



Research

November 2014

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to independent
investigator*

Dr. Craig Moore

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@Dr_KarenLee

All of us within the Canadian MS community—people living with MS, family members and caregivers, donors, clinicians, researchers and volunteers—have played a vital role in advancing research in multiple sclerosis.

Whether you have made a one-time donation to research or established a Studentship Award to support the next generation of MS researchers, your investment has led to the creation of sophisticated imaging techniques that have revolutionized diagnosis and catalyzed the development of 10 disease-modifying therapies now available for Canadians living with MS.

We are proud of these and many other accomplishments, but we are also reminded that our work does not end here. I have heard from many

of you who are concerned about the absence of treatments for progressive MS, and how research often takes too long to have an impact on people with MS who need answers today.

The MS Society of Canada has addressed research acceleration by seeking out ways to translate scientific breakthroughs into promising treatments. We formed a critical collaboration with the Centre for Drug Research and Development, a Vancouver-based translational research centre, which has moved forward with a call for research proposals in progressive MS and jointly launched the endMS-CDRD Postdoctoral Fellowship. In this issue of *MS Research*, we also feature Dr. Craig Moore, a former endMS Research and Training Network participant, as an up-and-coming researcher who is collaborating with world-leading MS experts to understand the role of B cells in MS.

As another important step forward to improving the quality of life for people with all forms of MS, the MS Society is funding 10 studies in remyelination, a process for myelin repair. Regarded as the next frontier in MS research, remyelination is key to repairing damage in the central nervous system, slowing the progression of disease and disability. This issue of *MS Research* delves deeper into why research in remyelination will have an enormous impact on understanding and treating progressive MS.

As we move forward with strategies to tackle progressive MS, support innovative research and foster the growth and development of promising young researchers, I am confident that Canada will continue to lead the global movement to end multiple sclerosis.

For more stories on MS research, visit my blog at DrKarenLee.ca or follow me on Twitter @Dr_KarenLee

Sincerely,

Dr. Karen Lee

Vice-president, research

Managing director, endMS Research and Training Network



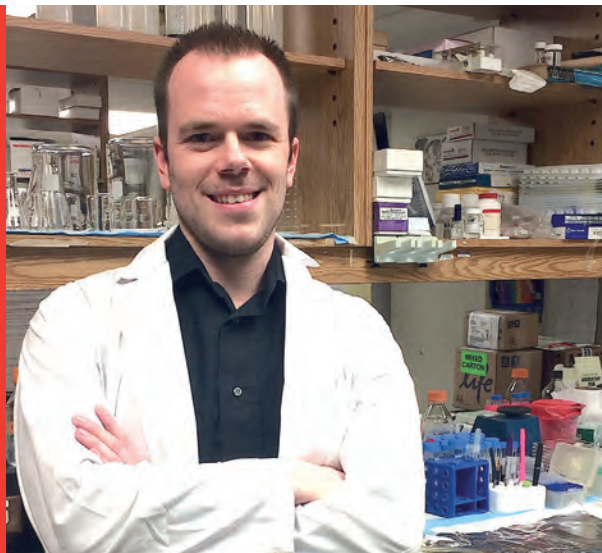
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From trainee to independent investigator

Dr. Craig Moore



“ I want people with progressive MS and their families to know that there are people out there working hard to find therapies for progressive MS. ”

Dr. Craig Moore believes in searching for answers about immune cells. As a young researcher collaborating with world-leading experts to understand the role of B cells in multiple sclerosis, Dr. Moore stands on the precipice of a new way of examining the disease. “A lot of MS research has not focused on the B cell,” says Dr. Moore, “but the study of B cells is really picking up. Many important MS-relevant findings have begun to emerge.”

Dr. Moore’s involvement with a Multiple Sclerosis Scientific Research Foundation collaborative study on B cells is based on his expertise in understanding how brain cells and immune cells interact in MS. Specifically, Dr. Moore has begun

to research how B cells influence the behaviour of brain cells and vice versa. Studying these cell-to-cell interactions can provide clues about levels of inflammation in the brain and how this may affect the severity and progression of MS. As a collaborator on the B cell study, Dr. Moore is helping to investigate those B cell subtypes that are harmful, and how they can be controlled to reduce inflammation and enable recovery.

To date, the T cell, another type of white blood cell, has been largely considered the major culprit responsible for attacking myelin in MS. This observation ultimately led to the development of therapies that aim to control or block the effects of harmful T cells; however, a surprising



The faces behind B cell research: Dr. Craig Moore will be collaborating with lead investigators Drs. Amit Bar-Or, Jennifer Gommerman and Alexandre Prat on a multi-centre study to discover more about B cells in MS.

discovery in emerging studies has revealed that therapies targeting B cells can dramatically reduce new MS disease activity. Unveiling new triggers of MS, such as the B cell, and understanding how B cells influence other immune and brain cells represent exciting innovations in MS research today.

Dr. Moore's relationship with MS research began in the Department of Pharmacology at Dalhousie University in Halifax, NS. There he spent five years observing how different treatments for MS can reduce inflammation and demyelination in animals which exhibited an MS-like disease. In 2008, he then transitioned to the University of Connecticut Health Center as a postdoctoral research fellow in brain development and myelin production.

Knowing he always wanted to return to Canada, Dr. Moore pursued an opportunity to work alongside world-leading MS researcher Dr. Amit Bar-Or at the Montreal Neurological Institute at McGill University, where he was also co-supervised by Dr. Jack Antel. From 2011 to 2014, he gained valuable knowledge and experience in many of the clinical aspects of MS. In June 2014, Dr. Moore joined the Faculty of Medicine at Memorial University as a new independent investigator in MS. There he has opened the first neuroimmunology laboratory in the province of Newfoundland and Labrador.

Dr. Moore credits much of his success to networking and collaboration, skills he acquired

through the endMS Research and Training Network, funded by the MS Society of Canada to secure the next generation of MS researchers. He participated in various programs within the endMS Network, such as the Scholar Program for Researchers IN Training (SPRINT), a research enhancement program designed to stimulate interdisciplinary research among trainees while enabling them to form valuable connections with peers in the field. "Through SPRINT, I was able to talk to other researchers about how to brand myself and be persistent about making myself known to academic institutions," Dr. Moore says. "The network enforced the importance of collaboration, which is very helpful when working with colleagues across Canada on a multi-centre study."

The B cell study looks to break new ground in the field of MS research by expanding current knowledge of the complexity of MS. Understanding B cells may lead to the identification of new biological targets for future treatments for all forms of MS, including progressive MS.

"There's an unmet need right now for people with progressive MS," Dr. Moore says. "The development of regenerative therapies that can increase myelin repair is critical to treating this relentless, disabling form of the condition. I want people with progressive MS and their families to know that we are working in the laboratory for them. Researchers are working hard to find therapies for progressive MS."



Translational research

First steps toward development of therapies

Earlier this year, the MS Society of Canada announced a collaboration with the Centre for Drug Research and Development (CDRD) to accelerate the pace of research in multiple sclerosis. The collaboration addresses gaps in the research process, with a special focus on finding answers about progressive forms of MS.

CALL FOR RESEARCH PROPOSALS

As a first step of the collaboration, the MS Society launched a call for research proposals that invited scientists from all over the world to submit novel and innovative ideas that will translate into effective treatment strategies for people with progressive MS. The final stages of the selection process are currently underway, and those who are successful in the competition will work closely with CDRD to move their research forward.

ENDMS-CDRD POSTDOCTORAL FELLOWSHIP

The MS Society and CDRD have jointly announced the launch of a unique postdoctoral fellowship. The endMS-CDRD Postdoctoral Fellowship will provide MS research trainees the opportunity to gain hands-on experience in the development process of therapies for MS. Candidates who are granted a postdoctoral fellowship will work alongside other researchers at CDRD in Vancouver, BC.

The program blends the collaborative spirit of academic research with the business rigour of the treatment development industry; promising young researchers will gain the tools they need to translate their scientific ideas into real-world applications in health and medicine.

The fellowship seeks to build and strengthen the pipeline of highly qualified researchers in Canada who have experience in the development of therapies, to ensure that safe and effective treatments are generated for people living with MS.



Centre for Drug Research and Development, Vancouver, BC.

Remyelination

The next frontier in progressive MS research

“Approved therapies for multiple sclerosis work by reducing the initial myelin injury – they do not promote myelin regeneration. My research supported in part by the MS Society of Canada could help find new drug targets to enhance myelin regeneration and help to restore lost function in people with multiple sclerosis.”

—Dr. Veronique Miron, Medical Research Council Centre for Regenerative Medicine at the University of Edinburgh

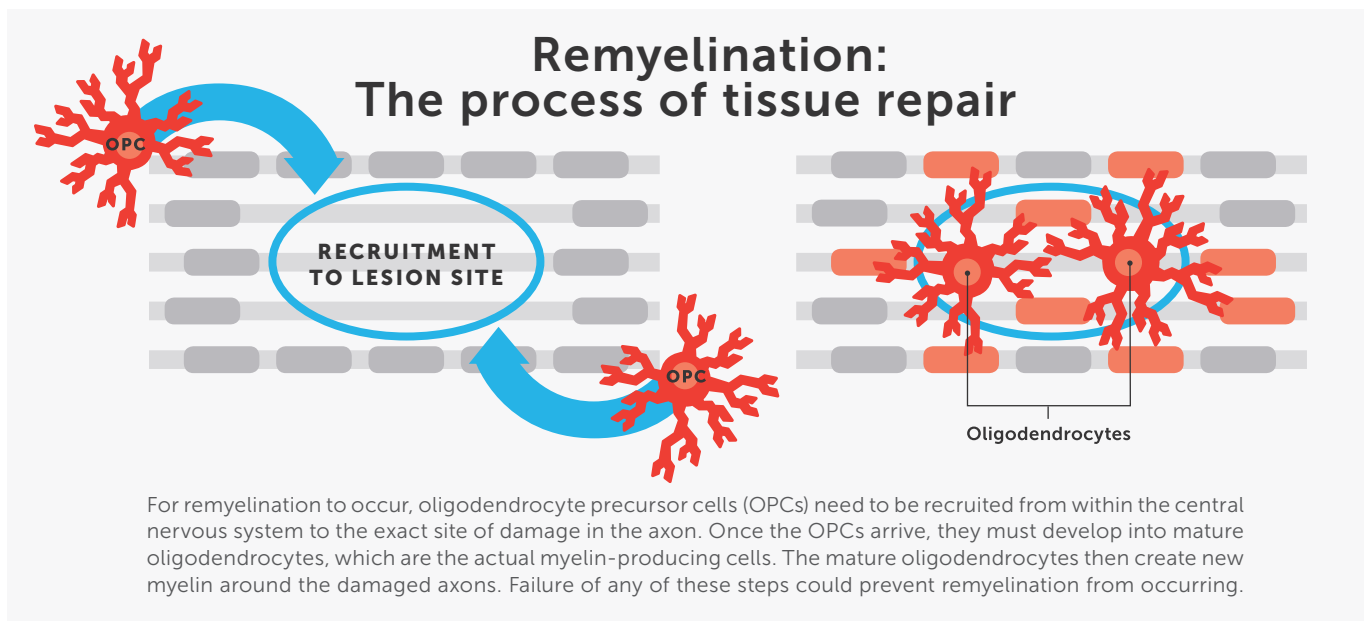
The MS Society of Canada is currently funding 10 studies dedicated to finding answers about myelin repair. Effective and timely repair of myelin—the insulation wrapped around nerve fibres, termed axons, in the central nervous system that is damaged by immune cells in multiple sclerosis—is critical to avoiding exhaustion of nerve cells and further damage to tissue.

Remyelination is a complex and time sensitive process. Once a window of opportunity for myelin repair has passed, the ability for the nervous system to undergo repair decreases significantly—thus it is important to know exactly when and how repair can take place.

Remyelination may also protect the axons from vulnerability to further damage by immune cells. Recent research using mice with an MS-like

disease has shown that axons that have been repaired appear to be protected from future degeneration. Whether this effect lasts over a long period of time is yet to be determined, but this evidence demonstrates that remyelination is a key step in reversing damage, preventing progression and improving physical recovery in all forms of MS.

While the development of therapies that encourage myelin repair is gaining more traction in the MS research community, many questions remain. Innovative work, such as Dr. Simon Zhornitsky’s MS Society funded research on the remyelinating abilities of an antipsychotic drug, has been conducted; however, more research is needed in this field to uncover new therapies that would enhance repair of nerve damage in people with all forms of MS.



Snapshot of MS research

2014 highlights

Multiple sclerosis is Canada's disease, with 100,000 Canadians living with MS. The MS Society of Canada funds world leaders in MS research and supports all promising avenues of research, such as nerve repair, cause, symptom management, progression and therapies. For more details on MS Society funded studies and more, visit mssociety.ca/msupdates



Study finds ICU admission is higher in people living with MS

A study led by Dr. Donald Paty Career Development Award recipient **Dr. Ruth Ann Marrie** from the University of Manitoba examined administrative and clinical data from Manitoba and found that the risk of intensive care unit (ICU) admission is higher in people living with multiple sclerosis compared to the general population. Mortality following admission is also higher in people with MS, particularly in those under 40. These findings highlight the need for an increased level of care to prevent infections and manage co-existing conditions, which are two common reasons for increased ICU admission among people with MS.



Apple peel extract may have neuroprotective properties

Dr. George Robertson and colleagues at Dalhousie University are currently studying the neuroprotective and anti-inflammatory properties of a flavonoid-enriched compound termed AF4, isolated from apple peel. The researchers had previously discovered that AF4 reduces disease progression in mice with an MS-like disease, and the MS Society is funding this work to examine the biological mechanisms behind the neuroprotective properties of AF4. Results from this study will provide evidence for new and innovative therapies for treating various forms of MS.



Cannabis may add to cognitive challenges for people with MS

Dr. Anthony Feinstein from Sunnybrook Research Institute led a MS Society supported study investigating the effects of smoked cannabis on cognition in people with MS. The research team examined participants' brain activity in real time using functional magnetic resonance imaging (fMRI) while the participants completed a variety of tests. The MS group who smoked cannabis performed more poorly on one of the tests and displayed abnormal patterns of brain activity, compared with the MS group who did not smoke cannabis. These findings demonstrate that smoking cannabis may add to the cognitive challenges that are already experienced by some people with MS.

Studentship Awards

Supporting the next generation of MS researchers

We are grateful to our donors for supporting the next generation of MS researchers through our Studentship Awards program. We are pleased to highlight the recipients of the 2014/2015 Studentship Awards, and we would like to extend a special thank you to those donors who made them possible.

Award	Recipient(s)
Alistair Fraser MS Society of Canada Masters Studentship	Kyla McKay, <i>University of British Columbia</i>
Asad Wali MS Society of Canada Postdoctoral Fellowship	Chao Wang, <i>Brigham and Women's Hospital</i>
Dr. William J. McIlroy MS Society of Canada Doctoral Studentship	Jenea Maria Bin, <i>McGill University</i>
National Bank Financial Group MS Society of Canada PhD Studentship	Mohammad Karim, <i>University of British Columbia</i> Nadine Akbar, <i>University of Toronto</i> Paulina Drohomyrecky, <i>University of Toronto</i>
Robert Boyd MS Society of Canada Postdoctoral Fellowship	Tingting Zhang, <i>University of British Columbia</i>
Sherritt International Corporation MS Society of Canada Doctoral Studentship	Curtis Benson, <i>University of Alberta</i> Liam E. Potter, <i>University of Alberta</i> Vahid Hoghooghi, <i>University of Calgary</i>
The Co-operators MS Society of Canada Doctoral Studentship	Fei Zhao, <i>University of Toronto</i>
The Lawrason Foundation MS Society of Canada Doctoral Studentship	Jeeyoon Ahn, <i>University of Toronto</i>
Waugh Family MS Society of Canada Doctoral Studentship	Afolasade Farotimi, <i>Queen's University</i> Alexandre Paré, <i>Université Laval</i> Gregory Duncan, <i>International Collaboration on Repair Discoveries (ICORD)</i> Julia O'Mahony, <i>University of Toronto</i> Kaarina Kowalec, <i>University of British Columbia</i> Katerina Othonos, <i>University of British Columbia</i> Laurine Legroux, <i>Centre de Recherche du Hospitalier de l'Université de Montréal</i> Michael Keough, <i>University of Calgary</i> Omar de Faria, <i>McGill University</i> Sandra Magalhaes, <i>McGill University</i>

To find out how you can support the next generation of MS researchers through the MS Society's Studentship Awards program, please contact Lee Nichols at lee.nichols@mssociety.ca or 1-800-268-7582 x3131.