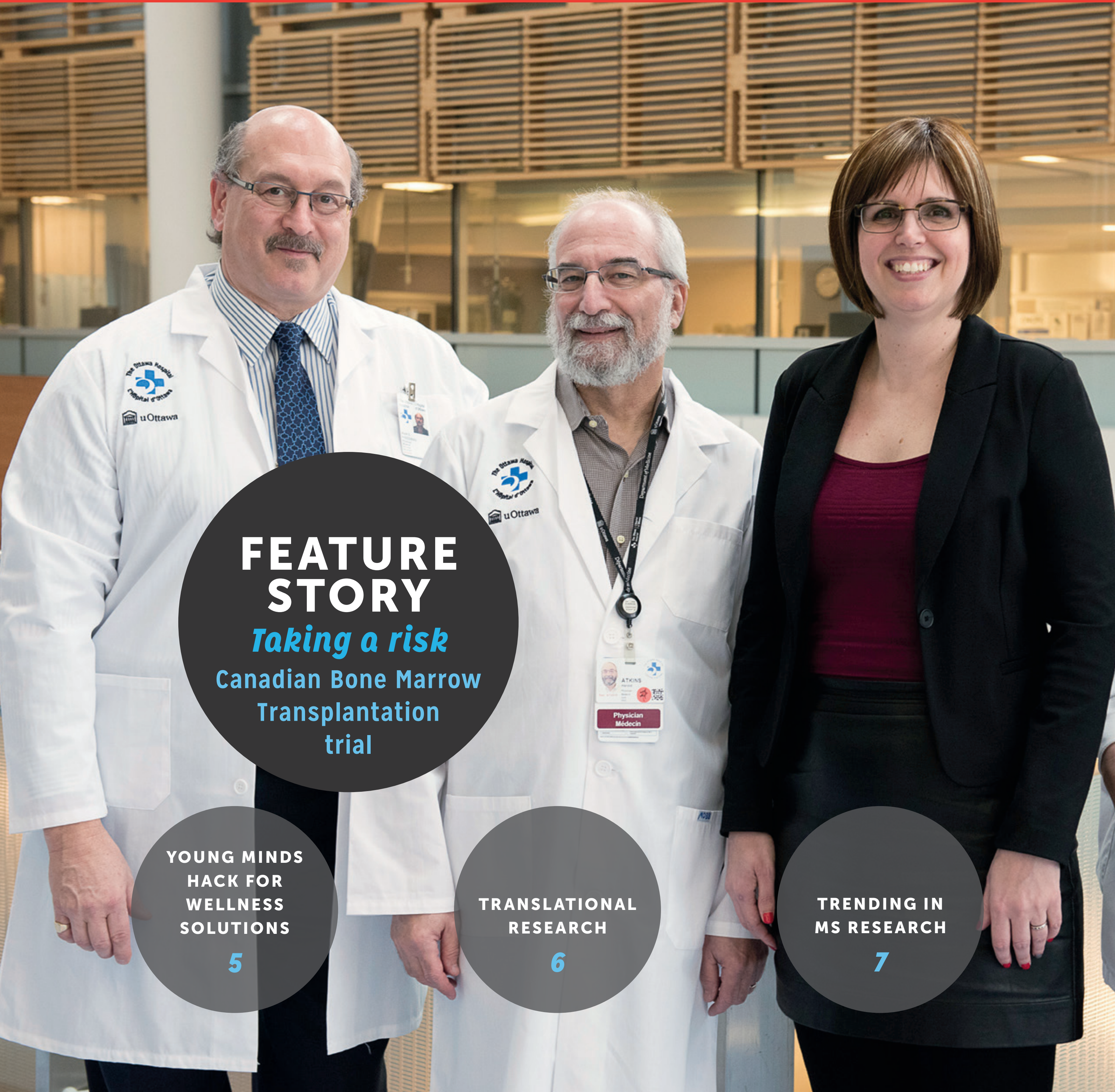
MS® Research

Fall/Winter 2016



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@Dr_KarenLee

You may be familiar with the phrase "bench to bedside," but what does it mean for a person living with multiple sclerosis? To me, given my background in research, it means taking a key scientific finding, a bold new idea, or a research question, and transforming it into something that will improve lives. It means applying something you learn about in textbooks to the development of clinical tools or health resources that can be used to prevent, manage, or predict disease. Bench to bedside moves ideas from laboratory to patient, but it's not as easy or quick as it sounds. New research findings require exhaustive testing before they move into clinical trials and real-world use. For MS, the approval of 11 disease-modifying therapies in Canada is a testament of the success of bench to bedside in the field.

The publication of the positive results of the MS Society of Canada and affiliated MS Scientific Research Foundation-funded Canadian Bone Marrow Transplantation (BMT) trial in *The Lancet* marked another significant milestone in the translation of research findings into real results for people living with MS. In this issue you'll read about Jennifer Molson's personal journey as one of the trial participants who received the treatment, and how she's now living a fulfilled life as a result of the procedure's success.

You'll also learn about our ongoing collaboration with the Centre for Drug Research and Development (CDRD); we are both determined to identify the most promising drug targets for progressive MS. The goal of the partnership is to enable researchers studying progressive MS to take advantage of the world-class drug development tools and expertise at CDRD, so that they can ultimately move their ideas from the lab to people who need results.

We're also proud to feature Team TBS, winners of last year's Hack4Health event at the University of Waterloo. Team TBS are a group of undergraduate engineering and health science students who recognize the need for better technology to track MS symptoms. They are developing a wearable device that will change the way people with MS manage their disease, demonstrating that it's possible to take an idea and turn it into a life-changing solution.

As new discoveries about MS are made, researchers, healthcare professionals, and the MS Society must work together to fill major gaps along the bench to bedside continuum, and ensure that discoveries are translated into clinical outcomes for people with all forms of MS as quickly as possible.

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

Sincerely,
Dr. Karen Lee
Vice-president, research

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Imagine Canada Ethical Code

Progression
& therapies

Taking a risk

Canadian Bone Marrow Transplantation trial

BY JENNIFER MOLSON

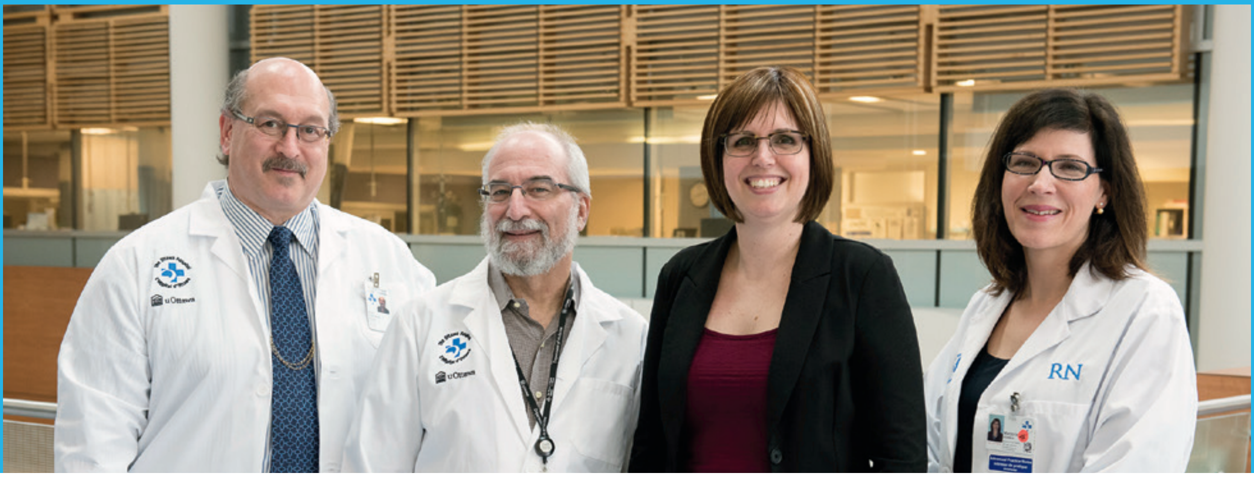
> “But now, here I am: walking, skiing, kayaking. Independent, working full time, married after having danced at my wedding.”

Still, knowing what I know now, I would do it all over again.

I won’t sugar coat this: the trial was hell. For three years, between 2002 and 2005, my life was a series of questions, tough decisions, and uncertainties. My body didn’t feel like my own. At one point I was taking 129 pills a day, and my stomach lining was so eroded that I couldn’t keep food down for a year. Destroying your immune system is no easy feat.

But now, here I am: walking, skiing, kayaking. Independent, working full time, married after having danced at my wedding. I have been living relapse-free for 14 years, and it’s because of the Canadian Bone Marrow Transplantation (BMT) trial conducted by Dr. Mark Freedman and Dr. Harry Atkins at The Ottawa Hospital. The BMT trial investigated a new immunoablation and autologous hematopoietic stem cell transplantation (IAHSCT) option for people with an early, aggressive form of multiple sclerosis, like the type I was living with in my early 20s.

Five years after being diagnosed with MS at age 21, my health had declined so rapidly that I was living at The Ottawa Hospital Rehabilitation Centre under constant care. Dr. Mark Freedman, my neurologist and co-lead investigator of the BMT trial, told me my MRI scan looked like a cheese grater — there were so many lesions on my brain that my nervous system looked like it had been shredded by MS.



Left to right: Dr. Freedman, Dr. Atkins, Jennifer Molson, and Dr. Bowman at The Ottawa Hospital. Photo credit: The Ottawa Hospital.

That was the moment I became eligible for the trial, and I rallied my then-boyfriend Aaron and my family to review the consent form, line by line, risk by risk. Dr. Freedman was straightforward about the difficulties I would face at each stage of the trial, first with the harvesting of my stem cells, then with the chemotherapy to completely wipe out my immune system, then with the transplantation of my stem cells back into my body (with a new consent form for each stage!). I had made the decision to participate in the trial expecting not that I would get better, but rather that I wouldn't get worse. I wasn't supposed to get better; even so, I decided it was worth the risk to prevent further progression of my MS.

At each stage, the trial became more and more difficult until the point of no return: 10 days of chemotherapy. I remember receiving treatment in the leukemia ward at the hospital, and needing to explain to others that I wasn't receiving chemotherapy because I was dying of cancer.

A year after I completed the trial, I started to see improvements: first I was able to walk without a cane, then get through the day without a nap, then make plans with my friends without needing to cancel. Finally, in 2006, I had regained complete ability, was able to return to work full time and feel more independent than I had in years.

I'm currently living relapse-free, but I'm also living with the after-effects of extreme chemotherapy. My husband and I have had to accept that we will never have children, as the treatment triggered early menopause in my body. I've had to get most of my childhood vaccines again, but I need to live without the MMR vaccination. I'm very prone to infection, and I developed a blood infection, shingles, and bladder infections after the treatment.

But when I'm asked if it was all worth it, I answer without hesitation: yes.

QUICK FACTS

IAHSCT is available for people with an early, highly inflammatory, aggressive form of MS that has not responded to other therapies.

In Canada, IAHSCT is currently only available at The Ottawa Hospital for people who meet the criteria and are referred by a neurologist.

70 per cent of Canadian BMT trial participants experienced a complete stop in disease progression, and 40 per cent experienced a lasting reversal of symptoms.

↘ *For more information on eligibility for IAHSCT, visit* ***www.ohri.ca/newsroom/newsstory.asp?ID=584***

Symptom management

Young minds hack for wellness solutions

Left to right: Abhinav Grover, Denez Zahra Bokhari, Muhammad Inzamam Tahir, and Muhammad Tahsin Sharif at the University of Waterloo.

Last fall more than 70 students from the University of Waterloo, in Ontario, came together and immersed themselves in a 36-hour brainstorming session called Hack4Health, with the goal of finding wellness solutions for people living with MS and Alzheimer's. With the help and guidance of medical professionals and people living with MS, these young, fresh minds took on the topics of wellness and technology with backgrounds in engineering, biology, and health sciences. The result: creative technology solutions for managing the symptoms of MS.

The winning concept was Team TBS's specialized health monitoring wristband. The band is designed to detect the user's symptoms, temperature and heart rate while logging the information for the user and their healthcare team to better monitor health status. Team members Denez, Sharif, Abhinav and Muhammad were awarded $15,000 from the MS Society of Canada to develop their concept, with the guidance of their mentor Dr. James Tung, a professor in the Department of Mechanical and Mechatronics Engineering at the University of Waterloo.

"It's a great honour for the MS Society of Canada to fund our work that could really help people," Abhinav says. "There has recently been a trend of implementing tech into healthcare, and with the increased integration of the two, we'll be able to help people living with MS in ways never thought possible. We want to continue this revolution of improving healthcare with tech, and we're so happy to be a part of this movement."

With varied backgrounds in science, engineering and programming, the members of Team TBS all have a passion for improving health and quality of life for people. "We want the end result of this project to be both accessible to people with MS and allow researchers to collect more intense data that can provide them with conclusions about the disease," Muhammad says. "For the users, they'll be able to track their symptoms from the comfort of their own home instead of being in the hospital for extended periods of time. If we're successful in developing something that inspires researchers to use the data to find a cure for MS, that would be a dream come true."

The team members, and all the hackers who attended Hack4Health, used data from the MS Society's MS Wellness Survey to formulate their proposals for the judges. Results from the survey expressed the ways people living with MS incorporate wellness into their daily lives, as well as what would be needed to improve wellness and symptom management. Common needs identified were improved technology and communications and integration of care and programs that would help people gauge and improve their state of wellness.

↘ *To read more about the MS Wellness Survey, visit* ***mssociety.ca/ms-wellness-survey***

Translational research

Finding the right tools for the job

Centre for Drug Research and Development (CDRD), Vancouver, BC.

Earlier this year, we announced funding for two translational research projects focused on progressive MS, in collaboration with the Centre for Drug Research and Development (CDRD). Based in Vancouver, BC, CDRD specializes in giving researchers the tools they need to push their discoveries into the drug development pipeline. This process of accelerating translational research brings potential therapies within reach for people living with MS. With the help of CDRD, researchers are exploring new drug targets that, if further developed, have the potential to slow, stop, or reverse the progression of MS.

CDRD combines teams of scientists with a facility equipped with specialized research equipment to help carry out translational research. For instance, Dr. Veronique Miron's (University of Edinburgh) research project in collaboration with CDRD looks at pursuing the development of a drug that promotes myelin repair by focusing on a molecule that drives the activity of myelin-producing cells. By working with CDRD, Dr. Miron can carry out large-scale screening of thousands of molecules in CDRD's library to pinpoint candidates for a potential myelin-repair drug.

These translational research tools go beyond early drug discovery. Dr. David Granville (University of British Columbia), who leads the second MS Society CDRD translational research project, is focused on a drug candidate that has the potential to repair damage to nerve cells – a hallmark of progressive MS. Collaborating with CDRD will enable Dr. Granville answer important questions about his drug candidate: How quickly is it absorbed? How is it distributed to different tissues and metabolized? And at what dose is it toxic? These are all crucial questions that researchers like Dr. Granville must answer to ensure that their drug candidate will be both effective and safe for people living with MS.

The Research Continuum

↘ *To learn more about translational research, visit our research blog at* ***drkarenlee.ca/research-decoder-translational-research/***

Trending in MS Research

Noteworthy advancements

Canada has the highest rate of multiple sclerosis in the world. It's because of our donors, event participants, and volunteers that we are able to fund some of the best MS research in the world, right here in Canada. To read more about the studies mentioned below and the latest in MS research, visit **mssociety.ca/research-news**, and follow **@Dr_KarenLee** & **@MSSocietyCanada** on Twitter.

MS Society of Canada @MSSocietyCanada · Aug 17
A new therapy promoting **myelin maintenance and repair** is explored in MS Society-funded study. #remyelination #endMS

MS Society of Canada @MSSocietyCanada · Jun 9
"Rebooting" the immune system leads to recovery in people with aggressive MS; landmark MSSRF study published. #stemcells #BMT

MS Society of Canada @MSSocietyCanada · Apr 15
Two studies by MS Society-funded researcher shine the spotlight on **comorbidity** in MS. #Comorbidity #endMS

MS Society of Canada @MSSocietyCanada · Feb 12
MS Society funds two new **translational research** projects to help bring lab discoveries one step closer to becoming treatments for progressive MS. #TranslationalResearch #ProgressiveMS

Multiple
Sclerosis
Society of
Canada

endMS Studentship & Fellowship Awards

Supporting the next generation of MS researchers

We are grateful to our donors for supporting the next generation of MS researchers through our endMS Studentship and Fellowship Awards program. We are pleased to highlight the recipients of the 2016/2017 endMS Studentship and Fellowship Awards, and would like to extend a special thank you to our donors who made this possible.

Award	Recipient(s)
Alistair Fraser MS Society of Canada endMS Master's Studentship	Elisea De Somma, *York University*
Asad Wali MS Society of Canada endMS Postdoctoral Fellowship	David Gosselin, *University of California, San Diego*
Dr. William J. McIlroy MS Society of Canada endMS Doctoral Studentship	Elizabeth Gowing, *Centre de recherche du CHUM (CRCHUM)*
The Kathleen Isabel Grosjean MS Society of Canada endMS Master's Studentship	James Dixon, *Montreal Neurological Institute*
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Thank you!

You can support the next generation of MS researchers too!
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