

MEDIA BACKGROUNDER



About the Stem Cell Network

The Stem Cell Network, established in 2001, brings together more than 90 leading scientists, clinicians, engineers, and ethicists from universities and hospitals across Canada. The Network supports cutting-edge projects that translate research discoveries into new and better treatments for millions of patients in Canada and around the world. Hosted by the University of Ottawa, the Stem Cell Network is one of Canada's Networks of Centres of Excellence funded through Industry Canada and its three granting councils. For more information on the Stem Cell Network, please visit www.stemcellnetwork.ca.

About the Till and McCulloch Award

In 2005, the Stem Cell Network established the Till and McCulloch Award in honour of Canadians Drs. James Till and Ernest McCulloch, whose pioneering work established the field of stem cell research. Each year, the Stem Cell Network awards the Till and McCulloch Award to one Canadian researcher in recognition of his or her exceptional contributions to global stem cell research in that year, based on what the selection committee determines to be the year's most influential peer-reviewed article by a Canadian stem cell researcher. Learn more about the nomination process and a list of past winners at www.tillandmcculloch.ca

About stem cells

What are embryonic stem cells and why are they important?

Embryonic stem cells are pluripotent, meaning they are capable of generating any cells in the body. Unlike adult stem cells, embryonic stem cells can grow readily in culture, which makes them a more robust source of stem cells. However, over time embryonic stem cells acquire chromosomal abnormalities as a result of their growth in tissue culture. The concern is that these mutations may result in progression towards a malignant state, which would of course be problematic for therapeutic use of the cells. Therefore, there is a need to derive new cells on a regular basis.

Because they expand easily in culture, embryonic stem cells have been instrumental in the study of human development and disease modeling. Continued study using embryonic stem cells, induced pluripotent stem cells and adult stem cells will help determine which cell type will ultimately be the best cell for clinical use and treatment of a particular disease.

What are induced pluripotent stem cells?

In 2007, researchers engineered adult skin cells into a pluripotent state. These induced pluripotent stem cells (iPS) have characteristics similar, but not identical, to embryonic stem cells – they are able to form all cell types in the body. However, the method of producing iPS cells is not yet ideal for the purposes of treatment in humans and research is continuing to improve the method of creation and to better understand how iPS cells can be used in therapies safely and effectively.

One of the other benefits of iPS cells is the opportunity to obtain the cells directly from a patient, thus potentially reducing the risk of auto-immune reactions following cell therapy.

What are adult stem cells?

Adult stem cells are undifferentiated cells found in various tissues within the human body. For

example, adult stem cells have been found in skin, brain, liver, muscle, and retina. The first stem cell discovery, made by Canadian scientists James Till and Ernest McCulloch in 1961, identified adult stem cells in bone marrow and has led to extensive understanding of hematopoietic (blood) stem cells and their therapeutic benefits.

Although adult stem cells have the ability to renew themselves, their limitation in therapeutic application is due the fact that they can only produce a restricted number of specialized cell types. Nevertheless, for some specific diseases, such as leukemia, they are a very powerful therapeutic tool.

When will stem cell therapies be routinely available?

Some stem cell therapies, such as bone marrow transplant, skin and corneal grafting are forms of stem cell therapy that have been shown to be safe and are readily available as a treatment option. Other stem cell therapies are still being studied and hold great promise for illnesses such as muscular dystrophies, retinal degeneration, Alzheimer disease, Parkinson's disease, arthritis, diabetes, spinal cord injuries, liver disease, and blood disorders such as hemophilia. Much of the current study using stem cells to treat these illnesses is in its early stages and will require considerable study and testing to ensure their safety and long-term benefit.

Some of the challenges facing researchers who are developing these new stem cell therapies are 1) identifying and isolating the right type of stem cell, 2) developing conditions in which a cell can be coaxed into a state that is safe for a particular therapy, 3) delivering the cells to the right part of the body in a way that allows them to perform their regenerative function, and 4) overcoming immune reactions. To find out more about how science becomes medicine, visit the web site www.closerlookatstemcells.org

About Stem Cell Tourism

Stem cell or medical tourism is the expression used to describe the practice of traveling outside of your home country to obtain medical therapies or treatments. It is a rapidly-growing multi-billion dollar industry. Specific to stem cells, such treatments can cost patients in excess of \$40,000, with no guarantee of efficacy or safety, and often with little or no follow-up on the part of the clinic. Current data suggests that as many as 5,000 of these treatments have already been conducted by the largest of these clinics.

There are many clinics that advertise fee-based stem cell treatments for a variety of ailments. Not all of these treatments are based on sound scientific evidence – for example, a Stem Cell Network-funded study of the online marketing of nineteen stem cell clinics found that the clinics' claims of safe, effective and routine therapies were not substantiated by published evidence. The research community has been vocal in its caution to patients who are considering these therapies. The web site, www.closerlookatstemcells.org was created by the International Society of Stem Cell Research, and is supported by the Stem Cell Network and many Canadian researchers.

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