



## Adult Stem Cells and its Applications

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### DESCRIPTION

Adult stem cells are present in small numbers in most adult tissues, such as fat or bone marrow. Adult stem cells have a more limited capability to give rise to various cells of the body in comparison with embryonic stem cells. Until currently, scientists thought adult stem cells could make only similar types of cells. For example, researchers thought that stem cells exist in the bone marrow could give rise only to blood cells. However, developing evidence suggests that adult stem cells may be able to create several types of cells. For instance, bone marrow stem cells may be able to create bone or heart muscle cells. This research has led to first stage clinical trials to test worth and safety in people. Such as adult stem cells are presently being tested in people with neurological or heart disease.

Scientists have effectively transformed regular adult cells into stem cells using genetic reprogramming. By changing the genes in the adult cells, researchers can reprogram the cells to act equally to embryonic stem cells. This new method may allow use of reprogrammed cells instead of embryonic stem cells and prevent immune system elimination of the new stem cells. However, scientists don't yet know whether using altered adult cells will cause adverse effects in humans. Researchers have been able to take constant connective tissue cells and reprogram them to become functional heart cells. In research studies, animals with heart failure that were inoculated with new heart cells experienced better heart function and survival time.

Although research with adult stem cells is promising, adult stem cells may not be as multipurpose and tough as are embryonic stem cells. Adult stem cells may not be able to be manipulated to produce all cell types that limit how adult stem cells can be used to treat diseases. Adult stem cells are also more likely to hold

abnormalities due to environmental threats, such as toxins, or from errors attained by the cells during replication. However, researchers have found that adult stem cells are more adaptable than was first thought.

Adult stem cells are indistinguishable cells found throughout the body that divide to refill dying cells and regenerate injured tissues. Adult stem cells are also known as somatic stem cells or resident stem cells, are uncommon population of identical cells, situated within a differentiated organ or organism, in a specific structure, called niche. The niches keep the local microenvironments that control the growth and development of stem cells. The adult stem cells can able to self-renew themselves, and they can be differentiated into a limited number of mature cell types. The foremost role of the adult stem cells is to maintain the tissue homeostasis.

### CONCLUSION

ASCs are a time-honored, Nobel Prize-recognized manner in the treatment of many human diseases. These ASCs are acquired from bone marrow, umbilical cord blood and peripheral blood. Following segregation of stem cells, they are administered to patients with leukemia, lymphoma, sickle cell anemia, thalassemia, aplastic anemia (failure of the marrow to produce red blood cells), and other situations. These stem cell transplants (formerly called bone marrow transplants) frequently restore normal hematologic role and a vital form of life-saving clinical practice. Inappropriately, ASCs obtained from other tissues such as heart muscle, skeletal muscle, or brains have not confirmed to be efficient. Use of ASCs from bone marrow or blood represent a proof of belief that stem cells from one person can multiply and differentiate in the marrow of another person.

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**Received:** 28-Feb-2022, Manuscript No. JSCRT-22-16335; **Editor Assigned:** 02-Mar-2022, PreQC No. JSCRT-22-16335 (PQ); **Reviewed:** 16-Mar-2022, QC No. JSCRT-22-16335; **Revised:** 21-Mar-2022, Manuscript No. JSCRT-22-16335 (R); **Published:** 31-Mar -2022, DOI: 10.35248/2157-7633.22.12.525

**Citation:** Fukada I (2022) Adult Stem Cells and its Application. J Stem Cell Res Ther. 12:525.

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