

Adult stem cells are present in all tissues in the human body. The major sources of ASCs that can be obtained from an adult human are:

- Bone marrow
- Peripheral blood, and
- Adipose Tissue (Fat).

However adult stem cells have been identified in many organs and tissues, including brain, bone marrow, peripheral blood, blood vessels, adipose tissue, skeletal muscle, skin, teeth, heart, gut, liver, ovarian epithelium, and testis. They are thought to reside in a specific area of each tissue (called a "stem cell niche").

[!\[\]\(c8d96c8885d3000a912c2582004aed63_img.jpg\)A microscopic image showing a single stem cell, which is a small, round cell with a prominent nucleus.](http://www.istockphoto.com/stock-photo-14442532-stem-cell.php)

Adipose tissue, like bone marrow, is derived from the mesenchyme and contains a supportive stroma that is easily isolated. Adipose tissue represents a source of stem cells that is having far-reaching effects in a large number of fields of medicine.

The best source to harvest ASCs from one's body is the adipose tissue. Below is a comparison of three sources:

- Bone marrow - About 50,000 ASCs can be harvested at any one time. These mostly become blood cells.
- Peripheral blood - About 10,000 ASCs can be harvested at any one time. 50% of which will become blood cells and 50% will become tissue cells.
- Adipose tissue (Fat) - About 10 to 50 million stem cells can be harvested at any one time, 5% of which will become blood cells and 95% will become tissue cells.

[!\[\]\(3ad821e3ca7dd4cb7003e9c8d982e254_img.jpg\)A microscopic image showing a cluster of cells growing in a petri dish, representing cells in vitro.](http://www.istockphoto.com/stock-photo-671858-life-in-vitro.php)

Scientists at Monash Immunology and Stem Cell Laboratories (MISCL) - as well as other international laboratories, have been carrying out extensive research to improve our ability to manipulate stem cells so as to be able to generate specific cell types so they can be used to treat injury or disease. In addition researchers at MISCL have been carrying out research to improve our ability to grow large quantities of adult stem cells in cell culture.

The initial concentration of researchers was on MSCs from the bone marrow. However, the clinical use of MSCs from the bone marrow has presented problems, including pain, morbidity, and low cell number upon harvest. This has led many researchers to investigate alternate sources for MSCs.