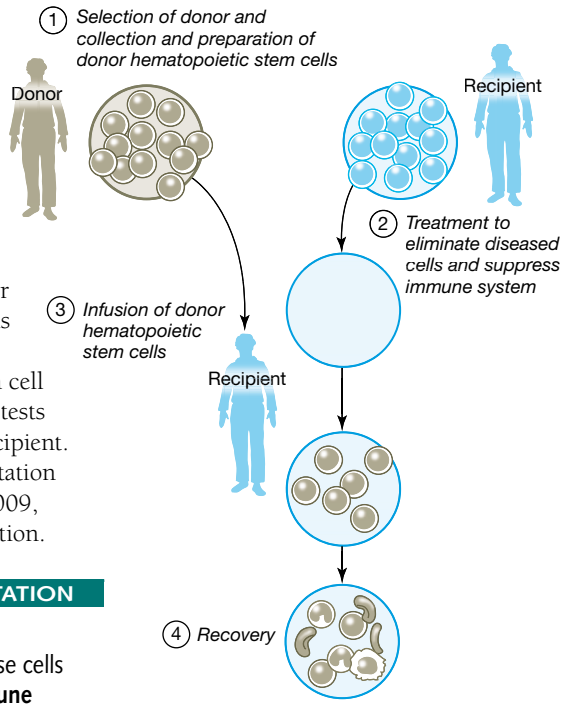
Hematopoietic Stem Cell Transplantation

Hematopoietic (blood-forming) stem cells are immature cells that develop into mature blood cells in the **bone marrow** (spongy center of bones where blood is formed), the bloodstream, or umbilical cord blood. Their source is thus completely different from **embryonic** stem cells that are derived from the earliest stages of development and have the potential to develop into mature cells of any type of tissue in the body. Stem cell transplantations from the blood and bone marrow are being used to treat a variety of disorders. There are 3 types of hematopoietic stem cell transplantations depending on the relationship of the donor to the recipient. If an individual donates his or her own cells, it is called an **autologous** stem cell transplant. If the recipient has an identical twin who can donate for him/her, it is called a **syngeneic** stem cell transplant. If the donor is another sibling or unrelated person, the stem cell transplant is called **allogeneic**. For allogeneic stem cell transplants, special tests are performed to ensure the best possible match between the donor and recipient. This is important because some of the adverse effects of stem cell transplantation are related to differences between donor and recipient cells. The July 15, 2009, issue of *JAMA* includes an article about hematopoietic stem cell transplantation.



DISORDERS THAT MAY BE TREATED WITH STEM CELL TRANSPLANTATION

- **Leukemia**—cancer involving white blood cells
- **Lymphoma**—cancer involving lymphoid cells that reside in lymph nodes; these cells travel in the lymphatic vessels throughout the body and are part of the **immune system** (the system that protects the body from invasion by external factors like infections or cancers)
- **Multiple myeloma**—a cancer in which one type of white blood cell forms tumors within the bone marrow
- **Aplastic anemia**—a disease involving inadequate production of red and white blood cells and blood platelets in the bone marrow
- **Thalassemia**—a disease of red blood cells when there is a decrease in the production of **hemoglobin** (the protein that allows red blood cells to carry oxygen)
- Immune deficiency disorders causing a decrease or malfunction of the cells of the immune system

RISKS OF HEMATOPOIETIC STEM CELL TRANSPLANTATION

- Infection because chemotherapy given to destroy the cancer cells before the stem cell transplantation makes the recipient's immune system very weak and the new immune system requires time to become functional
- Transplant rejection if the recipient's immune system destroys the transplanted cells
- **Graft-versus-host disease** (GVHD) occurs if the donor cells (the graft) attack the healthy organs of the recipient (the host), leading to impaired organ function

Source: National Cancer Institute; Centers for Disease Control and Prevention; National Heart, Lung, and Blood Institute

FOR MORE INFORMATION

- National Heart, Lung, and Blood Institute
  www.nhlbi.nih.gov/health/dci/Diseases/bmsct/bmsct_all.html
- National Marrow Donor Program
  www.marrow.org

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To find this and other JAMA Patient Pages, go to the Patient Page link on *JAMA*'s Web site at www.jama.com. Many are available in English and Spanish. A Patient Page on acute myeloid leukemia was published in the June 10, 2009, issue; one on acute lymphoblastic leukemia was published in the January 28, 2009, issue; and one on lymphoma was published in the May 9, 2007, issue.

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