

Stem Cell Transplant Fact Sheet

What are stem cells?

- Stem cells (also technically called hematopoietic stem cells or HSCs) are unique cells that are primarily located in the bone marrow. These stem cells mature into red blood cells that carry oxygen, white blood cells that fight infection and platelets that help prevent bleeding.
- In adults, the bones of the hip and chest contain the greatest amount of bone marrow and stem cells. Stem cells that leave the bone marrow and circulate into the bloodstream are called peripheral blood stem cells.

What is a Stem Cell Transplant?

- A stem cell transplant is the infusion of bone marrow or peripheral blood stem cells into the bloodstream of a patient. The stem cells then travel through the blood back into the bone marrow, where they take up residence. These cells then grow and divide in bone marrow producing new HSCs which then subsequently mature into new red blood cells, white blood cells and platelets before moving out into the bloodstream.
- In the past, a bone marrow harvest (a surgical procedure) was the only way to collect stem cells for a transplant. Today, it is now possible to collect stem cells from the peripheral blood (from the bloodstream). The terms bone marrow transplant and stem cell transplant are now often used interchangeably.
- Although very few peripheral blood stem cells are found in the blood stream, their numbers can be increased through administering mobilization agents that help release stem cells from bone marrow.
- The two main types of stem cell transplants are:
 - **Autologous:** the patient utilizes his or her own stem cells for use in their transplant
 - **Allogeneic:** stem cells are donated from a related or unrelated person; a process called HLA matching helps to ensure the cells are as close as possible a match to the patient's own stem cells
- Factors that affect which type of stem cell transplant is best for the patient include: disease type, health of the patient's own marrow, extent of bone marrow injury caused by prior chemotherapy, age and overall health of the patient.

Key Differences Between Autologous and Allogeneic Transplants

	Autologous	Allogeneic
<i>Source of stem cells</i>	Patient	Related or unrelated donor
<i>Goal</i>	A stem cell transplant can be a part of treatment and allow administration of higher doses of chemotherapy to kill cancer cells, then replace stem cells destroyed by chemotherapy	<ul style="list-style-type: none"> - Replace damaged bone marrow/stem cells - Tumor-killing effect known as "graft versus tumor" - Part of disease treatment for certain tumor types
<i>Typical types of blood cancer/disease</i>	Multiple myeloma, non-Hodgkin's lymphoma, Hodgkin's disease, amyloidosis	Cancer/blood disorders that damage bone marrow such as myelodysplastic syndromes, aplastic anemia, acute myeloid leukemia (AML)

Key Differences Between Autologous and Allogeneic Transplants (cont'd)

	Autologous	Allogeneic
<i>When performed</i>	Collected cells can be frozen at any time prior to transplant and stored for years, although re-infusion typically occurs after chemotherapy	Carefully timed infusion of fresh, unfrozen donor cells after chemotherapy
<i>Approximately overall length of procedure</i>	About 4-5 weeks, including 2 weeks for recovery	About 10-14 weeks, with 8-12 weeks for recovery
<i>Advantages</i>	Patient's own cells are readily available and won't attack the body	Receive cancer-free cells
<i>Disadvantages</i>	Potential to receive some cancerous cells	- Need for near-perfect matched donor cells - Potential for rejection - Potential for donor cells to attack patients body (graft vs. host disease)

Facts About Stem Cells Transplants

- The first successful bone marrow transplant was performed in 1968. Twenty years later, doctors successfully performed a transplant using peripheral blood stem cells.
- In 2009, nearly 17,000 stem cell transplants were performed in the United States. Of these, nearly 10,000 were autologous and about 7,000 were allogeneic.
 - The top three diseases requiring transplants were multiple myeloma, non-Hodgkin's lymphoma and AML.
- Close relatives, especially brothers and sisters, are more likely than unrelated people to be HLA-matched. However, only 25 to 35 percent of patients have an HLA-matched sibling.
- About half of Caucasians who need a stem cell transplant may find a perfect match among unrelated donors, versus only about one in 10 people of other ethnic groups.