



## An Overview on Stem Cell Technology

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### EDITORIAL

#### *What are the stem cells?*

Our body is made up of many different types of cell. Most cells are specialised to perform functions. Stem cells have the capacity to regenerate and replace all of the tissues in the human body, making them ideal candidates for possible therapeutic applications in tissue regeneration and repair. They may be used to replace tissues and cells that have been damaged or lost due to the disease. Stem cells are the raw materials of the body. They have two very different properties that enable them to do this. Stem cells provide new cells for the body as it grows stem cells divide to form more cells called daughter cells and these daughter cells either become new stem cells or become specialized cells with a more specific function, such as, brain cells, heart muscle cells, bone cells or blood cells. They differentiate and can transform into the various cell types that make up the human body. The use of stem cells and gene therapy for repair in all types of acute and chronic disease is one of the most promising advancements in medicine today.

#### *Types of stem cells*

**Embryonic stem cells:** ESCs are pluripotent and originating from the blastocyst, a stage of the pre-implantation embryo that develops 5-6 days after fertilisation. The blastocyst has 2 layers of cells, i.e. the inner cell mass, which will form the embryo, and the outer cell mass, called trophoblasts, that will form the placenta. Embryonic stem cells supply new cells for an embryo. It grows and develops into a baby. These cells may be frozen and thawed for future experiments and cultures. It is used to repair and generate organs and diseased tissue.

**Adult stem cells:** Adult stem cells are made up of cells that have been extracted from adult tissue.

These stem cells are found in bone marrow or fat. Compared with embryonic stem cells, adult stem cells have a more limited ability to give rise to various cells of the body. Adult stem cells could be obtained from all tissues of the 3 germ layers as well as placenta. In any case, arising proof proposes that grown-up adult stem cells might have the option to make different kinds of cells. For example, bone marrow immature microorganisms might have the option to make bone or heart muscle cells. Stem cells are supposed to be multipotent, which implies they can just change into certain cells in the body. Other research has shown that cultured adult stem cells secrete anti-apoptotic, immunomodulatory, angiogenic, and chemoattractant properties with molecules mediators that aid in tissue repair.

**Induced pluripotent stem cells:** Induced pluripotent stem cells are the cells that scientists make in the laboratory. These stem cells also have the ability to change into specific cells. 'Actuated' implies that they are made in the lab by taking ordinary grown-up cells, similar to skin or platelets, and reconstructing them to become stem cells they are pluripotent so they can develop into any cell type. Scientists have distinguished undifferentiated organisms in examples of amniotic liquid attracted from pregnant ladies to test for anomalies—a method called amniocentesis.

- **Uses of stem cells:** Stem cells can be used to
- Research—to assist us with understanding the fundamental science of how living things work and what occurs in various sorts of cell during infection.
- Therapy—to supplant lost or harmed cells that our bodies can't supplant normally.

- Grow new cells in a laboratory to replace damaged organs or tissues.
- Correct parts of organs that don't work properly.
- Research causes of genetic defects in cells.
- Research how diseases occur or why certain cells develop into cancer cells.
- Test new drugs for safety and effectiveness.