

Feature



A Tradition Of Excellence

In the world of stem cell science, Canada is a leader. It was two Canadians – Drs. James Till and Ernest McCulloch – who proved the existence of stem cells more than 40 years ago. If we had not taken another single step forward, Canada still would deserve a place in modern medical history. We also would be spectators, watching as molecular medicine moves ever closer to finding a cure for diseases such as Parkinson's, muscular dystrophy, diabetes and other afflictions that have, until now, stymied science.



But Canadians are a curious breed: we want to know more. It was again our own researchers who made many of the groundbreaking gains after the Till and McCulloch breakthrough. Building on their legacy, Canadian researchers were the first to identify skin stem cells, retinal stem cells, neural stem

as the world's first stem cell network back in 2001, the potential of stem cell research to change the face of medicine was just beginning to be understood. Six years later the importance of stem cell research and regenerative medicine is increasingly evident:

- The growing economic and social burden of chronic and degenerative disease and rising treatment costs has accelerated the need for Canada to identify new therapeutic approaches.
- Globally there is a consensus that stem cells and regenerative medicine present an opportunity to transform medical practice, by offering the potential to cure or alleviate many of today's most devastating and costly diseases, including cancer, type 1 diabetes, Parkinson's disease, Alzheimer's disease, cardiac damage, stroke, and spinal cord injury. Indeed, the impact of stem cell research has already been evidenced by the use of bone marrow transplants (hematopoietic stem cell transplantation) – globally 45,000 people receive such treatments every year.

This, again, is where Canada steps in to lead the field.

The Stem Cell Network plays a critical role in the global effort to develop stem cell science. This global effort grew out of work done by the International Stem Cell Forum, an organization founded in 2003 and comprised of some of the world's most advanced research-funding agencies, including the Canadian Institutes of Health Research (CIHR). Among its first acts, the Forum created a working group to develop standardized criteria for deriving, characterizing, and maintaining stem cell lines – a colony of constantly-dividing cells, the product of a single parent group of stem cells – with Dr. Janet Rossant, Deputy Scientific Director of the Stem Cell Network leading the initiative.



As policy may differ greatly from country to country, the Network recognized that it is essential for all scientists to work within a strict ethical framework. In this area, Canada has again taken a leading role. Under the supervision of the Stem Cell Network's Bartha Knoppers, a senior researcher at the Centre de recherche en droit public at the Université de Montréal, Canadian researchers have developed a compendium of the regulations of 50 countries on embryonic stem cell research. The comprehensive study, which took over three years to complete, grew out of work which was funded by the Stem Cell Network, and is constantly updated.

This work has put Canada at the forefront of stem cell research ethics. Academic Secretary to the Stem Cell Forum's Ethics Working Group Project, Rosario Isasi, an attorney specializing in health and human rights, has made presentations on this research to the United Nations and medical/scientific agencies around the world.

As is the case in so many areas, there is a clear need for an international approach to accelerate therapeutics by avoiding duplication of efforts and building on each other's successes. In recognizing this, the Stem Cell

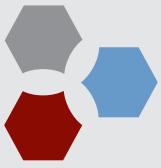
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cells in the brain, and cardiac stem cells in the heart. On an international scale, Canadian scientists have authored half the pivotal papers of stem cell science in the last half of the 20th century. It was this work that, in 2001, led to the creation of the Stem Cell Network – the first organization of its kind in the world.

Federally funded by Canada's Networks of Centres of Excellence, the Stem Cell Network (SCN) is a not-for-profit corporation that is made up of 70 researchers, including clinicians, engineers, and ethicists, more than 200 trainees at 24 institutions, and 30 industry and not-for-profit partners, with the mandate to investigate the immense therapeutic potential of stem cells for the treatment of diseases currently incurable by conventional approaches. When the Stem Cell Network was established

- It is widely understood that this field of medical research has the potential to transform not just clinical practice, but also change the paradigm of healthcare and the pharmaceutical industry, and to displace or remove the need for existing treatments such as the use of insulin to treat diabetes.
- Now, more than ever, being first is not nearly enough. It is essential that one is at the forefront of scientific discovery, and more importantly, a leader in collaboration. Just as stem cell science traverses many disciplines, it also knows no borders. Work done in Edmonton is being advanced in Edinburgh. New protocols in Melbourne impact on Montréal. Finding future life-saving therapies likely will require co-operation from many countries pooling their intellectual property and trading their technology.

Continued on page 11



In Memoriam



Remembered as a Friend and Mentor

OSMT was saddened to hear of the unexpected death of Dr. Harold Richardson on February 12, 2007. Dr. Richardson retired from his job as QMP-LS Managing Director on June 30, 2006.

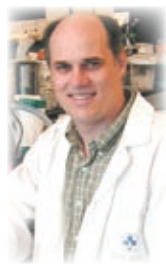
Dr. Richardson's many accomplishments include a BSc, MBBS, MD, FCCP and FR-CPC. He served as the vice-chair of the National Committee on Medical Laboratory Quality Systems of the Canadian Standards Association. He was the former chair of the McMaster University's Medical Microbiology and Infectious Diseases program and the

past president of the Canadian Association of Medical Microbiologists. He authored many published works and articles including several for the OSMT *Advocate* magazine.

Dr. Richardson contributed greatly to the implementation of the laboratory quality management program in Ontario and was a great supporter of new technologies and professional development. He was a mentor to many medical laboratory technologists during his career and will be remembered with fondness by the many people who were fortunate enough to have known or worked with him. ❖

Continued from page 10

Network led the way in the creation of the International Consortium of Stem Cell Networks (ICSCN) – in essence, a network of networks – to link research organizations in Australia, Canada, Israel, Norway, Sweden, Germany, the UK, Denmark, and Switzerland. At a meeting organized by the Stem Cell Network, representatives hammered out the Montreal



Declaration to begin the process of integrating international efforts.

The International Consortium, co-chaired by SCN Scientific Director Dr. Michael Rudnicki, is tackling issues of concern to stem cell scientists around the globe.

Among these issues is an urgent need to identify new therapeutic agents that specifically target cancer stem cells. Cancer tissues have been shown to contain rare populations of cells that have stem cell properties, generating other cancer progenitors and aberrantly differentiated cancer cells that form the bulk tumour population. Cancer stem cells (also called tumour-initiating cells) were first identified ten years ago by Dr. John Dick of

Toronto's Hospital for Sick Children, and his colleagues. More recently Drs. Michael Clarke (Stanford Comprehensive Cancer Centre), Connie Eaves (BC Cancer Agency) and Peter Dirks (Hospital for Sick Children), and their collaborators, provided key evi-

problem has been the Cancer Stem Cell Genomics and Therapeutics Project led by Dr. John Hassell (McMaster University). This project team has devised methods to isolate and grow various adult stem cells and their cancer stem cell counterparts.

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dence in landmark papers that solid tumours from breast and brain tissue also comprise a minor population of cancer stem cells. These studies have catalyzed further research in solid tumours suggesting that additional human cancers contain rare populations of cancer stem cells that fuel tumour growth. It is suspected that cancer stem cells are generally refractory to most current therapeutic treatments primarily because these cells rarely divide and express proteins that actively export anti-cancer drugs. Hence cancer stem cells often escape these drugs.

The Stem Cell Network's response to this

Through the ICSCN, the Stem Cell Network has been able to leverage this groundbreaking work to significantly broaden the cancer stem cell types studied, thus advancing the field closer to unlocking the mysteries of cancer.

These are just a few of the many areas in which Canadian research is once again leading the way on a global scale. In keeping with our history of leadership in this age's most promising field of discovery, as scientific advancements are made on a global scale Canada will undoubtedly continue to build on its reputation as a global leader. ❖