Canada's rising stars in ALS research receive more than $1 million from the ALS Canada Research Program and Brain Canada

Three young investigators are pursuing ALS research thanks to funds raised through the Ice Bucket Challenge and matched by Brain Canada with financial support from Health Canada

The generosity of Canadians has helped three early-career researchers to make ALS the focus of their work in the country's labs and academic institutions. The research funding, which totals more than $1 million, has been awarded through the ALS Canada Research Program and Brain Canada as a result of money raised through the Ice Bucket Challenge.

Canada is home to many world-class ALS researchers who have played a significant role in landmark discoveries about the disease. Ensuring that our country continues to have a strong community of talented ALS researchers is the goal of the research funding, which supports senior postdoctoral trainees as well as recently hired junior faculty members to secure or maintain a faculty job in Canada. Recipients of this funding are all pursuing forward thinking, high-impact ALS research aimed squarely at helping ALS Canada to achieve its vision of making the disease treatable, not terminal. Furthermore, this research will have a broader impact on our understanding of other neurodegenerative diseases.

2016 marks the second year this particular research program has been funded – it was introduced in 2015 following the Ice Bucket Challenge and provides young investigators with the financial stability to pursue their studies in ALS research at the Assistant Professor level. Without this type of funding, it would be very difficult for ALS research to be a viable area for young Canadian researchers to pursue within our country's borders.

Partnership with Brain Canada (with the financial support of Health Canada) and funds from the ALS Ice Bucket Challenge bolstered the implementation of this new program and allowed for funding to support the early careers of three promising young ALS researchers from a very strong pool of applicants. By the end of 2016, $20 million in research funding will be awarded through the ALS Canada Research Program as a result of the Ice Bucket Challenge.

Please read on to learn more about the recipients of the 2016 ALS Canada-Brain Canada Career Transition Award.

Dr. Jeehye Park
Assistant Professor, Department of Molecular Genetics
Hospital for Sick Children, Toronto, ON
Title: Characterization of MATR3 mutations associated with ALS
$315,000 over three years

Dr. Park has made significant contributions to neurodegenerative disease research since the beginning of her career. During her PhD work in South Korea with Dr. Jongkyeong Chung, Dr. Park discovered a key connection between two Parkinson's disease pathways that had a major impact on the field and was published in the elite scientific journal *Nature*. She subsequently pursued postdoctoral research at Baylor College of Medicine under the guidance of Dr. Huda Zoghbi, where Dr. Park helped to create a network of laboratories with expertise across different animal models to screen for treatments for the neurodegenerative disease spinocerebellar ataxia 1, which led to yet another paper in *Nature*. Her

research then led her to study RNA binding proteins (RBP), where she not only developed a new tool to study them, but became interested in the multiple RBPs that are linked to ALS.

In her lab, Dr. Park will examine how abnormalities in RBPs – in particular, one called Matrin 3 (MATR3) – can lead to ALS. MATR3 was discovered to be a genetic cause of ALS in 2014 and has yet to be studied in any detail. By creating the first-ever cell, fruit fly and mouse models of MATR3, Dr. Park will learn both about the functions of MATR3 and how mutations can confer motor neuron degeneration. Dr. Park will then search for other genes that may increase or reduce mutant MATR3 toxicity in both human cells and fruit fly models to find potential targets for treatment, and follow up with the most promising candidates being tested in the new MATR3 mouse models with an aim to eventually move them forward translationally into the clinic.

As a member of the Canadian ALS research community, Dr. Park will be able to integrate the knowledge gained about MATR3 with the work of others here and around the world as yet another puzzle piece in understanding ALS. By focusing the early stages of her independent career on a less understood ALS mechanism, she intends to find connections between MATR3 and more prominently studied RBPs like TDP-43 and FUS to ultimately unravel key mechanisms in the development of ALS, as well as new targets to treat the disease.

Dr. Veronique Belzil
Postdoctoral Fellow
Mayo Clinic, Jacksonville, Florida
Supervisor: Dr. Leonard Petrucelli
Title: Discovery of transcriptomic biomarkers and epigenetic therapeutic targets for c9ALS and sALS
$110,000 over two years; eligible for an additional $315,000 over three years

Dr. Belzil began her research career as a PhD student at the Université de Montréal under the guidance of world renowned geneticist and Director of the Montreal Neurological Institute and Hospital, Dr. Guy Rouleau. During this time, Dr. Belzil pursued a better understanding of the genetics behind familial/hereditary ALS and led or contributed to more than 20 manuscripts, an amazing accomplishment for a graduate student.

For the past four years, Dr. Belzil has spent her postdoctoral studies pursuing the complex understanding of how alterations in genetic regulation may lead to ALS not just in certain familial forms, but in sporadic ALS that makes up 90-95% of cases. She has led or contributed to a large number of important discoveries.

The high impact work that Dr. Belzil has been pursuing during her postdoctoral training translates very well into an expanded program for an independent laboratory and she aims to continue to tackle these mechanisms as an Assistant Professor. The program she has outlined is also designed to apply the knowledge of these discoveries into a strategy to develop novel and exciting new treatments for ALS that would be based on an intricate understanding of the disease.

Dr. Petrucelli and a mentoring committee at Mayo Clinic are committed to assisting Dr. Belzil to not only reach her goal of becoming an independent investigator at a Canadian institution, but to become an internationally recognized leader in translational ALS research.

Dr. Kessen Patten
Assistant Professor, Genetics and Neurodegenerative Disease
Centre INRS–Institut Armand-Frappier, Laval, QC
Title: Pathogenic mechanisms of C9ORF72 repeat expansion in ALS and development of therapeutics
$315,000 over three years

Dr. Patten started his research career as a PhD student at the University of Alberta under the supervision of Dr. Declan Ali in 2004. There he trained in electrophysiology, cell biology and imaging using zebrafish as a model to study neurodevelopment. After publishing several manuscripts on his discoveries and receiving multiple awards, including national recognition for the outstanding quality of his PhD thesis, Dr. Patten pursued a postdoctoral fellowship in Montreal with Drs. Florina Moldovan and Pierre Drapeau. During that time, among other achievements, he developed zebrafish models of human disease including ALS, and used those models to develop a high-throughput method for drug discovery. This procedure was then used by Dr. Patten in the identification of pimozide as a lead compound in a translational pipeline that has led to a multi-centre Canadian clinical trial to start in 2017. The trial is being supported by the first ALS Canada-Brain Canada Arthur J. Hudson Translational Team Grant that was awarded in 2014.

In the initial years of his independence as an Assistant Professor, Dr. Patten will pursue the development and use of zebrafish models of the most common genetic cause of ALS, C9ORF72, as well as use of the high-throughput screening method to examine more promising compounds for further examination. As a key addition to his work, he has formed strong collaborations with international ALS experts with proficiency in developing motor neurons from induced pluripotent stem cells (iPSCs) that will undoubtedly strengthen the ability to translate zebrafish discoveries to the clinic via the use of human cells.

Dr. Patten has been a regular attendee at the ALS Canada Research Forum for the past several years and has formed relationships with a number of other investigators in the community. Combined with multiple other Canadian investigators using ALS model zebrafish, *C. elegans* worms, *Drosophila* fruit flies, mice, rats and iPSC derived motor neurons, Dr. Patten will strengthen this country's expertise on forming a pipeline of drug discovery that can efficiently reach the clinic and ultimately help make ALS a treatable, not terminal disease.