

# CellCAN

## OUR MISSION

CellCAN's mission is to mobilize knowledge and stakeholders across Canada to significantly advance regenerative medicine and cell therapy research and clinical development.

## GOING FURTHER TOGETHER

CellCAN allows unprecedented collaboration between professionals in the field of cell-based therapy. Indeed, CellCAN is a network regrouping Canada's main cell therapy centres, whose research teams are working tirelessly to improve our health.

CellCAN is also implementing knowledge mobilization platforms so that researchers, clinicians, granting bodies, industry stakeholders, charitable organizations, members of the government, patient representatives and the public can exchange knowledge, express their needs, and share their questions and even concerns.

## WHAT DISEASES CAN BE TREATED?

Cell therapy has been, for years now, used in hematology, particularly to treat blood cancers such as leukemia, lymphoma and myeloma.

Cell therapy also has the potential to treat:

- Many other types of cancer: breast cancer, lung cancer, melanoma, kidney cancer, testicular cancer and others;
- Heart disease: heart attack, heart failure;
- Neurological disorders: Parkinson's disease, Alzheimer's disease, stroke, spinal cord injuries;
- Eye diseases: macular degeneration, glaucoma, corneal defects;
- Autoimmune diseases: diabetes, scleroderma, lupus erythematosus, rheumatoid arthritis, kidney disease and others;
- Musculoskeletal disorders: cartilage injuries, osteoarthritis, muscular dystrophy.

The text from this pamphlet has been adapted from the document *What you need to know about stem cell therapies* written by the Stem Cell Network, the Albany Medical College and the Health Law Institute – University of Alberta. CellCAN thanks its partners for giving the rights to use this document.



CELLCAN'S COMMUNITY IS AT THE **FOREFRONT OF THE LATEST ADVANCES IN THE FIELD OF CELL THERAPY!**

## JOIN US!

Visit our website and find unique resources to learn more about regenerative medicine and cell therapy.

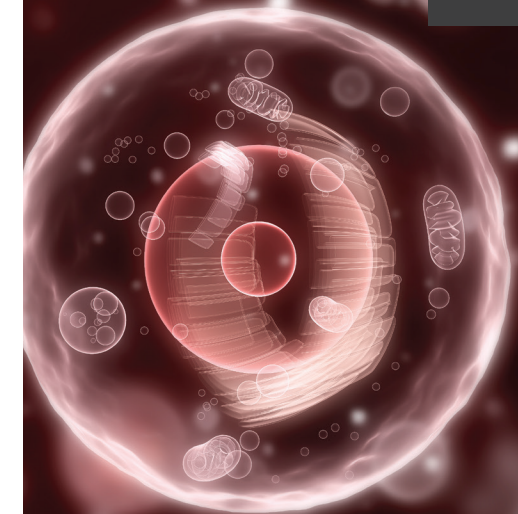
[WWW.ILOVESTEMCELLS.CA](http://WWW.ILOVESTEMCELLS.CA)

[WWW.CELLCAN.COM](http://WWW.CELLCAN.COM)

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# STEM CELLS

WHAT YOU NEED TO KNOW



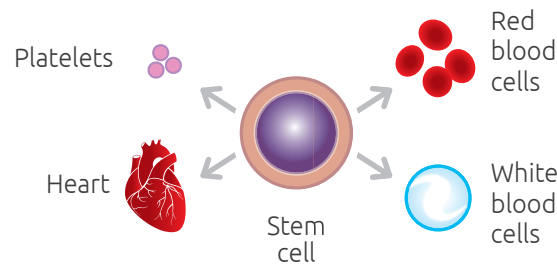
# STEM CELLS 101

## STEM CELLS: UNIQUE PROPERTIES!

The human body contains hundreds of cell types that are its building blocks. These cells are not all the same, as they fulfil specific roles in various parts of the body. However they have a common origin: stem cells. Indeed, stem cells are pluripotent: they have the ability to transform into cells by a process called differentiation (see below). There are many types of stem cells and all have unique properties.

Stem cells are the basis of a new type of medicine that is to use the power of these cells to repair tissues or organs damaged by disease or injury.

Imagine a heart attack that irreversibly impairs the heart muscle of the person. It might be possible to produce new heart muscles from stem cells and transplant them into the patient's heart to make it functional again!



## CELL THERAPY: MYTHS OR REALITIES?

The term cell therapy is used to describe the various medical treatments using stem cells. Stem cells can be transplanted into the body in different ways, for example, surgery or injection into the bloodstream.

As simple as it may seem, there are major obstacles to the success of these types of therapies that are very innovative but complex. Nevertheless, cell therapy is very promising, offering the opportunity of a curative medicine. This is why scientists around the world are working hard for the development of cell-based treatments to cure diseases such as cancer, diabetes or Parkinson's disease.

Cell therapy is already a proven treatment for blood cancers. And many other treatments should be available in the coming years.

## THE DIFFERENT TYPES OF STEM CELLS AND THEIR PROPERTIES

### Embryonic stem cells

They are pluripotent cells, which means that they can turn into any type of human cell. They are obtained from human embryos at a very early stage.

### Adult stem cells

Adult stem cells are found in various tissues of the body. They can turn into a few different types of specialized cells. For example, hematopoietic stem cells, which are collected at the adult stage in the bone marrow, can give rise to all types of blood cells (white blood cells, red blood cells, and platelets).

### Induced pluripotent stem cells

Induced pluripotent stem cells are obtained by adding genes to adult stem cells (for example, the cells of the skin) to make them pluripotent, that is able to transform into any type of human cell. As they are created from the patient's own cells, they will not be rejected by the immune system after transplantation.

### Mesenchymal stem cells

Mesenchymal stem cells are found in bone marrow, grease, blood, placenta and umbilical cord blood. Like many other stem cells, they are able to migrate in the body to repair damaged tissue. However, contrary to other cells, they do not trigger immune reaction, i.e. they will not be rejected by the body after having been transplanted. In addition, they produce many molecules that help the surrounding cells to grow and regenerate. Further research needs to be done, but these unique properties could be very useful for the development of regenerative medicine.