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## **[What is a Stem Cell Transplant \(Bone Marrow Transplant\)?](#) [1]**

**This section has been reviewed and approved by the [Cancer.Net Editorial Board](#) [2], 01/2016**

A stem cell transplant is a treatment for some types of cancer. For example, you might have one if you have leukemia, multiple myeloma, or some types of lymphoma. Doctors also treat some blood diseases with stem cell transplants.

In the past, patients who needed a stem cell transplant received a “bone marrow transplant” because the stem cells were collected from the bone marrow. Today, stem cells are usually collected from the blood, instead of the bone marrow. For this reason, they are now more commonly called stem cell transplants.

### **Why are bone marrow and stem cells important?**

A part of your bones called “bone marrow” makes blood cells. Marrow is the soft, spongy tissue inside bones. It contains cells called “hematopoietic” stem cells (pronounced he-mah-tuh-poy-ET-ick). These cells can turn into several other types of cells. They can turn into more bone marrow cells. Or they can turn into any type of blood cell.

Certain cancers and other diseases keep hematopoietic stem cells from developing normally. If they are not normal, neither are the blood cells that they make. A stem cell transplant gives you new stem cells. The new stem cells can make new, healthy blood cells.

## Types of stem cell transplant

The main types of stem cell transplants and other options are discussed below.

- **Autologous transplant.** Doctors call this an AUTO transplant. This type of stem cell transplant may also be called high-dose chemotherapy with autologous stem cell rescue.

In an AUTO transplant, you get your own stem cells after doctors treat the cancer. First, your health care team collects stem cells from your blood and freezes them. Next, you have powerful [chemotherapy](#) [3], and rarely, radiation therapy. Then, your health care team thaws your frozen stem cells. They put them back in your blood through a tube placed in a vein (IV).

It takes about 24 hours for your stem cells to reach the bone marrow. Then they start to grow, multiply, and help the marrow make healthy blood cells again.

- **Allogeneic transplantation.** Doctors call this an ALLO transplant.

In an ALLO transplant, you get another person's stem cells. It is important to find someone whose bone marrow matches yours. This is because you have certain proteins on your white blood cells called human leukocyte antigens (HLA). The best donor has HLA proteins as much like yours as possible.

Matching proteins make a serious condition called [graft-versus-host disease](#) [4] (GVHD) less likely. In GVHD, healthy cells from the transplant attack your cells. A brother or sister may be the best match. But another family member or volunteer might work.

Once you find a donor, you receive chemotherapy with or without radiation therapy. Next, you get the other person's stem cells through a tube placed in a vein (IV). The cells in an ALLO transplant are not typically frozen. So, doctors can give you the cells as soon after chemotherapy or radiation therapy as possible.

There are 2 types of ALLO transplants. The best type for each patient depends his or her age and health and the type of disease being treated.

- Ablative, which uses high-dose chemotherapy
- Reduced intensity, which uses milder doses of chemotherapy

If your health care team cannot find a matched adult donor, there are other options. Research is ongoing to determine which type of transplant will work best for different patients.

- **Umbilical cord blood transplant.** This may be an option if you cannot find a donor match. Cancer centers around the world use cord blood.
- **Parent-child transplant and haplotype mismatched transplant.** These types of transplants are being used more commonly. The match is 50%, instead of near 100%. Your donor might be a parent, child, brother, or sister.

## Choosing a transplant

Your doctor will recommend an AUTO or ALLO transplant based mostly on the disease you have. Other factors include the health of your bone marrow and your age and general health. For example, if you have cancer or other disease in your bone marrow, you will probably have an ALLO transplant. In this situation, doctors do not recommend using your own stem cells.

Choosing a transplant is complicated. You will need help from a doctor who specializes in transplants. So you might need to [travel to a center](#) [5] that does many stem cell transplants. Your donor might need to go, too. At the center, you talk with a transplant specialist and have an examination and tests. Before a transplant, you should also think about non-medical factors. These include:

- Who can care for you during treatment
- How long you will be away from work and family responsibilities
- If your insurance pays for the transplant
- Who can take you to transplant appointments

Your health care team can help you find answers to these questions.

## How a transplant works

The information below tells you the main parts of AUTO and ALLO transplants. Your health care team usually does the steps in order. But sometimes certain steps happen in advance, such as collecting stem cells. Ask your doctor what to expect before, during, and after a transplant.

## AUTO transplant timeline

## **Part 1: Collecting your stem cells**

- A doctor puts a thin tube called a “transplant catheter” in a large vein. The tube stays in until after the transplant. Your health care team will collect stem cells through this tube and give chemotherapy and other medications through the tube.
- You get injections of a medication to raise your number of white blood cells. White blood cells help your body fight infections.
- Your health care team collects stem cells, usually from your blood.

Time: 1 to 2 weeks

Where it’s done: Clinic or hospital building. You do not need to stay in the hospital overnight.

## **Part 2: Transplant treatment**

- You get high doses of chemotherapy, and rarely, radiation therapy.

Time: 5 to 10 days

Where it’s done: Clinic or hospital. At many transplant centers, patients need to stay in the hospital for the duration of the transplant, usually about 3 weeks. At some centers, patients receive treatment in the clinic and can come in every day.

## **Part 3: Getting your stem cells back**

- Doctors call this the “stem cell transfusion.” Your health care team puts your stem cells back in your blood through the transplant catheter.

Time: Each infusion usually takes less than 30 minutes. You may receive more than 1 infusion.

Where it’s done: Clinic or hospital.

## **Part 4: Recovery**

- You take antibiotics and other drugs. You get blood transfusions through your transplant catheter if needed. Your health care team helps with any transplant side effects.

Time: approximately 2 weeks

Where it's done: Clinic or hospital. You might be staying in the hospital or you might not.

## **ALLO transplant timeline**

### **Part 1: Collecting stem cells from your donor**

- The health care team gives your donor injections of a medication to increase white cells in the blood, if the cells are collected from blood. Some donors will donate bone marrow in the operating room during a procedure which takes several hours.

Time: Varies based on how the stem cells are collected

Where it's done: Clinic or hospital

### **Part 2: Transplant treatment**

- You get chemotherapy with or without radiation.

Time: 5 to 7 days

Where it's done: Many ALLO transplants are done in the hospital.

### **Part 3: Getting the donor cells**

- Doctors call this the "stem cell transfusion." Your health care team puts the donor's stem cells in your blood through the transplant catheter. It takes less than 1 hour. The transplant catheter stays in until after treatment.

Time: 1 day

Where it's done: Clinic or hospital.

### **Part 4: Recovery**

- You take antibiotics and other drugs. This includes medications to prevent graft-versus-host disease. You get blood transfusions through your catheter if needed. Your health care team takes care of any side effects from the transplant.
- After the transplant, patients visit the clinic frequently at first and less often over time.

Time: Varies

- For an ablative transplant, patients are usually in the hospital for about 4 weeks in total.
- For a reduced intensity transplant, patients are in the hospital or visit the clinic daily for about 1 week.

## **Milestones of successful transplant**

The words “successful transplant” might mean different things to you, your family, and your doctor. Below are 2 ways to measure transplant success.

**Your blood counts are back to safe levels.** A “blood count” is the number of red cells, white cells, and platelets in your blood. A transplant makes these numbers very low for 1 to 2 weeks. This causes risks of:

- Infection from low numbers of white cells, which fight infections
- Bleeding from low numbers of platelets, which stop bleeding
- Tiredness from low numbers of red cells, which carry oxygen

Doctors lower these risks by giving blood and platelet transfusions after a transplant. You also take antibiotics to help prevent infections. When the new stem cells multiply, they make more blood cells. Then your blood counts improve. This is one way to know if a transplant is a success.

**It controls your cancer.** Doctors do stem cell transplants with the goal of curing disease. A cure may be possible for some cancers, such as some types of leukemia and lymphoma. For other patients, remission is the best result. Remission is having no signs or symptoms of cancer. After a transplant, you need to see your doctor and have tests to watch for any signs of cancer or complications from the transplant.

## **Questions to ask the doctor**

[Talking often with the doctor](#) [6] is important. It gives you information to make health care decisions. The questions below may help you learn more about stem cell transplant. You can also ask other questions that are important to you.

- Which type of stem cell transplant would you recommend? Why?

- If I will have an ALLO transplant, how will we find a donor? What is the chance of a good match?
- What type of treatment will I have before the transplant? Will radiation therapy be used?
- How long will my treatment take? How long will I stay in the hospital?
- How will a transplant affect my life? Can I work? Can I exercise and do regular activities?
- How will we know if the transplant works?
- What if the transplant doesn't work? What if the cancer comes back?
- What are the side effects? This includes short-term, such as during treatment and shortly after. It also includes long-term, such as years later.
- What tests will I need later? How often will I need them?
- If I am worried about managing the costs of treatment, who can help me with these concerns?

## **More Information**

[Bone Marrow Aspiration and Biopsy](#) [7]

[Making Decisions About Cancer Treatment](#) [8]

[Donating Blood and Platelets](#) [9]

[Donating Umbilical Cord Blood](#) [10]

## **Additional Resources**

[Explore BMT](#) [11]

[Be the Match: National Marrow Donor Program](#) [12]

[Blood & Marrow Transplant Information Network](#) [13]

U.S. Department of Health and Human Services: [Understanding Transplantation as a Treatment Option](#) [14]

[National Bone Marrow Transplant Link](#) [15]

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## Links

- [1] <http://www.cancer.net/navigating-cancer-care/how-cancer-treated/bone-marrowstem-cell-transplantation/what-stem-cell-transplant-bone-marrow-transplant>
- [2] <http://www.cancer.net/about-us>
- [3] <http://www.cancer.net/node/24723>
- [4] <http://www.cancer.net/node/24674>
- [5] <http://www.cancer.net/node/31446>
- [6] <http://www.cancer.net/node/24958>
- [7] <http://www.cancer.net/node/24409>
- [8] <http://www.cancer.net/node/24582>
- [9] <http://www.cancer.net/node/24501>
- [10] <http://www.cancer.net/node/24503>
- [11] <http://www.explorebmt.org/>
- [12] <http://bethematch.org/>
- [13] <http://www.bmtinonet.org/>
- [14] [http://bloodcell.transplant.hrsa.gov/transplant/understanding\\_tx/index.html](http://bloodcell.transplant.hrsa.gov/transplant/understanding_tx/index.html)
- [15] <http://www.nbmtlink.org/>