Research

HIGHLIGHTS 2011-2013

Parkinson
Society
Canada

Parkinson Society Canada
Société Parkinson Canada
Since 1965
Depuis 1965

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Parkinson's is...

A chronic degenerative neurological disease caused by a reduction of dopamine in the brain. It affects over 100,000 Canadians. There is no cure. Symptoms include: resting tremor, slowness of movement, stiffness or rigidity of muscles, difficulty with balance and walking, changes in voice volume and speech, and difficulty with fine movements. Non-motor symptoms include depression, loss of sense of smell, sleep disturbances and cognitive changes.

Knowledge is power over Parkinson's

Knowledge of symptoms, treatment and where to find support can help people manage their Parkinson's. We're here for you. Call 1-800-565-3000 or visit www.parkinson.ca

Parkinson Society Canada is...

the national voice for Canadians living with Parkinson's, working together with our ten regional partners and more than 240 support groups across the country. Parkinson's disease affects 1% of the population over age 65 and 2% of those aged 70 and older. As the population ages, the number of new cases of Parkinson's disease is expected to rise. Though there is no cure, various pharmaceutical and surgical treatments can help manage symptoms and improve quality of life.

Because Parkinson's is a degenerative disease, its social and economic impact increases over time for the individual, the family and the healthcare system. There is an urgent need to increase support for research and development of new medicines in this area. Access to newer medicines currently available in other countries and more opportunities to participate in clinical trials are critical for improving the quality of life of Canadians living with this disease and their loved ones.

Parkinson Society Canada is the leading source of non-government funds for Parkinson research in Canada. Our National Research Program is modeled on the Canadian Institutes of Health Research's four pillars of research and encourages a broad range of applications from biomedical, clinical, health services, and systems research to population health studies.

Our National Research Program is the cornerstone of what we do at Parkinson Society Canada. Our research focus is to uncover more effective treatments and ultimately a cure for Parkinson's disease. Help us find a cure. Visit www.parkinson.ca.

Charitable Registration Number:
108091786RR0001

Member Imagine Canada's Ethical Program

Imagine Canada Ethical Code

Research
HIGHLIGHTS 2011-2013

30 years of Excellence: A proud funding tradition

It is only in the last few decades that science has acquired the techniques and instruments necessary to begin to understand the most complex organ in the human body – the brain. Since then there have been dramatic advances in our knowledge of Parkinson's disease and important breakthroughs in treatment.

Every advance and breakthrough has its foundation in earlier scientific investigation – the knowledge gained from researchers exploring a wide variety of possible leads never before tried. This initial stage – or discovery research – is essential to the international effort to improve the lives of people living with Parkinson's disease and to eventually find a cure.

In 1981, Parkinson Society Canada began funding discovery research. Through over 385 awards, fellowships, and grants, researchers working in Canada have been able to explore promising leads in the aetiology, progression and treatment of Parkinson's disease. These researchers are currently working at hospitals, universities and throughout the medical community – participating in further research, training new generations of researchers and treating patients.

The future of Parkinson's research in Canada depends on a solid foundation of discovery research. As a direct result of our investments, we have seen several Canadian researchers at the start of their careers advance to establish their own research facilities and clinics.

Funding Philosophy

Parkinson Society Canada, together with 10 regional partners, invests in Canada's Parkinson's researchers. We support research at the beginning, the discovery stage, providing grants that strategically spread resources across Canada. The result is more researchers exploring novel ideas, providing a crucial foundation for advancing knowledge, improving treatments, developing potential therapies and ultimately finding a cure.

Recognizing the need to make the most effective use of research funds available, Parkinson Society Canada revamped its research program in 2003, creating a program that provides smaller grants and awards which will reach many more scientists across Canada, rather than providing larger amounts to only a few researchers. Seed money for established researchers allows them to test theories that might not otherwise have been investigated because the ideas were considered too preliminary by other funders. The possibility that an idea could lead to a significant finding is what makes a pilot grant important and we have focused our research efforts on this. Support to students, fellows, and new investigators ensures that we are building capacity by training the next generation of Parkinson's researchers.

We recognize that research and training is also needed to support and improve the quality of life for those living with Parkinson's now. For this reason, we encourage research from other health disciplines such as nursing, occupational therapy, speech language pathology and social work. In addition, Parkinson Society Canada has continuously supported the further training of neurologists to gain expertise in the diagnosis and management of Parkinson's disease and other movement disorders. This has led to an increase in the number of Parkinson's and movement disorder specialists in Canada.

This investment in researchers and the Parkinson's research community has proved successful and, as the only organization that specifically funds Parkinson's research in Canada, our contribution is highly valued.

Research Policy Committee

Dr. Pierre Blanchet
Chair

Parkinson Society Canada's Research Policy Committee (RPC), a National Board committee, develops collaborative policies with other research programs and associated funding agencies, and advises the Board on policies about the most effective means to promote research into the cause(s), management and eventual cure of Parkinson's disease. This committee, which includes representatives of the scientific community, patient advocates, clinicians and non-medical health professionals engaged in the care of people with Parkinson's disease, promotes the relevance, credibility and viability of the research program to Parkinson Society Canada Board members, the scientific community and other stakeholders.

Recommendations for funding applications are made by the Research Policy Committee to the Parkinson Society Canada Board. The RPC and Scientific Advisory Board are two separate groups, with the Chair of the Scientific Advisory Board sitting on both committees to ensure continuity. Decisions are based on the ranking of applications by the Scientific Advisory Board members (who have scored on scientific excellence and relevance to Parkinson's disease). Funding recommendations based on the amount of money that is available in a given year are made to the Parkinson Society Canada National Board, who approves the funding.

Scientific Advisory Board

Dr. Ted Fon
Chair

Health funding agencies that fund research use a peer review process, an evaluation system that ensures quality and excellence in scientific research. Peer review helps guarantee we fund research that is novel, important and scientifically sound. Parkinson Society Canada's Scientific Advisory Board (SAB) is the group that undertakes this responsibility on behalf of the organization. Parkinson Society Canada invites prominent and respected individuals from the Parkinson's scientific community across Canada to become members of its peer review committee. Selection is based first on their specific expertise and secondly to ensure geographical representation. This volunteer, arms-length panel of experts meets twice a year to adjudicate applications submitted for funding consideration.

The SAB determines scientific excellence and relevance to Parkinson's disease, providing the highest quality of objective adjudication. All members of the committee, with the exception of the Chair, and those members who have a conflict of interest with a particular proposal, score a given application using Canadian Institutes of Health Research (CIHR) standards following thorough discussion. SAB members review and score applications only. The establishment of a rank order of proposals is based on the scores provided through the peer review process to ensure objectivity in the process. Funding decisions are made by a separate body.

The success of the Parkinson Society Canada National Research Program is made possible through the significant efforts of our volunteer panels of experts.

Donald Calne Lectureship

The Donald Calne Lectureship recognizes a distinguished neurologist of international reputation, whose work is primarily in the area of Parkinson's disease. Awarded annually, the recipient will deliver a "state of the illness" lecture on Parkinson's disease to the Parkinson community. This lectureship was established in 2002 to honour Dr. Donald Calne for his outstanding service to the Parkinson's community as Professor of Neuroscience, University of British Columbia and past chair and long time member of the Scientific Advisory Board, Parkinson Society Canada.

Donald Calne Lectureship Awardees


Dr. Matthew Farrer

2011 Dr. Matthew Farrer, Director, Centre for Applied Neurogenetics, Brain Research Centre, University of British Columbia Vancouver, British Columbia, Canada (Vancouver, October, 2012)

2010 Dr. Stanley Fahn, Director, Movement Disorder Division, Neurological Institute, Columbia University Medical Centre, New York, New York, U.S.A. (Toronto, June, 2011)

2009 Dr. Andrés Lozano, Toronto Western Hospital, Toronto, Ontario (Ottawa, May, 2010)

2008 Dr. J. William Langston, Scientific Director, The Parkinson's Institute, Sunnyvale, California, U.S.A. (Calgary, January, 2009)

2007 Dr. Anthony Lang, Director, Morton and Gloria Shulman Movement Disorders Centre, Toronto Western Hospital, Toronto, Ontario (Ottawa, January, 2008)

2006 Dr. Jon Stoessl, Director,Pacific Parkinson's Research Centre, University of British Columbia, Vancouver, British Columbia (Ottawa, November, 2007)

2005 Dr. ZbigniewWszolek, Mayo Clinic, Jacksonville, Florida, U.S.A (Winnipeg, November, 2005)

2004 Dr. OlehHornykiewicz, The Brain Research Institute, University of Vienna, Vienna, Austria (Toronto, November, 2004)

2003 Dr. Yoshikuni Mizuno, Neurology Department, Juntendo University Medical School, Tokyo, Japan (Montreal, November, 2003)

Research Program Descriptions

PILOT PROJECT GRANT PROGRAM

Duration 1 year
Funding Amount Maximum $45,000

Pilot Project Grants support established investigators performing research in new, specifically targeted, high priority areas. Through the provision of 'seed money', researchers are able to engage in novel or emerging research areas that will place them on a trajectory to applying for and receiving subsequent substantial grants from larger funding institutions.

NEW INVESTIGATOR AWARD PROGRAM

Duration 2 years
Funding Amount $45,000/year

During the initial period of their independent careers, new investigators are in a good position to formulate innovative and fertile research projects. This program provides an opportunity for new investigators to develop and demonstrate their ability to initiate and conduct independent health research.

CLINICAL RESEARCH FELLOWSHIP PROGRAM

Duration 2 years
Funding Amount $50,000/year

To address the shortage of medical specialists, neurologists or neurosurgeons with experience both in the critical management of Parkinson's and in its clinical research, this fellowship training program encourages scientists to enter the field of Parkinson's clinical research.

CLINICAL MOVEMENT DISORDERS FELLOWSHIP PROGRAM

Duration 1 year
Funding Amount $50,000

Each person with Parkinson's in Canada should receive appropriate medical expertise, drug treatment, support services, continuous care, educational resources, respect, dignity, help and hope. Through this fellowship, clinicians entering into clinical training in the subspecialty of Movement Disorders are trained to gain expertise in the diagnosis and management of Parkinson's disease and other movement disorders.

BASIC RESEARCH FELLOWSHIP PROGRAM

Duration 2 years
Funding Amount Maximum $40,000 - $50,000/year

Through the provision of salary support, Parkinson Society Canada has attracted promising young scientists to the field of biomedical research into Parkinson's disease. Investing in their research training ensures a solid foundation of researchers offering promise for future work in the area of Parkinson's.

GRADUATE STUDENT AWARD PROGRAM

Duration 2 years
Funding Amount $15,000/year*

Parkinson Society Canada wishes to encourage continued growth and revitalization in the fields of Parkinson's research in Canada. By providing salary support, talented master's and doctoral students have an opportunity to choose Parkinson's research as their area of focus during the early stages of their training.

* Additional $5,000/year is contributed by the student's supervisor for a total award amount of $20,000 per annum.

PSYCHOSOCIAL RESEARCH

Parkinson Society Canada established the psychosocial funding stream to encourage researchers from other health disciplines, e.g. nursing, occupational therapy, speech language pathology and social work, that leads to better understanding of the "quality of life" issues faced by people living with Parkinson's and their care partners. Areas of interest are: caregiving or supportive interventions, behavioural or cognitive changes, treatments for non-motor and motor symptoms, and economic impacts on families.

RESEARCH GRANT

Duration 2 years
Funding Amount Maximum $50,000/year

In partnership with the Canadian Institutes of Health Research, Institute of Neurosciences, Mental Health & Addiction, this research grant provides operational support to an investigator.

DOCTORAL AWARD

Duration Up to 3 years
Funding Amount $30,000 + $5,000 travel allowance/year

In partnership with the Canadian Institutes of Health Research, Institute of Neurosciences, Mental Health & Addiction, this doctoral award provides salary support to a student who is pursuing a PhD.

Causes of Parkinson's

Movement is normally controlled in part by dopamine, a chemical that carries signals between nerve cells in certain areas of the brain. When a significant proportion of cells that normally produce dopamine have gradually died, Parkinson's motor symptoms appear. Parkinson's is a complex disease with many potential underlying causes. Researchers believe it may be caused by a combination of factors including genetic predisposition and the environment. Research is currently being supported in these areas to determine the cause of the disease.

Several genes that cause the less common genetic form of Parkinson's have already been identified. This knowledge can be used to understand the more common forms of the disease. Researchers are now intensively investigating the chemical or genetic trigger that starts the cell death process particularly in dopamine neurons. By understanding the sequence of events that leads to the loss of dopamine cells, scientists believe they will be able to develop treatments to stop or reverse the disease.

Ms. Shababa Masoud
PhD candidate
Department of Pharmacology and Toxicology
University of Toronto

The effects of exogenous Parkinson's disease inducing toxicants on neuronal injury in genetically modified mice with increased intracellular dopamine

Graduate Student Award | $30,000 over two years

Researchers already know that in Parkinson's disease, the brain cells that transmit dopamine degenerate and die. What they don't know is why these particular neurons are so vulnerable. At the University of Toronto, graduate student Shababa Masoud is examining whether the way dopamine is handled within neurons is what makes them more susceptible to damage and death.

"If we can understand the fundamental vulnerability of these neurons, then we can help alleviate the symptoms of the disease," Masoud says.

Masoud, who specializes in pharmacology and toxicology, chose to work on Parkinson's disease because the knowledge that other researchers have already accumulated focuses her work, while leaving many avenues to pursue. "I like functioning at the edge of knowledge," she says. This award will help Masoud conduct her experiments, publish her data and ensure the information reaches a wide audience so her research contributes to the foundation for the treatment of Parkinson's disease.

Mr. Gian-Luca McLelland
Master's student
Department of Neurology and Neurosurgery
Montreal Neurological Institute
McGill University

The roles of parkin and PINK1 in mitochondrial-derived vesicle biogenesis and mitochondrial quality control

Parkinson Society Canada/Fonds de recherche du Québec-Santé Partnership Award / Graduate Student Award | Year Two $20,000

At the Montreal Neurological Institute and Hospital, graduate student Gian-Luca McLelland is investigating the way mitochondria – the parts of a cell responsible for generating energy – interact with genes linked to Parkinson's disease. McLelland and Heidi McBride of the University of Ottawa's Heart Institute study small parts of mitochondria known as mitochondria-derived vesicles. They believe these vesicles are used to transport proteins. If McLelland and McBride can figure out how the vesicles interact with parkin, a protein linked to Parkinson's disease, their work could guide other researchers in developing a drug target to alleviate the symptoms or stop the progression of Parkinson's disease.

Ms. Andrea Schreij
PhD candidate
Department of Neurology and Neurosurgery
Montreal Neurological Institute
McGill University

Exploring the functional role of a novel interaction between leucine-rich repeat kinase 2 and clathrin-light chain

Graduate Student Award | $30,000 over two years

Andrea Schreij vividly remembers the look of despair on her grandmother's face when Andrea handed her the $100-bill her grandmother had misplaced.

That was the moment Alyda Schreij, who was later diagnosed with dementia, realized she was forgetting where she put important things. It was also the incident that spurred her granddaughter into a career as a neuroscientist.

"From that time on, I realized that if your brain doesn't function, you can't function. It's as simple as that," Schreij says.

Now a doctoral candidate at McGill University, Schreij studies the molecular role of LRRK2, a gene that, when mutated, is the most common genetic cause of Parkinson's disease. Schreij has identified a novel interaction between LRRK2 and a protein called clathrin light chain. Understanding LRRK2's specific function and this molecular interaction could eventually help researchers devise drugs to prevent the death of brain cells, a hallmark of Parkinson's, says Schreij.

Remembering her grandmother's distress as she became progressively ill motivates Schreij to understand the molecular mechanisms that underlie Parkinson's and other neurological disorders.

"I can work much harder if I know that in the end, it will help people," she says.

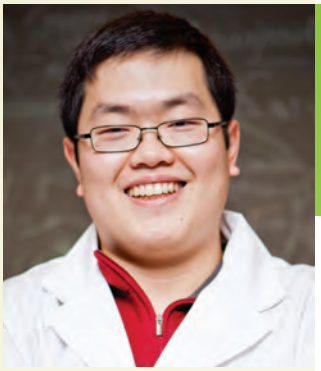
Mr. Mohammad Parsanejad
PhD candidate
Department of Cellular and Molecular Medicine
University of Ottawa

The role of paraoxonas-2 in protective function of DJ-1 in Parkinson's disease

Graduate Student Award | Year Two $15,000

At the University of Ottawa, PhD student Mohammad Parsanejad investigates the relationship between two proteins that work together to send biochemical messages in cells. Parsanejad believes one protein, called PON-2, is designed to work with a second protein, called DJ-1, to protect brain cells from toxins that can kill then. But when it is mutated, DJ-1 interferes with PON-2's protective role. When that happens, brain cells die.

If Parsanejad's research confirms the relationship between the proteins, it could help find a way to raise the levels of PON-2 in dopamine-producing brain cells. That could lead the way to a new drug target, and a new treatment for Parkinson's disease.



Mr. Guang Shi
PhD candidate
Department of Biochemistry
University of Toronto

Understanding how the mitochondrial rhomboid PARL impacts the PINK1 dependent Parkin mitochondrial recruitment and subsequent mitophagy

Garden Centre Group Co-Op Corp. Graduate Student Award | $30,000 over two years

Increasingly, researchers like Guang Shi at the University of Toronto are focusing on the role of mitochondria in Parkinson's disease.

Mitochondria are little organs within cells that use glucose and oxygen to produce energy. Damaged mitochondria can derail processes essential to healthy cells. Fortunately, cells contain their own procedure to remove damaged mitochondria – called mitophagy.

"Mitophagy is like a mitochondrial quality assurance system," says Shi. "Instead of letting the mitochondria become really sick and damaged, which can result in cell death, mitophagy gets rid of the damaged mitochondria before the cell dies."

Shi, a biochemist, believes mitophagy can protect dopamine-producing cells. But if it is disrupted, mitophagy could be part of the problem causing Parkinson's. He investigates mitophagy's interaction with three proteins, hoping one of those proteins could eventually become a drug target to treat Parkinson's.

Shi was already interested in mitochondria when Binjing Tang, who was like a grandmother to him, died of Parkinson's disease in China. Shi, who came to Canada six years ago to study, shifted his focus to the mitochondrial process in Parkinson's.

"This disease affects the entire family and even friends," says Shi. "I thought I could do something to help other people not go through this process."

Mr. Guillaume Fortin
PhD candidate
Department of Pharmacology
University of Montreal

Role of co-release of glutamate in the survival of dopaminergic neurons

Graduate Student Award | $30,000 over two years

The loss or damage of particular genes has long been known to cause forms of Parkinson's disease. But researchers know they haven't yet identified all the proteins and genes involved.

At the University of Montreal, PhD candidate Guillaume Fortin studies VGLUT2. This gene in dopamine-producing cells also allows the release of another chemical messenger, called glutamate. Fortin investigates whether the release of these two neurotransmitters, dopamine and glutamate, is linked to the death of the dopamine-producing brain cells involved in Parkinson's disease.

If Fortin determines that a lack of VGLUT2 causes Parkinson's motor symptoms, he could open a new avenue for gene therapy, involving a virus that could convince the body to produce more of this critical protein. Ultimately, Fortin hopes his work will help to develop a new way to treat Parkinson's disease.

As a neuropharmacologist, Fortin is well placed to marry basic research with drug design. But he tries never to get so consumed in the lab that he gets disconnected from the central issue. "To see the real disease and its effect on humans – for me, it helps me continue to achieve my goals."

Dr. Jean-Francois Trempe
Post-doctoral Fellow
Department of Neurology and Neurosurgery
Montreal Neurological Institute
McGill University

In vivo interaction of parkin and endophilin-A and their roles in the regulation of synaptic endocytosis and protein degradation

Basic Research Fellowship | Year Two $50,000

Dr. Jean-Francois Trempe is unravelling the relationship between two proteins, parkin and endophilin. He wants to figure out how they work together to kill other proteins that are linked to Parkinson's disease. Researchers already know that when parkin is missing or mutated, it can cause a form of Parkinson's that runs in families. But they don't know exactly how the loss of parkin interferes with dopamine-producing brain cells, which are at the heart of Parkinson's disease. Trempe's research is designed to illuminate whether there is a way researchers can interfere with the interaction between the two proteins, and protect dopamine-producing neurons.

"The research skills and knowledge I gained will have life-long benefits. I'm really grateful to Parkinson Society Canada for this opportunity to expand my skills."

Dr. Ratan Bhardwaj, BASIC RESEARCH FELLOWSHIP 2003-2005

Dr. Jeremy Van Raamsdonk
Post-doctoral Fellow
Department of Biology
McGill University

The role of genes that extend lifespan in the pathogenesis and treatment of Parkinson's disease

Basic Research Fellowship | Year Two $50,000

Even though mutations in genes that cause Parkinson's may be present from birth, most people don't display symptoms until age 60 or older, unless they have a familial form of the disease. At McGill University, Dr. Jeremy Van Raamsdonk is investigating whether changes in the ageing process make cells more vulnerable to the harmful effects of genetic mutations.

If the ageing process does contribute to the onset of Parkinson's, researchers may one day be able to turn so-called "longevity" genes on or off, as a way to treat or prevent the disease.

Dr. Anurag Tandon
Assistant Professor
Department of Medicine
Tanz Centre for Research in Neurodegenerative Diseases
University of Toronto

Evaluation of PGC1α expression to ameliorate PINK1-induced mitochondrial deficits

Pilot Project Grant | $45,000

Increasingly, evidence points to the loss or misplacement of mitochondria, the energy-producing component of cells, as key to the development of Parkinson's disease. That's why neurobiologist Anurag Tandon is investigating the function of a gene called PGC1-alpha. Tandon thinks this gene, which increases the production of mitochondria, could eventually be used to correct the deficiencies that other mutated genes produce, which lead to Parkinson's disease.

Tandon's work could open a new avenue for treatment. "The argument would be that it would essentially allow us to correct the disease, if we could up-regulate (or produce more) mitochondria," he says.

Parkinson Society Canada funding will help Tandon generate enough preliminary data to establish a larger study in the future, he says. He hopes his research will not only be relevant, but will one day help find a cure. "If my research helps improve the quality of life for thousands – or millions – of people in the next two or three decades, that would be immensely satisfying," Tandon says.

"The support from Parkinson Society Canada was instrumental in my appointment at Albany Medical College as an Assistant Professor (tenure track)."

Dr. Damian Shin – BASIC RESEARCH FELLOWSHIP 2007-2009

Dr. David Park
Professor
Department of Cellular and Molecular Medicine
University of Ottawa

The role of AFG3L2 in PINK1 function

Pilot Project Grant | $45,000 | Funded by Parkinson Society Ottawa

Although the loss or damage of a gene called PINK1 has been linked to genetic forms of Parkinson's disease, researchers don't yet understand this gene's complete role in the molecular process causing the disease.

At the University of Ottawa, neuroscientist David Park investigates the interaction between PINK1 and a protein called AFG3L2. Park believes that this second protein's role is to stabilize and cut PINK1, ensuring that the right amount goes to the right place to regulate mitochondria, the energy-producing component of a cell. Without healthy mitochondria, vital brain cells can die.

Using the funding from this grant, Park will test his theory about the interaction between the two proteins. Ultimately, what he discovers about their roles could present a target for drugs or other therapies to treat Parkinson's disease.

Parkinson's disease is unique in terms of the number of critical biological processes involved in its cause and progression, says Park, making it a fascinating and complex puzzle.

"This is certainly more than one lifetime's work, but if I can contribute in a small way to the understanding of this disease, I think that's an incredibly worthwhile mission and goal," says Park.

"I am immensely grateful for the opportunity that has been afforded to me by the Parkinson Society Canada, its members and those families and individuals whose donations make this kind of sponsorship possible. My movement disorders fellowship has been the most useful educational and professional experience I have had to date. I hope that I can take what I have learned and apply it effectively to the care of patients with Parkinson's disease and to advance our knowledge of the disease for which many important questions remain unanswered."

- Dr. Richard Walsh, CLINICAL MOVEMENT DISORDERS FELLOWSHIP 2010-2012

Dr. Kalle Gehring
Professor
Department of Biochemistry
McGill University

Structural Studies of Parkin and PINK1

Pilot Project Grant | $45,000

Researchers have already determined that people who lack the protein parkin develop the familial form of Parkinson's disease. What scientists don't know is how parkin interacts with other proteins and with mitochondria – the energy powerhouses within cells.

At McGill University, Kalle Gehring investigates the structure of parkin to see if he can determine how it carries out the activities for which it was designed. Using a technology called X-ray crystallography, he will study the function and regulation of parkin as it interacts with other key genes.

"Different parts of parkin have been studied separately," says Gehring. "But no one has been able to study the whole protein and get a global picture."

Learning more about parkin's function and structure opens up a new avenue for researchers designing drugs to treat Parkinson's disease. This pilot project will enable Gehring to demonstrate results that will lead to more funding and a larger research project, he says.

One day, Gehring hopes his work will be remembered as resulting in a critical development leading to a cure.

Dr. Connie Marras
Assistant Professor,
University of Toronto
Staff neurologist
Movement Disorders and Epidemiology
Toronto Western Hospital
Movement Disorders Centre

Environmental determinants of age at onset of Parkinson's disease in LRRK2 G2019S mutation carriers

Pilot Project Grant | $45,000

People who carry a mutated gene known as LRRK2 are at high risk for Parkinson's. However, not everyone with this mutation gets the disease. That's why Dr. Connie Marras investigates the environmental factors that may tip the balance for susceptible people.

Marras, a neurologist at the Toronto Western Hospital Movement Disorders Centre, is part of an international study administering a questionnaire to identify the environmental risks and protective factors shared by people with this mutated gene who developed Parkinson's.

It is as important to find out what protects people with this gene from the disease as it is to discover why they develop it, says Marras. "If we better understand protective factors or risk factors for the disease, then it would lead immediately to research to find out how we can leverage that information."

Although Marras has relatives with Parkinson's disease, it was her exposure to people living with it while she was training in Toronto that sparked her interest in learning more about the disease. She hopes her research will enable her one day to provide more answers when people ask her what causes the disease.

Dr. Tim Kennedy
Associate Professor
Department of Neurology
and Neurosurgery
McGill University

Dr. Abbas Sadikot
Professor
Department of Neurology
and Neurosurgery
Montreal Neurological
Institute
McGill University

A Novel Mechanism Regulating Dopaminergic Neuronal Survival in Parkinson's Disease

Pilot Project Grant | $45,000

Researchers have identified a family of proteins that is critical to the normal development of the brain of an embryo. But these proteins, including Netrin1, DCC and UNC5, continue to be produced in the brains of adults.

At McGill University, Dr. Tim Kennedy and Dr. Abbas Sadikot study these proteins to see if they promote the survival of brain cells that produce dopamine – a critical factor in Parkinson's disease.

"We think they (the proteins) are keeping these cells alive and maintaining the connections between cells," says Kennedy.

The neuroscientists believe they have identified a mechanism involving these proteins that is required for dopaminergic neurons to survive. If the genes for these proteins are mutated, that may contribute to the development of Parkinson's.

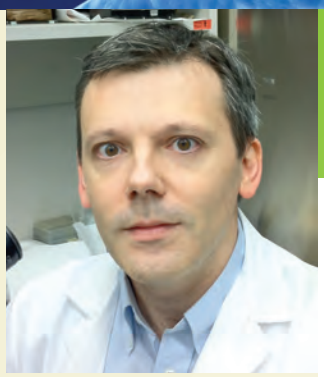
Eventually, the researchers hope their work could point the way to new or existing drugs that could target those proteins to keep dopamine-producing neurons alive.

By collaborating, Kennedy and Sadikot will open "a new avenue in Parkinson's research looking at the role of these particular proteins," says Sadikot.

Sadikot became involved in this research after treating people with Parkinson's disease for 20 years. Although effective medical and surgical treatments exist, "the only way to really improve these treatments is to learn about the basic mechanisms of dopamine nerve cell degeneration, and degeneration in the rest of the nervous system," he says.

"As a Neurosurgery resident interested in the surgical treatment of Parkinson's disease, the Parkinson Society Canada Basic Research Fellowship enabled me to take time away from my clinical training to pursue basic science research studies investigating novel ways of treating Parkinson's disease. It enabled me to devote 100% of my time to working on these research projects."

-Dr. Karim Mukhida – BASIC RESEARCH FELLOWSHIP 2006 - 2008



Dr. Denis Soulet
Assistant Professor
Department of Psychiatry/
Neuroscience
Laval University

Role of the inflammation in MPTP-induced dopaminergic cell degeneration in the myenteric plexus

New Investigator Award | $83,890 over two years

Many patients with Parkinson's disease have problems with their digestive systems, creating symptoms that may appear before motor control problems. At Laval University, assistant professor Denis Soulet investigates the role of inflammation in both the central nervous system, affecting brain cells, and in the myenteric system, controlling the digestive tract.

Previous research suggests the cause of Parkinson's disease may originate in the gut before moving to the brain stem. Soulet is studying the impact of exposure to toxins on cells within the myenteric plexus, and the resulting inflammation, to see if what occurs there parallels what happens in the central nervous system.

"The idea is to try to understand what happens at a very early stage of the disease," says Soulet. The inflammation triggered by toxins could kill dopamine-producing brain cells, or disrupt the protective role of immune cells.

If this research illuminates the role of the inflammation in dopamine neurons in the intestine, it may lead eventually to new therapies based on changing the behaviour of immune cells, says Soulet. "I anticipate that our study will have a major impact in the field," he says.

Dr. Frank Lee
Assistant Professor
Faculty of Health Science
Simon Fraser University

Modulation of the DAT/DJ-1 interaction by oxidative stress

New Investigator Award | Funded by Parkinson Society British Columbia
Year Two $45,000

Although researchers know the death of brain cells that produce dopamine is the key factor in Parkinson's disease, they don't yet know why those brain cells die. Dr. Frank Lee thinks too much dopamine can destroy neurons.

At Simon Fraser University, Lee studies two proteins, DAT and DJ-1, involved in controlling how much dopamine neurons produce. He also examines the interaction among these proteins and oxidative stress, a by-product of the process that occurs when cells use oxygen to generate energy. Oxidative stress can also cause cell death. If Lee confirms the relationship among these two proteins and oxidative stress, he thinks researchers can design a small synthetic protein to disrupt that interaction and prevent too much dopamine from killing brain cells.

Complications of Parkinson's

Parkinson's can progress at a different rate for each person and the nature, severity and impact of symptoms can vary with each individual. The disease has defining features like slowness of movement, impaired balance, muscle rigidity and resting tremor. But nowadays, Parkinson's is recognized as more than a movement disorder. Indeed, other non-motor complications such as depression, anxiety, problems with sleep, difficulty with swallowing, low blood pressure, urinary incontinence, sexual problems or cognitive changes can also develop and affect the quality of life of the person living with Parkinson's.

Researchers are exploring the motor and non-motor complications associated with the disease or drug treatment, which can lead to new or improved treatment options.

Dr. Clinton McCracken
Post-doctoral Fellow
Department of Clinical Neurosciences and the Hotchkiss Brain Institute
University of Calgary

Therapeutic mechanisms of deep brain stimulation for Parkinson's disease

Basic Research Fellowship | $100,000 over two years

Deep brain stimulation (DBS) can significantly improve the basic symptoms of Parkinson's and may also reduce dyskinesia, the uncontrolled movements that are a side-effect of medication to treat the disease. But the surgical intervention can also increase impulsivity, resulting in side-effects like problem gambling.

At the University of Calgary, Clinton McCracken, a post-doctoral fellow, investigates the brain circuitry that DBS affects to discover why some people become so impulsive. He wants to help surgeons refine the positioning of the DBS electrodes and the frequencies at which electrical stimulation is delivered, to avoid impulsive side effects.

"Figuring out ways that we can better tune these circuits so we get better outcomes and better quality of life is something that is really compelling for me," says McCracken.

McCracken first became interested in DBS as a treatment for chronic depression and obsessive compulsive disorder. His research led him to Parkinson's because he believes the technology has "huge potential" for treating otherwise intractable aspects of the disease.

McCracken, who recently lost an uncle to the disease, hopes his research will generate fundamental insight into how the brain works and will improve this treatment.

Dr. Nicola Ray
Post-doctoral Fellow
Centre for Addiction and Mental Health
University of Toronto

The role of the dopaminergic system in the development of impulse control disorders in Parkinson's disease patients on dopamine agonists

Lois Harper Estate | Basic Research Fellowship | Year Two $50,000

Some people with Parkinson's disease become pathological gamblers or fall prey to other impulse control disorders while taking levodopa medication – but others do not. At the University of Toronto, Dr. Nicola Ray uses Positron Emission Tomography (PET) scanners to discern what makes some people more vulnerable to impulse control disorders than others.

Ray also explores the way the brain is affected while people with Parkinson's are taking their medication, and similar changes in the brains of people in the general population who suffer from addictions. Ray hopes to find a way of determining who should or should not receive medications that could trigger pathological gambling or other impulsive control disorders.

Ms. Sherri Thiele
PhD candidate
Department of Cell and Systems Biology
University of Toronto

Characterization of pathological striatal synaptic plasticity in a mouse model of L-DOPA induced dyskinesia

Graduate Student Award | $30,000 over two years

Even lifting a glass of water to their lips can become impossible for people with Parkinson's disease who have uncontrollable movements. These uncontrollable movements, called dyskinesia, can be a side-effect of dopamine replacement therapy.

That's why PhD candidate Sherri Thiele searches for connections in the brain that contribute to dyskinesia.

Thiele, a graduate student at the University of Toronto, knows that Parkinson's disease changes the way the brain stores information – a process called synaptic plasticity. Thiele investigates whether Parkinson's affects the strength of the connections among brain cells. She wonders if these connections change or adapt depending on stresses they face. Learning more about synaptic plasticity could result in new targets for drugs to treat dyskinesia.

"A person living with Parkinson's would be able to continue taking their treatment and not experience dyskinesia if we could find the underlying causes and a way to treat or reverse the pathology we've identified," says Thiele.

Thiele's desire to be a scientist (a career that's a perfect fit for her curiosity and love of challenges) was sparked by a Grade 6 visit to the Ontario Science Centre.

Dr. Susan Fox
Associate Professor
Department of Neurology
University of Toronto
Staff neurologist
Toronto Western Hospital
Movement Disorders Centre

An 'N-of-1' study of the Histamine H2 Antagonist, Famotidine in Levodopa-Induced Dyskinesia in Parkinson's disease

Pilot Project Grant | $38,443

Developing new drugs for Parkinson's disease or the side-effects of existing drugs that treat it can take decades, and cost millions. However, if Dr. Susan Fox is right, a drug that's already approved for acid reflux could alleviate one of the most common and difficult side-effects of current treatment.

Fox is investigating using famotidine to reduce uncontrollable movements, known as dyskinesia, which most people with Parkinson's develop after years of treatment with levodopa medication. If famotidine works, people with Parkinson's would not have to reduce their dosage of levodopa. They would add this drug to their treatment.

Investigating new uses for existing drugs stems from Fox's desire to move ideas from the lab into patient care. "It's a quicker way of getting drugs, potentially, to Parkinson's patients," she says. "It's well and good having wonderful ideas in the lab, but you actually have to take it the next few steps and get them into clinical studies." If Fox's initial research pans out, this pilot study will provide evidence for a larger randomized controlled trial.

Dr. Lili-Naz Hazrati
Clinical Scientist
Tanz Centre for Research in Neurodegenerative Diseases
University of Toronto

Gene expression changes in the direct and indirect basal ganglia pathways in a mouse model of Parkinson's and L-DOPA-induced dyskinesia

Pilot Project Grant | $45,000

After 10 years of treatment with dopamine-replacement medication, as many as 90 percent of people with Parkinson's disease develop uncontrollable movements, called dyskinesia.

At Toronto's Tanz Centre for Research in Neurodegenerative Diseases, neuropathologist Lili-Naz Hazrati investigates the molecular changes in cells in the basal ganglia, the part of the brain affected by Parkinson's. By understanding changes in the way genes synthesize or direct proteins in different pathways in the brain as the disease progresses, Hazrati hopes to identify molecules that could become drug targets to alleviate Parkinson's and prevent dyskinesia. Hazrati also looks at this relationship between genes and proteins, called gene expression, to see how drug treatment changes the cells.

"Hopefully, we will find molecules that no one (previously) suspected were involved in any way," says Hazrati.

Hazrati and her collaborator, post-doctoral fellow Naomi Visanji, believe discovering more about the gene expression in different structures in the brain of people with Parkinson's will add a new level of knowledge to the understanding of this disease. Hazrati hopes their research will build a bridge to better clinical treatments, by unlocking another piece of the Parkinson's puzzle.

Dr. Réjean Dubuc
Professor
Department of Physiology
University of Montreal

Changes in brainstem locomotor circuitry in a model of Parkinson's disease

Pilot Project Grant | $45,000

Research into the causes of Parkinson's disease has traditionally focused on the loss of dopamine-producing cells in the basal ganglia portion of the brain. But scientists are now investigating the role of other kinds of cells in other parts of the brain.

At the University of Montreal, Professor Réjean Dubuc studies the way cholinergic neurons, which slowly disappear in the later stages of Parkinson's disease, influence motor control. He also examines the role of the Mesencephalic Locomotor Region, a brainstem area now targeted for deep brain stimulation in Parkinson's disease.

Using an animal model, Dubuc maps the circuitry in this region of the brain and studies changes in brain activity and neurons to see how they affect the speed and power of locomotion.

Learning more about these structures will help surgeons to pinpoint where to place the electrodes during deep brain stimulation. These electrodes deliver electrical pulses to stimulate motor function.

"The fact that areas we work on are now the focus of trying to get a recovery of function in patients is an exciting repercussion of our work," says Dubuc.

Eventually, Dubuc hopes his research will also lead to a new treatment for Parkinson's disease to replace dying cholinergic neurons, the brain cells that conduct impulses and may contribute to motor control problems in people with Parkinson's.

"The Parkinson Society Canada Pilot Project Grant was instrumental to our getting a $1.5 million Emerging Team Grant in Mobility in Aging from the CIHR Institute of Aging. With this 6-year funding, we will be able to extend the project on a larger scale, which gives us an opportunity to understand better the intrinsic and extrinsic obstacles patients with Parkinson's face when navigating in their natural environments."

- Dr. Christian Duval, PILOT PROJECT GRANT 2008 – 2010

Dr. Isabelle Boileau
Clinical Research Scientist
Centre for Addiction and Mental Health
University of Toronto

Investigating the role of the D3 dopamine receptor in dyskinesias: Positron Emission Tomography Studies

New Investigator Award | Year Two $45,000

Using an imaging tool called Positron Emission Tomography (PET), Dr. Isabelle Boileau is scanning the brains of people with Parkinson's disease. Boileau is investigating a particular protein in the brain, called a D3 receptor. She believes it is linked to the involuntary movements (dyskinesias) that most people with Parkinson's eventually experience as a side-effect of medication to treat their motor control symptoms. If Boileau confirms that D3 receptors are involved in dyskinesias, that knowledge could help researchers develop new drugs or use existing ones to block the receptors, and potentially reduce these side-effects.

Dr. Catharine Winstanley
Assistant Professor
Department of Psychology
University of British Columbia

Exploring the role of the subthalamic nucleus in rodent gambling tasks in hypo- and hyper-dopaminergic states

New Investigator Award | Year Two $45,000

At the University of British Columbia, psychologist Catharine Winstanley studies the origins of impulsivity in the part of the brain called the subthalamic nucleus. For some people with Parkinson's disease, impulsivity, resulting in problem gambling and other devastating behaviours, is a side-effect of treatment with levodopa medication. Impulsivity may also be an adverse effect of deep brain stimulation.

By determining why the subthalamic nucleus of the brain appears so sensitive to changes in dopamine levels in some people, Winstanley hopes she can recommend who is most at risk of developing problem gambling or other impulsive behaviours. Hopefully, doctors could then seek alternative treatments for people at risk of developing these behaviours.

"The great thing about being a researcher funded by Parkinson Society Canada is that they do not dictate what research you must do like other organizations. The research they fund is very broad and unbiased. The freedom to explore is necessary for success – a cure will come from being open."

Dr. Ami Gupta – CLINICAL MOVEMENT DISORDERS FELLOWSHIP 2008

Cognitive Impairment and Parkinson's

Many people with Parkinson's experience variable cognitive deficits that may become severe enough in some to be considered as dementia. Only recently have researchers identified these changes as part of the disease progression. Unlike Alzheimer's disease, the cognitive changes in Parkinson's include: attention deficit; problems with word finding; slowness in thinking ability; difficulty retrieving information; and problems with "executive functioning," such as planning, anticipating consequences, and making decisions. These cognitive changes must be distinguished from depression which is common in Parkinson's. Psychiatric symptoms (visual hallucinations, delusional ideas) may also occur in some people.

How the Parkinson brain is affected by cognitive impairment and the subsequent symptoms that people experience is a growing research area.

Dr. Mario Masellis
Clinician Scientist
Department of Medicine
University of Toronto
Staff Neurologist
Sunnybrook Health Sciences Centre

Parkinson's-related dementia: A Pharmacogenomic Study of Cholinesterase Inhibitors Investigating Cognitive Benefit, Motor Worsening and Brain SPECT

Garden Centre Group Co-Op Corp. New Investigator Award | $90,000 over two years

About half of everyone with Parkinson's disease will eventually develop dementia or some form of cognitive impairment, including visual hallucinations. To treat the hallucinations and diminished memory, concentration and focus, doctors use a class of drugs called cognitive enhancers.

At the University of Toronto, Dr. Mario Masellis investigates the way people with Parkinson's and with Lewy body dementia, a related disease, change after receiving these drugs. By matching the changes to people's genetic profiles, Masellis hopes to predict who will respond well to these medications and who will have side-effects.

"One side-effect is that your motor function can sometimes be made worse," Masellis says. "It would be nice to know in advance who would likely have that negative effect, to better target therapy directly to individuals."

Using a special scan called a SPECT to observe the effects of these drugs on blood flow in the brain, Masellis also hopes to develop a painless biomarker to help guide treatment and identify people who could benefit most from these drugs.

This funding is vital to help Masellis expand his study and continue his research, he says.

Biomarkers

An important emerging area of Parkinson's research has been to identify biomarkers that can be used as a disease indicator. Nearly all people who develop Parkinson's recall experiencing early signs of the disease, such as loss of sense of smell, constipation, problems with sleep, minor cognitive impairment, and depression. Identifying biomarkers to detect the early stages would allow people with Parkinson's to start taking potential treatments long before significant nerve cell loss occurs and motor complications appear. Biomarkers could be used to identify individuals at risk of developing Parkinson's, improve diagnosis, measure disease progression, and assess the likelihood of an individual responding to a particular treatment.

Ms. Yuko Koshimori
PhD candidate
Centre for Addiction and Mental Health
University of Toronto

The role of fronto-striatal network in cognitive deficits in Parkinson's disease

The Lawrason Foundation Graduate Student Award | $30,000 over two years

If doctors could detect changes in the judgment, reasoning and self-control in people with Parkinson's disease early enough, those changes might predict whether they will develop dementia. Graduate student Yuko Koshimori uses PET scans and MRI-like imaging technology to study the brains of people with Parkinson's, compared to those who do not have it. She's looking for changes in white matter – the tissue that connects different regions – to see if those changes are associated with symptoms of impaired thinking or reasoning. "It's an area that hasn't been explored much," says Koshimori.

Using non-invasive imaging to identify those changes could become a biomarker to predict who will and will not develop dementia. Understanding the differences in white matter could also lead to treatments or interventions to prevent dementia.

Identifying cognitive impairment can also help both people with Parkinson's disease and their families to adjust and compensate for the difficulties people are experiencing, says Koshimori. One day, Koshimori hopes people will recognize her as an early investigator of the importance of white matter in the brain, as it relates to cognitive functioning.

"Funding has helped me enter the world of Parkinson's disease research and provided a foundation on which I hope to build a promising career as a Parkinson's researcher."

Dr. Thomas Durcan – BASIC RESEARCH FELLOWSHIP 2008-2010

Dr. Silke Cresswell
Professor
Pacific Parkinson's
Research Institute
University of British Columbia

Dr. Martin McKeown
Professor and Clinical Director
Pacific Parkinson's
Research Centre
University of British Columbia

Co-investigator
Dr. Z. Jane Wang
Associate Professor, Electrical
& Computer Engineering
University of British Columbia

Elucidating the mechanisms of apathy in Parkinson's disease

Pilot Project Grant | $45,000

Apathy – a disorder involving lack of motivation or interest – is one of the most distressing symptoms of Parkinson's disease for both people living with it and their caregivers. Traditional treatments for depression don't seem to help those who are apathetic.

That's why Dr. Martin McKeown and Dr. Silke Cresswell, two neurologists at the Pacific Parkinson's Research Institute, are using novel MRI techniques to scan areas of the brain involved in both apathy and depression. They hope to discover which areas of the brain communicate with each other, or have stopped communicating, in people who suffer from apathy.

"In the past, people have tried different ways to treat apathy with Parkinson's disease, and none have been very successful," says McKeown. "We think this is because there might be different kinds of apathy, and one of the ways to tease them apart is to do brain imaging."

Once Cresswell and McKeown have conducted their imaging study, they hope to develop a biomarker that indicates which type of apathy corresponds to a specific pattern in the brain, as revealed by the imaging.

Then they can try different medication to treat the different forms of apathy.

"Knowing more about apathy and eventually being able to treat it more effectively should improve quality of life for both the patient and the caregiver," says Cresswell.

"I will begin my practice at Hôtel-Dieu de Lévis hospital, on Quebec City's south shore. Although the Centre currently has a neurologist with a special interest in movement disorders, I will be the first practitioner in the region to have completed specialized training in this field. I have a number of projects planned for my first years of practice."

Dr. Manon Bouchard, CLINICAL MOVEMENT DISORDERS FELLOWSHIP 2009 – 2011

Neuroprotection

Most research to date has focused on alleviating symptoms and promoting well-being. But there is growing interest in studying neuroprotection. Researchers are currently investigating ways to prevent the death of dopamine-producing cells which could slow or halt the progression of the disease. If this research is successful, neuroprotective drugs could be developed and used by individuals with early clinical signs of Parkinson's or given to those at genetic risk. Much of the current therapeutic research involves a search for neuroprotective compounds that protect the brain from degeneration. Research includes naturally occurring substances such as caffeine, nicotine, ginseng and turmeric which have been shown to have neuroprotective qualities.

Given the huge current and future impact of Parkinson's and other neurological conditions on society, the economy and the quality of life of people living with the disease and their care providers, neuroprotection research is very important.

Dr. Paul Adams
Post-doctoral Fellow
Department of Biomedical Engineering
Johns Hopkins School of Medicine

To explore the role of Cav1.3 calcium channels in Parkinson's disease pathophysiology in order to optimize the use of calcium channel agonists for neuroprotection against Parkinson's disease

Basic Research Fellowship | $80,000 over two years

Channels that allow calcium into cells are a critical factor in the communication process among brain cells, such as the transmission of information about muscle coordination or movement. That's why postdoctoral fellow Paul Adams is studying the way calcium channels relate to Parkinson's disease.

Adams, a fellow at Johns Hopkins School of Medicine in Baltimore, hopes to discover exactly how calcium channels are involved in Parkinson's disease. If he succeeds, his work may help researchers determine whether a class of drugs that is already approved and available, called calcium channel blockers, could help prevent Parkinson's disease. Doctors have already observed that people taking calcium channel blockers for heart disease seem protected against Parkinson's. Adams' research could help fine-tune the approach of using these drugs.

"I think we have some pretty good hypotheses to test out that could be very exciting, with good potential for advancing the understanding of the disease," says Adams.

Adams has long been excited about discovering new things – making neuroscience a natural field for him.

Dr. Pershia Samadi
Assistant Professor
Department of Psychiatry
and Neuroscience
Laval University Hospital
Centre

Opioid function in the control of movement in Parkinson's disease

New Investigator Award | $90,000 over two years

Naturally occurring opioids exist in the brain, particularly in the basal ganglia, which houses the circuits that modulate motor control, cognitive and emotional behaviour. But neuroscientists don't yet know what role opioids play in controlling movement.

At the Laval University Hospital Centre, assistant professor Pershia Samadi investigates whether increased levels of opioids in the brain during the early stages of Parkinson's disease is an attempt to protect neurons from further damage.

Samadi believes that once people with Parkinson's begin levodopa therapy, an increase in opioid levels could also be an attempt to delay the appearance of dyskinesias, the involuntary movements that are a side effect of the medication.

If she can prove her hypotheses, Samadi's research could open new avenues for harnessing this natural neuroprotective mechanism in the brain, such as a new drug.

"It's very important and will have real impact on this subject," says Samadi.

Samadi was led to research on Parkinson's disease after studying the effects of morphine and nicotine on catalepsy. In this condition, which also involves the basal ganglia, people are rigid and do not respond to external stimulation.

Samadi hopes her work will forge the next link in understanding Parkinson's, and will ultimately lead to a better quality of life for people living with the disease.

"This study would not have been possible to perform without funding as the cost of PET scans is very high. Getting large grants from CIHR is very hard as preliminary data is generally required, which would be impossible without this seed money for pilot studies from the Parkinson Society Canada."

Dr. Susan Fox - PILOT PROJECT GRANT 2007-2009

Ms. Giulia Cisbani
PhD candidate
Department of Neurosciences
Laval University (CHUL)

Cystamine: a potential neuroprotective molecule for Parkinson's disease

Graduate Student Award | Year Two $15,000

At Laval University, graduate student Giulia Cisbani studies the possible protective effects of a molecule called cystamine on dopamine-producing brain cells. Cystamine is an amine, a combination of two amino acids. It increases the levels of other molecules that support the survival of brain cells.

Cystamine is already an approved drug. If Cisbani's work shows that it can protect neurons that currently die in people with Parkinson's disease, researchers could get approval to use it to treat Parkinson's much more quickly than if they had to get a new drug approved.

"That's why it is of great interest, because it's going to be very easy to get for patients," Cisbani says.

Dr. Francesca Cicchetti
Associate Professor
Department of Neurosciences
Laval University (CHUL)

Investigation of the impact of cellular and clinical potential of transcranial magnetic stimulation

The Dany Royer Pilot Project Grant | $24,698.43

Deep brain stimulation is a surgical technique to relieve the motor symptoms of Parkinson's disease. But at Laval University, Francesca Cicchetti is investigating a less invasive technique she hopes will help the brain create new pathways and connections or use different ones to replace those damaged by Parkinson's disease.

Cicchetti uses animal models to study the effects of transcranial magnetic stimulation, or TMS. TMS stimulates the brain through the use of coils that create a magnetic field over a patient's head – without the potential dangers of surgery. "We're looking at how TMS affects the behaviour of the (brain) cells and how we can target those areas affected with Parkinson's and try to modify them," Cicchetti says.

Cicchetti focuses on therapies that are readily applicable, instead of looking for a new drug that could take decades to develop. She's grateful for this pilot project funding that allows researchers to explore totally new ideas. "I would like to be known as someone who was very pro-active in my approach to help people with Parkinson's," she says.

"A better understanding of these basic cellular processes provides important insight into the disease. Because of the funding we receive from Parkinson Society Canada, we take an important step in the prevention and eventual reversal of Parkinson's disease in people."

Dr. Brian Staveley – PILOT PROJECT GRANT 2004

Clinical Fellowships

Each Canadian living with Parkinson's should receive the appropriate medical expertise, drug treatment, support services, continuous care, educational resources and emotional support. Medical neurologists or neurosurgeons with special experience – both in the day-to-day management of Parkinson's and in its clinical research – play a vital role in providing those key elements of care for people with the disease. These leaders show the ability to work with the various agencies and multiple disciplines involved in the care of those with Parkinson's to help develop better treatments and services. Clinical fellowships give a physician an opportunity to receive additional training and/or to acquire more specialized expertise in clinical aspects of Parkinson's disease and other movement disorders. These clinical training programs help to address the shortage of leaders involved in Parkinson's care and clinical research in Canada.

Dr. Barbara Connolly
Clinical Fellow
Toronto Western Hospital
Movement Disorders Clinic

A Clinical Fellowship in the diagnosis, management and treatment of Parkinson's disease

The Nora Fischer Clinical Movement Disorders Fellowship | $50,000

When people with Parkinson's disease have been living with their illness for years, the disease can become more difficult to manage – sometimes beyond the expertise even of neurologists. That's why Dr. Barbara Connolly, herself a neurologist, wants to become a specialist in Parkinson's disease.

Connolly is spending the year at Toronto Western Hospital's Movement Disorders Clinic and wants to become an expert in not just the motor symptoms but the cognitive issues, pain and other issues that people with complex forms of Parkinson's disease experience.

"Other neurologists can refer to me if they need help treating their own patients, so I'll be a resource in the community that I am part of," Connolly says.

During her fellowship, Connolly is also participating in two clinical trials of medications. The first trial is an international study of Cogane, being assessed as a neuroprotective agent to slow or stop the progression of Parkinson's disease. The second trial for famotidine,* which is already approved to treat heartburn, is studying the drug to see if it can reduce the uncontrollable movements called dyskinesias that many people experience as a side effect of levodopa medication.

"My hope is that I can help as many people as I can and make their lives better," says Connolly.

*See Dr. Susan Fox page 19

Dr. Silvia Rios Romenets
Clinical Fellow
McGill University

Treatments for insomnia in patients with Parkinson's Disease

Clinical Research Fellowship | Year 1 $50,000 Year 2 $50,000 Total Award $100,000

For Dr. Silvia Rios Romenets, a grant from Parkinson Society Canada to help her find ways to improve the lives of people living with Parkinson's is a dream come true.

Rios will spend her time as a clinical fellow at McGill University seeing patients, and also participating in five research projects. Rios, who is half-Peruvian, half-Russian, has wanted to combine clinical work with research ever since she began practising as a neurologist in Colombia, where she learned English with the express purpose of conducting research.

"In our countries it's very difficult to develop important clinical research because of lack of money," she explains. "That's why I wanted to learn to do that."

Rios, who specialized in behavioural neurology, is particularly interested in the non-motor symptoms of Parkinson's disease, including behavioural and cognitive problems, as well as sleep disorders. She hopes eventually to teach, in order to transmit her clinical and research knowledge, and to return to South America. She wants to learn "everything about improving the quality of life."

"I won this grant, and I'm very fortunate. Many doctors in Russia or South America dream about that," she says.

"Our research puts disease management in the hands of patients. Non-motor symptoms affect quality of life, including depression, loss of sense of smell, sleep disturbances and changes in thinking ability. There have been a lot of little successes including treatment of depression and other non-motor symptoms. By funding these types of research, Parkinson Society Canada is leading the way in connecting all the pieces, motor, non-motor and psychosocial, to better understand (and treat) Parkinson's."

Dr. Ron Postuma – PSYCHOSOCIAL RESEARCH GRANT 2009 - 2011

Quality of Life Research

A growing area of research supported by Parkinson Society Canada is aimed at researchers in other health disciplines such as nursing, physio therapy, occupational therapy, speech language pathology and social work. The goal is to improve the quality of life of people living with Parkinson's and their care partners. Emphasis is placed on gaining insight into the experience of the person with Parkinson's and those in caregiver or health provider roles. This knowledge can be used to improve treatment and support services, and plan advocacy strategies that influence policy decisions.

Researchers may investigate ways to improve our understanding and treatment of non-motor and motor symptoms of Parkinson's, explore behavioural and cognitive changes, examine economic impacts on families or address issues related to caregiving or supportive interventions. Quality of Life research provides pertinent information about the quality of life of people living with Parkinson's, which can be used to improve the support and services they receive.

Dr. Ronald Postuma
Assistant Professor
Department of Neurology
McGill University

Insomnia in Parkinson disease – Developing Pharmacologic and Non-Pharmacologic treatment

Pilot Project Grant | $45,000

Waking frequently and being unable to return to sleep is a problem that plagues about half of everyone with Parkinson's disease. The resulting sleep deprivation can increase irritability, worsen concentration and forgetfulness, and result in fatigue or daytime sleepiness.

Dr. Ron Postuma, a neurologist, studies ways to treat Parkinson's-related insomnia. He is conducting a pilot study comparing cognitive behavioural therapy and sleep hygiene, combined with bright light therapy, against the use of the anti-depressant doxepine, or low intensity red light, alone.

Postuma and his team, will use sleep diaries and motion sensing devices the size of a wristwatch to track total sleep time, as well as how often people wake, how long they sleep and the number of naps they take. They want to see if simple behavioural changes, or the use of bright light or medication improve sleep.

Insomnia is "a major quality of life issue in Parkinson's disease," says Postuma. "We're hoping to have new advances to help people sleep better."

Postuma enjoys treating people with Parkinson's disease because many of them get better with existing therapies. But he'd like to find more practical ways to improve people's lives – like helping them sleep better.

Dr. Mandar Jog
Professor
Department of Neurology
Lawson Health Research Institute
University of Western Ontario

Dr. Michael Katchabaw
Associate Professor
Department of Computer Science
University of Western Ontario

Novel Virtual Reality based training program in Parkinson's disease

Pilot Project Grant | $43,425 | Funded by Parkinson Society Southwestern Ontario

People with Parkinson's disease often struggle with activities of daily living, from navigating between rooms in their home, to going shopping or just crossing a street. But physical and occupational therapy usually takes place in a sterile clinical environment – not the real world.

Using a virtual reality program, Dr. Mandar Jog and Dr. Michael Katchabaw want to change that. Jog, a neurologist, studies the way Parkinson's disease disrupts normal functioning, and looks for variables he can modify to help people adapt. After studying people with Parkinson's in their own homes, Jog, Katchabaw and their team have created a duplicate "virtual" apartment that people with Parkinson's disease can enter and navigate, with the help of a visor.

"The best part is that we're only scratching the surface in terms of what can be done with the technology, "says Katchabaw. "This could lead to new programs of treatment and rehabilitation that ultimately result in significant improvements in quality of life." By assigning people specific tasks in that apartment, Jog can study how well they solve problems and strategize. Using light-based cues, Jog, Katchabaw and the team prompt people to practise different scenarios. Gradually, they hope to help people transfer the skills they learn from a virtual environment to the real world.

"Traditional therapy doesn't teach people how to function in life," says Jog. "My hope is to encourage young people that thinking outside the box is OK."

Dr. Laura Monetta
Assistant Professor
Department of Speech Therapy
Laval University

Evaluation of Pragmatic Deficits and the Neuroconnective Process in Individuals with Parkinson's Disease

New Investigator Award | Year 2 $32,000

People with Parkinson's disease often lose their ability to understand non-literal speech, such as irony, sarcasm, or the use of metaphors. At Laval University, Dr. Laura Monetta studies this problem, called pragmatic language deficit. She uses magnetic resonance imaging to scan the brains of people with Parkinson's as they read and interpret a paragraph containing indirect language. By comparing the scans of people with Parkinson's disease who are taking medication to those with Parkinson's disease who are not, Monetta is assessing whether dopamine-replacement therapy helps, or why it does not. Eventually, she wants to develop a better way of evaluating and treating these language problems.

Mr. Vincent Martel Sauvageau
PhD candidate
Department of Speech Therapy
Laval University

Impacts of therapeutic management on speech deficits in Parkinson's Disease: deep brain stimulation and speech therapy

Graduate Student Award | $30,000 over two years

Communications problems negatively affect the daily lives of many people with Parkinson's disease – but standard treatments that improve their motor function may not improve speech.

At Laval University, doctoral candidate Vincent Martel Sauvageau studies the effects of deep brain stimulation, a surgical intervention to treat Parkinson's, on speech. He wants to know why implanting electrodes and stimulating areas of the brain with electrical impulses improves the speech of some patients, but not others. That information could help neurologists determine the best candidates for the surgery.

Sauvageau also studies a type of speech therapy called Lee Silverman Voice Treatment to see why it helps some people with Parkinson's speak louder and more clearly.

"We'd like to know, in the future, who would benefit more from this type of treatment," Sauvageau says. He hopes his findings will help people with Parkinson's communicate better and live as independently as possible.

Sauvageau focused on Parkinson's research after he learned that speech problems are among the symptoms, and met people living with the disease.

"The people I met really touched me," he says.

Ms. Angela Roberts-South
PhD candidate
Department of Communications Sciences and Disorders
University of Western Ontario

Non-motor language and communications in Parkinson's disease and the impact on quality of life for individuals with Parkinson's and family care partners

Michael Kingdon Estate Graduate Student Award | Year Two $15,000

People with Parkinson's disease often have trouble communicating, without knowing their struggles are connected to the disease. At the University of Western Ontario, speech pathologist Angela Roberts-South studies the reasons for these communications challenges and how they affect people's lives. Her goal is to educate healthcare providers about how to recognize the problem and develop strategies or treatment programs. South knows there are practical suggestions to improve the ability of people with Parkinson's disease to communicate. The key is for people with Parkinson's disease to get the right counselling and supports.

Ms. Kaitlyn Roland
PhD candidate
Human Kinetics Program
University of British Columbia

Assessing sex and stage differences in muscle activity using portable electromyography in Parkinson's disease

Parkinson Society Canada/Canadian Institutes of Health Research - Institute of Neurosciences, Mental Health & Addiction Psychosocial Doctoral Award
Year 2: 2011-2012 $22,000 | Year 3: 2012-2013 $7,333

More women than men develop involuntary movements, known as dyskinesias, as a side-effect of the medication they take to treat Parkinson's disease. At the University of British Columbia/Okanagan, Kaitlyn Roland studies the differences in the muscle activity patterns of men and women with Parkinson's disease.

She hopes to determine how these differences affect women's ability to remain independent and mobile. Roland hopes to help rehabilitation specialists design sex-specific programs to strengthen muscles or address dyskinesia. Eventually, her work could also serve as a diagnostic tool, helping healthcare professionals find the same muscle activity patterns she charted in people not yet diagnosed with Parkinson's.

Dr. Marc Pell
Professor and
Interim Director
School of Communication
Sciences and Disorders
Faculty of Medicine
McGill University

Effects of Parkinson's disease on social cognition and communication

Parkinson Society Canada/Canadian Institutes of Health Research - Institute of Neurosciences, Mental Health & Addiction Psychosocial Research Grant
$100,000 over two years

If researchers could determine exactly what damaged areas of the brain affect the communication pathways of people with Parkinson's disease, speech pathologists could better help them improve their speech.

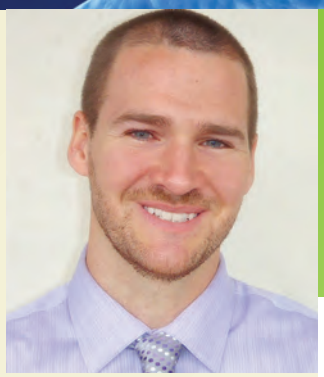
At McGill University, Marc Pell studies what aspects of people's communication change with Parkinson's, such as their ability to understand tone of voice and to read emotions. By taking electrophysiological measurements of people's brains while they respond to different types of speech, Pell learns what aspects of communication have been spared and what areas are affected.

Pell is particularly concerned because communication problems are poorly understood, even by people living with Parkinson's, physicians and families. Often, people stop interacting with others because they have trouble speaking, following conversations or being understood.

"We're trying to find ways we can help patients, with the goal of increasing their quality of life and satisfaction, and discouraging any type of withdrawal from society," says Pell.

Pell trains speech language pathologists and tries to increase awareness of these communications problems in other healthcare providers.

"I hope we can advance basic evidence of the types of challenges that individuals with Parkinson's face, from a good scientific view," says Pell.



Mr. Mike Ravenek
PhD Candidate
Health and Rehabilitation Sciences
University of Western Ontario

Development of a Framework for information needs at diagnosis in Young Onset Parkinson's disease: A patient centred approach using ground theory methodology

Parkinson Society Canada/Canadian Institutes of Health Research - Institute of Neurosciences, Mental Health & Addiction Psychosocial Doctoral Award
$105,000 over three years

Young adults diagnosed with Parkinson's disease have unique needs and concerns. But there is little education or information designed specifically for them.

At the University of Western Ontario, graduate student Mike Ravenek is using focus groups and interviews to consult people diagnosed with Parkinson's at a young age about what information would have helped them. He plans to develop an education program and materials for Parkinson Society Canada and healthcare providers.

"We hope that the materials will help people who are newly diagnosed with young-onset Parkinson's to better cope and transition into a life with Parkinson's disease," Ravenek says.

Ravenek hopes the information he provides will help people with Parkinson's who are still working and raising families connect to community resources.

Working with people with Parkinson's disease during his undergraduate degree at Wilfrid Laurier University sparked Ravenek's interest in working with those with young-onset Parkinson's.

"I learned a lot about people's initial experiences in being diagnosed and experiences in their daily lives," he says.

In the future, Ravenek hopes people will find the materials he develops useful.

"If we can reduce the side effects of some Parkinson's medication, we'll greatly improve quality of life for those living with the disease. As a scientist, you can often get lost in research and overlook the human aspect, but my involvement with Parkinson Society Canada allowed me to connect with people living with the disease and their families. It brings new meaning to my research and validates my work."

Dr. Naomi Visanji – POST DOCTORAL FELLOW 2008

Partnerships

Parkinson Society Canada recognizes the importance and value of partnerships. Partnerships allow us to:

- Expand our presence among all levels of government, healthcare professionals, the research community, health charities and the general public;
- Make better use of resources and increase research funding capacity;
- Meet the health research needs of people living with Parkinson's more effectively;
- Build capacity;
- Increase awareness;
- Advocate for people living with Parkinson's;
- Build support for health research;
- Set the Canadian health-research agenda with regard to neurodegenerative diseases.

Our partners

Canadian Institutes of Health Research (CIHR)

- Institute of Neurosciences, Mental Health & Addiction (INMHA)
- Institute of Aging (IA)

Fonds de recherche du Québec – Santé (FRQS)
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