Difference Between Progenitor Cells and Stem Cells

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Key Difference - Progenitor Cells vs Stem Cells

In the context of modern biology, stem cells and progenitor cells play a major role in different research and experimental procedures. Stem cells are considered as undifferentiated cells which can grow indefinitely into different types of specialized cells. They are of two types; embryonic stem cells and adult stem cells. Progenitor cells are more specific than stem cells even though both types of cells are similar. Progenitor cells are considered to be the adult stage of stem cells, but they reside in a stage of further differentiation. **The key difference between Progenitor cells and Stem cells is that stem cells can divide indefinitely while progenitor cells can divide only a limited number of times.**

What are Progenitor Cells?

In the context of biological cells, progenitor cells are similar but more specific than stem cells, can differentiate into a specific target cell when needed. Progenitor cells can divide and differentiate into specific types of cells only a limited number of times. The ability of progenitor cells to divide and differentiate into few types of cells is known as *oligopotency*. Most of the progenitor cells occur at a dormant stage which involves in fewer activities of their tissues. Vascular stem cells are considered as a type of progenitor cells that can divide and differentiate into both types of cells; endothelial and smooth muscle. Progenitor cells are considered to be the adult stage of stem cells, but they reside in a stage of further differentiation. Progenitor cells and adult stem cells share common characteristics. Simply, progenitor cells are in a stage between stem cells and fully differentiated cells. The research was done on progenitor cells found that these cells can move along the body into a specific location of necessary tissues. Progenitor cells act as cells for repair mechanisms of the systems in an adult body. They involve in the restoration of special cells in the body and also act in the maintenance of intestinal tissues, blood cells and skin. In the developing embryonic pancreatic tissue, progenitor cells are mainly found. Growth factors and cytokines are two important components that activate the progenitor cells to move into different tissues in the case of tissue injury or due to the presence of dead or damaged cells.

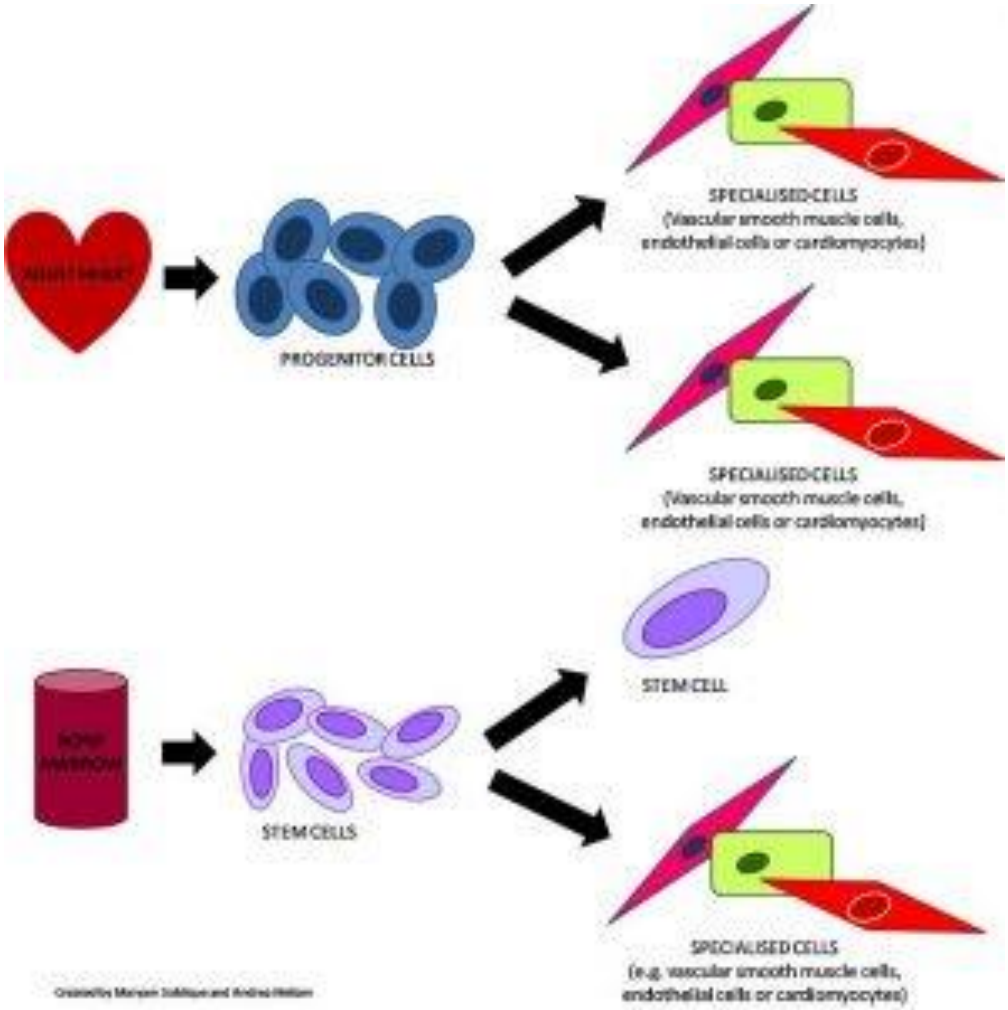

Figure 01: Progenitor Cells

What are Stem Cells?

Stem cells are considered as undifferentiated cells which have the ability for further differentiation and develop into specialized cells. These cells divide mitotically to produce larger quantities of stem cells. Stem cells are found in multi cellular organisms. They can be of two types; embryonic stem cells and adult stem cells. Embryonic stem cells are present in the inner cell mass of the blastocysts of the developing embryo and adult stem cells are present in different types of cells. Stem cells present in the developing embryo led to the development of the three germ layers; ectoderm, endoderm, and mesoderm. Stem cells can be extracted from different sources of the human body including bone marrow, adipose tissue, and blood and from the umbilical cord right after birth. Autologous harvesting of stem cell is a procedure with the lowest of number of risks. The adult stem cells are utilized in different medical procedures including therapies. With the development of technology, stem cells are now grown artificially in laboratories which are transformed into different types of cells which include muscle and nerve cells. During laboratory procedures, several mechanisms are initiated to maintain a stem cell population. This includes obligatory asymmetric replication; where a stem cell divides to produce two cells, a mother stem cell which is identical to the original stem cell and a daughter cell which is differentiated and stochastic differentiation where two differentiated daughter cells are developed from one stem cell.

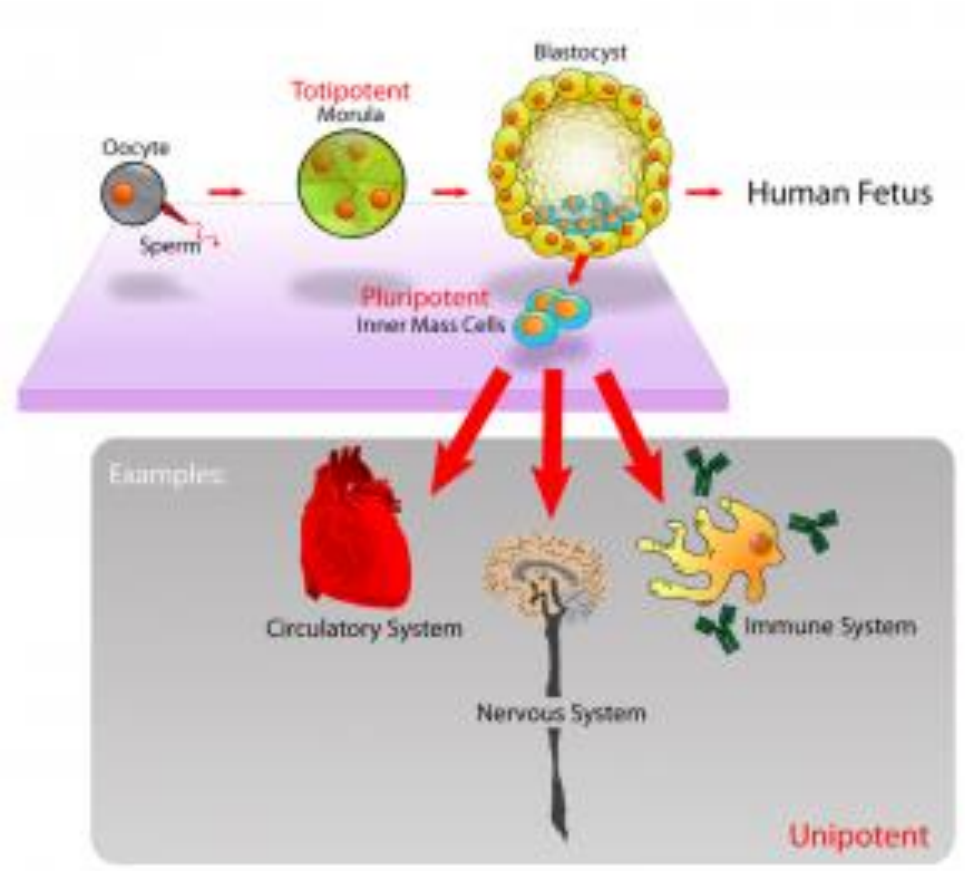

Figure 02: Stem cells

What is the Similarity Between Progenitor Cells and Stem Cells?

- Both cells involve in repair mechanisms of the body.

What is the Difference Between Progenitor Cells and Stem Cells?

Progenitor Cells vs Stem Cells	
Progenitor cells are biological cells which can divide and differentiate into specific types of cells, similar to a more specific type of stem cells.	Stem cells are undifferentiated cells that have the ability for further differentiation and develop into specialized cells and grow indefinitely.
Location	
Progenitor cells are found in muscles and pancreas, intermediate progenitor cells and stromal cells are found in the bone marrows.	Stem cells can be found in adult stem cells, fetal stem cells, embryonic stem cells, induced stem cells

Summary - Progenitor Cells vs Stem Cells

Stem cells and progenitor cells are two important types of cells in the context of modern biology and experimental procedures. Stem cells are considered as undifferentiated cells which have the ability for further differentiation and develop into specialized cells. Progenitor cells are similar but more specific than stem cells that can differentiate into a specific target cell when needed. This is the difference between progenitor cells and stem cells. Both types of cells involve in different functions of the body which includes repair mechanisms and maintenance of different tissues.

Reference:

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