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Short Communication

A Short Communication on Stem Cell Therapy

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INTRODUCTION

Stem-cell therapy is the use of stem cells to treat or prevent a disease or condition. The stem cells are the body's raw materials — cells from which all other cells with specialized functions are generated. Under the right conditions in the body or a laboratory, stem cells divide to form more cells called daughter cells.

These daughter cells either become new stem cells (self-renewal) or become specialized cells (differentiation) with a more specific function, such as blood cells, brain cells, heart muscle cells or bone cells. No other cell in the body has the natural ability to generate new cell types.

TYPES OF STEM CELLS

There are several types of stem cells that can be used for different purposes.

Embryonic stem cells

Embryonic stem cells come from human embryos that are three to five days old. They are harvested during a process called in-vitro fertilization. This involves fertilizing an embryo in a laboratory instead of inside the female body. Embryonic stem cells are known as pluripotent stem cells. These cells can give rise to virtually any other type of cell in the body.

Non-embryonic (adult) stem cells

Adult stem cells have a misleading name, because they are also found in infants and children. These stem cells come from developed organs and tissues in the body. They're used by the body to repair and replace damaged tissue in the same area in which they are found.

Induced pluripotent stem cells (iPSCs)

Scientists have recently discovered how to turn adult stem cells into pluripotent stem cells. These new types of cells are called iPSCs. They can differentiate into all types of specialized cells in the body. This means they can potentially produce new cells for any organ or tissue. To create iPSCs, scientists genetically reprogram the adult stem cells so they behave like embryonic stem cells.

Cord blood stem cells and amniotic fluid stem cells

Cord blood stem cells are harvested from the umbilical cord after childbirth. They can be frozen in cell banks for use in the future. These cells have been successfully used to treat children with blood cancers, such as leukaemia, and certain genetic blood disorders.

Stem cells have also been found in amniotic fluid. This is the fluid that surrounds a developing baby inside the mother's womb. However, more research is needed to help understand the potential uses of amniotic fluid stem cells.

CELL-BASED THERAPIES

There are few medical conditions that may potentially be treated with embryonic stem cells include:

- Traumatic spinal cord injury
- Stroke
- Severe burns
- Rheumatoid arthritis
- Heart disease
- Hearing loss
- Retinal disease
- Huntington's disease
- Parkinson's disease

Have stem cells already been used to treat diseases?

The doctors have performed stem cell transplants, also known as bone marrow transplants. In stem cell transplants, stem cells replace cells damaged by chemotherapy or disease or serve as a way for the donor's immune system to fight some types of cancer and blood-related diseases, such as leukaemia, lymphoma, neuroblastoma and multiple myeloma. These transplants use adult stem cells or umbilical cord blood. Researchers are testing adult stem cells to treat other conditions, including a number of degenerative diseases.

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