive difference in the lives of patients and families in Chicago and across the globe. Our center is directed by Tanya Simuni, MD, who also serves as the Arthur C. Nielsen Professor of Neurology at Northwestern.

We are incredibly grateful to the generous and forward-looking individuals, foundations, and corporations that are investing in our efforts and making our positive trajectory and achievements possible. We invite their continued support as well as the participation of newly engaged friends and groups. We are excited for what the future holds.

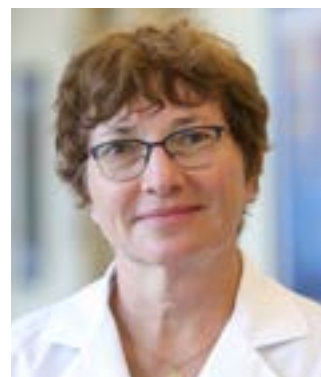
### A Distinguished and Forward-Looking Program

Dr. Simuni and Dimitri Krainc, MD, PhD, the Aaron Montgomery Ward Professor, chair of the Ken and Ruth Davee Department of Neurology, and director of the Simpson Querrey Center for Neurogenetics, are working with colleagues across disciplines to pursue new discoveries through laboratory, clinical, and translational studies of movement disorders. They also are training the next generation of experts in the field and providing care that is at the leading-edge of prevention, diagnosis, and treatment.

Because of our internationally respected research programs and clinical care in Parkinson's disease and movement disorders, we have received recognition that sets us apart as a destination for high quality care and establishes us as a leader among our peers for research and training. Notably, the Davee Department of Neurology is ranked 5th nationally for National Institutes of Health research funding, and Northwestern is ranked 5th nationally for Neurology and Neurosurgery by *U.S. News & World Report*.

The Parkinson's Disease and Movement Disorders Center is recognized by the Parkinson's Foundation as one of its worldwide Centers of Excellence. We offer clinical trials, experimental treatments, and comprehensive care as a Center of Excellence. We proudly serve as a strategic partner in research for Parkinson's disease with the Michael J. Fox Foundation. Our center also is recognized as a Wilson Disease Center of Excellence, Center of Excellence of the Huntington's Disease Society of America, and as a credentialed research site for Ataxia. Our scientists have contributed significantly to the understanding of the mechanisms underlying all these diseases.

Our center is unique. We have the ability to spearhead translational studies—known as bench to bedside research—and see them through. We have the capacity, ability, and success to take a novel finding from the laboratory and translate it all the way to humans through late phase clinical trials. One example of our exciting translational work is the national, multi-center isradipine study that was led by Dr. Simuni based on the preclinical work by James Surmeier, PhD, the Nathan Smith Davis Professor and chair of Physiology. We also have a unique vision guiding us well into the future that is at the



“At Northwestern, we have a responsibility to deliver better therapeutics for all of the movement disorders that we treat in our patients. As clinicians, we are the first ones to see the burden of these challenging diseases on patients and their families. We cannot promise a cure today, but we can be very optimistic that our field of care and study is incredibly active and promising. I am constantly asked when we will cross the finish line in terms of cures. I can share that there are definitely many dedicated physicians and scientists here who are not just ‘marathoning’ that road, but are sprinting the trail.”

Tanya Simuni, MD  
Arthur C. Nielsen Professor of Neurology  
Director of the Parkinson's Disease and Movement Disorders Center  
Northwestern University Feinberg School of Medicine

cutting-edge of the field: We are focusing on personalized medicine for patients, early disease identification, and exercise interventions as the mainstream of therapy.

At the heart of our program are experts in neurology, neurological surgery, psychiatry, sleep medicine, physiology, physical medicine and rehabilitation, physical therapy and human movement sciences, radiology, and public health. One example of our interdisciplinary focus is our Functional Movement Disorders Center, which pairs rehabilitation with cognitive behavioral techniques. Under the direction of Kathrin LaFaver, MD, the center seeks to restore function and improve independence for patients with neurological symptoms not known to be caused by underlying structural illness or disease. We also provide rehabilitation services to patients across the spectrum of movement disorders. Jennifer Goldman, MD, recently joined Northwestern and heads the new Parkinson's Disease and Movement Disorders section at Shirley Ryan AbilityLab, the first division of its kind nationally.

### Breakthrough Basic, Clinical, and Translational Research

Our faculty members conduct an impressive range of research projects ranging from studies of potential neuroprotective medications for Parkinson's disease that can slow progression, to novel treatments to control Parkinson's symptoms, to investigating the role of physical therapy and other non-pharmacological interventions in the management of the disease. We actively collaborate with basic scientists at Northwestern to bring their discoveries to the clinical setting, as well as our peers in the field of movement disorders research. Here we share just a few examples of our latest research and distinctive resources that are leading the way to personalized approaches to Parkinson's treatment.

- Dr. Dimitri Krainc's research has focused on understanding how mutations in genes lead to degeneration in patient-derived neurons. In a recent study, his laboratory showed how a mutation in the gene GBA1 increases a patient's risk of Parkinson's disease. The team was able to reduce the harmful effects of the mutation and alleviate symptoms of the disease. Dr. Krainc and his colleagues also discovered that mutations in LRRK2 and GBA1—two common genetic risk factors for Parkinson's disease patients—can be regulated, revealing the potential for the development of new therapeutics, according to a study published in *Nature Communications*.
- In a study published in *Cell Reports*, Mark Bevan, PhD, professor of Physiology, showed promise in treating Parkinson's disease symptoms by restoring the intrinsic discharge of nerve cells within the subthalamic nucleus. He and his team rescued movement in a mouse model of Parkinson's disease by restoring the intrinsic discharge of nerve cells within the subthalamic nucleus, which is a component of the basal ganglia, a brain network critical for motor and impulse control. The findings provide proof-of-concept for a new therapeutic approach in Parkinson's disease.
- A cancer drug that failed to show benefit in clinical trials for cancer more than 15 years ago may slow the progression of Parkinson's disease, according to a study led by Joseph Mazzulli, PhD, assistant professor of Neurology. The small molecule drug appears to help jump-start lysosomal function, which in turn clears out harmful proteins that build up and lead to Parkinson's symptoms. Dr. Mazzulli and his colleagues started trying to figure out why cells die in Parkinson's disease. They came up with this new protein called ykt6 as a therapeutic target and discovered a way to activate this protein with a small molecule.

### Parkinson's Disease

Parkinson's disease is an area of enormous strength and depth at Northwestern in terms of the leadership and innovation we offer in patient care, training, and high-impact research. Parkinson's disease is a progressive degenerative disorder that affects nerve cells, or neurons, in the part of the brain that controls movement. In this disease, a certain group of nerve cells in the brain that produce the chemical dopamine degenerate. The lack of dopamine causes the primary symptoms—tremor, slowness of movement, muscle stiffness, and balance problems. More than one million people in the United States have Parkinson's disease.

Some facts about Parkinson's disease:

- It affects 1 in 100 Americans over the age of 60.
- The average age of onset is 65.
- As many as 5 to 10 percent of people are diagnosed prior to age 40 with young-onset Parkinson's.
- It affects slightly more men than women.
- Early symptoms are subtle, and people may think their symptoms are “normal aging.”

- Dr. Simuni led the effort on the analysis of the data from the genetic cohorts in the Parkinson Progression Marker Initiative Michael J. Fox Foundation global study. In the study published in *The Lancet Neurology*, investigators showed that unaffected people who carry genetic variants associated with increased risk of Parkinson's disease have subtle features of motor and non-motor features of the disease. Longitudinal follow-up of these cohorts will be essential to understand what biological factors (biomarkers) define who will ultimately develop Parkinson's disease and who will not. Such data are essential for the ultimate design of disease prevention studies.



- Research led by our fellows in the Department of Physiology is focused on two major, unmet medical needs of the Parkinson's disease community: 1) the development of more effective symptomatic therapies for patients with the disease, and 2) the development of a disease-modifying therapy that slows or stops progression. Investigations include understanding the mechanisms underlying levodopa-induced dyskinesia and studying a novel mouse model of Parkinson's disease. At present, there are no animal models that recapitulate the key features of the disease, particularly its progressive nature.

### **Laboratory for Therapeutic Interventions for Parkinson's Disease**

With the leadership of Daniel Corcos, PhD, professor of Physical Therapy and Human Movement Sciences, this laboratory is seeking to understand the causes and progression of Parkinson's disease, to help patients live their lives to the fullest. The scientists conduct and study highly innovative research in the areas of exercise and deep brain stimulation. Dr. Corcos and his team have discovered that specific exercise prescriptions of both weight training and endurance exercise slow Parkinson's disease progression. Further, they have shown that deep brain stimulation reduces tremor and improves a patient's ease of movement.

### **Parkinson's Disease and Movement Disorders Center Biorepository**

The biorepository is a valued resource for our research program, storing genetic, biologic samples, and detailed clinical information from patients and healthy controls evaluated at Northwestern Memorial Hospital. Participants include patients with movement disorders, including but not restricted to Parkinson's disease, atypical Parkinsonian syndromes, Huntington's disease, dystonia, lewy body dementia and spinocerebellar ataxia, unaffected family controls, and unrelated controls. Consent is obtained to conduct research on all participants' DNA and clinical information.

### **Training Leaders of the Future**

We strongly believe that training the next generation of movement disorder neurologists requires the highest level of expertise and a commitment to a supportive and stimulating environment. Our center offers a one- or two-year clinical fellowship in movement disorders, as well as a research fellowship. We also have outstanding research fellows in the Department of Physiology leading novel studies of movement disorders, particularly in the area of Parkinson's disease.

### **Join Us in Partnership**

We ask our most loyal donors and new friends to join us in our urgent work to discover new and effective approaches and treatments for Parkinson's disease and movement disorders. At Northwestern, we are charting a new course in personalized medicine for each and every patient. We are striving to identify movement disorders earlier for better outcomes and developing innovative exercise interventions that are leading the field forward. We are seeking your support to create Endowed Professorships to recruit and retain exceptional physicians and scientists, as well as Fellowship Funds to support our fellowship trainees, who represent the future of our field. We also welcome philanthropic funds to propel our high-impact research programs.

**For more information about supporting the Parkinson's Disease and Movement Disorders Center, please contact Jordan Sund at [jordan.sund@northwestern.edu](mailto:jordan.sund@northwestern.edu) or 312-503-2706.**

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