

# Cord Blood and Tissue Stem Cell Storage Education Part 1



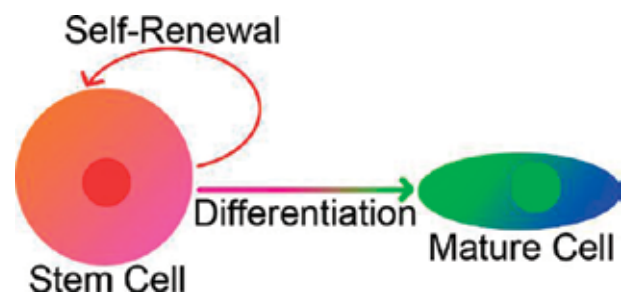
© Medpharm

Prof Nurs Today 2016;20(2):46-47

## What are stem cells?

Stem cells are the body's master cells that work as an internal repair system.

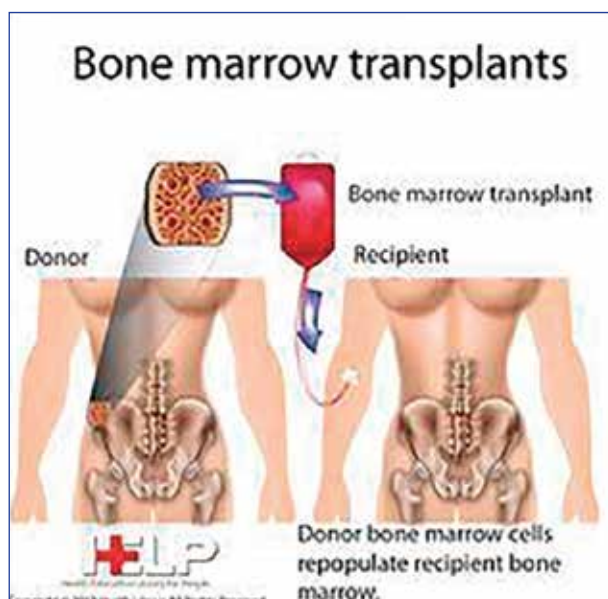
Stem cells are cells that are able to (1) self-renew (can create more stem cells indefinitely) and (2) differentiate into (become) specialised, mature cell types.



## Clinical Applications of Stem Cells

### 1. Cell Replacement Therapy

Healthy cells replace dead and diseased cells. Blood stem cell transplant/bone marrow transplant.



### 2. Bioprinting of tissues and organs

3-D printing of organs using stem cells instead of ink.



### 3. Generation of tissues and organs for transplantation

Stem cell-based skin grafting is when skin stem cells are obtained from the patient, and then expanded in the lab to produce sheets of cells sufficient to cover the burn or wound area.


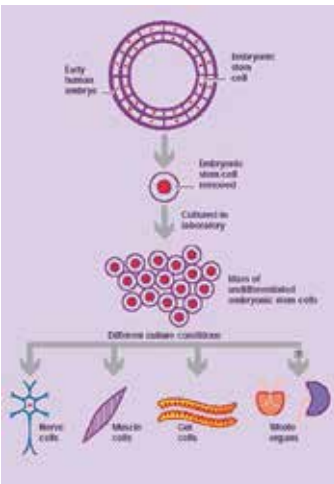
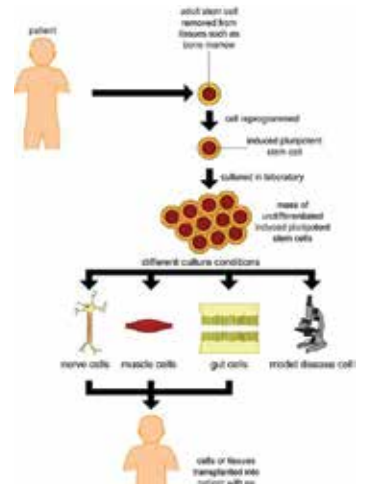


### 4. Regenerative medicine

The intrinsic regenerative potential of individual organs may allow the development of drugs aimed at stimulating the body's own (endogenous) stem cells to initiate or enhance repair.



## Types of Stem Cells

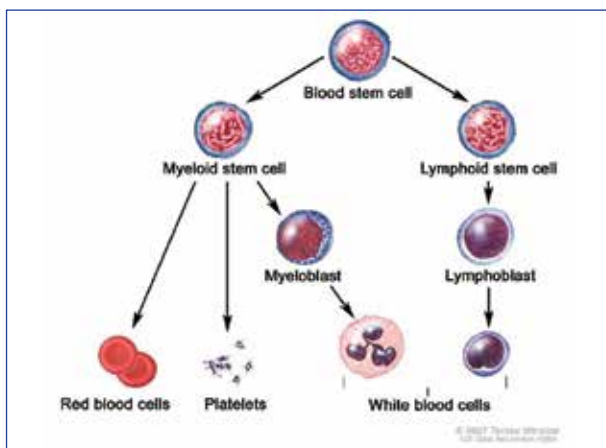
1. Tissue Stem Cells	2. Embryonic Stem Cells	3. Induced Pluripotent Stem Cells
<p>Tissue stem cells are found in the foetus, the baby and throughout life. It is found throughout the body. Each type gives rise to at least one type or more specialised cell - multipotent e.g. blood stem cells are found in bone marrow</p> 	<p>ESC can be genetically manipulated to give rise to any specialised cell - pluripotent</p> 	<p>iPS can be genetically manipulated to give rise to any specialised cell - pluripotent</p> 

## Tissue Stem Cells

Tissue stem cells relevant to cord blood and tissue storage:

### 1. Blood Stem Cells

Sources: Bone marrow and cord blood. Differentiate into red blood cells, white blood cells and platelets.



### 2. Mesenchymal Stem Cells

Sources: Adipose tissue, bone marrow, umbilical cord tissue and placenta. Differentiate into bone, connective tissue, fat, muscle, nerve and cartilage cells.

