

Blood and Marrow STEM CELL TRANSPLANT



WHAT YOU NEED TO KNOW

You or your loved one has been diagnosed with a type of blood cancer. One of the treatments your doctor may offer is a stem cell transplant (SCT). What does it mean and how does it work?

This fact sheet will help you:

- Get an overview of what your blood and bone marrow do
- Understand the different types of stem cell transplants
- Learn who is eligible for a stem cell transplant
- Find out how to prepare for a stem cell transplant
- Learn about recovery



A stem cell transplant may help a person with blood cancer live longer. It may even cure their cancer.

This treatment comes with serious risks – not everyone is eligible for it.

What your blood and bone marrow do

To understand SCT treatment, it helps to know more about your blood and bone marrow. Blood is the main transport system in your body. It makes up about 7% of your body weight. An average person has about 5 litres of blood. Here are the key parts of this system:

- **Bone marrow** is the soft, spongy material inside your bones where blood cells form. Blood passes through the marrow and picks up developed red and white cells and platelets to circulate.
- **Blood cells** begin as stem cells in the bone marrow. Stem cells grow and mature into:
 - **Red blood cells**, which contain a protein called hemoglobin that allows blood to carry oxygen from the lungs to all the tissues in your body
 - **White blood cells**, which help your body to fight infection
 - **Platelets**, which help your blood to clot (stop bleeding)
- **Plasma** is the liquid part of blood that contains the blood cells.
- **Blood stem cells** are immature cells that produce the body's blood cells. The stem cells mature into red blood cells, white blood cells, or platelets.

SCT in blood cancer treatment

- Most people who have a stem cell transplant have a blood cancer like leukemia, lymphoma, or myeloma.
- When your cancer or your treatment destroys your stem cells, your body can no longer produce enough new blood cells. These new cells are needed to live.
- If your bone marrow can't make enough new blood cells, you can have health problems such as infections, bleeding, or low red blood cell count (anemia). These can be serious enough to cause death.
- SCT can replace damaged and diseased stem cells with healthy stem cells. It can also restore your bone marrow's ability to make new blood cells.

What is a stem cell transplant?

Your body depends on stem cells to produce blood cells. With a stem cell transplant, you receive healthy stem cells to replace the ones that have been destroyed by cancer or by high doses of chemotherapy and/or radiation therapy.

The two main types of SCT used for blood cancers are:

- **Autologous:** The stem cells come from your own body, so you can receive high doses of chemotherapy, with or without radiation. The stem cells then restore your bone marrow's ability to make new blood cells and reset your immune system.
- **Allogeneic:** The stem cells come from a healthy person (the donor). They are used to replace stem cells in your bone marrow. This can provide a long-term cure.

A successful allogeneic transplant depends on how well the donor's tissue type matches your own. A blood test is done to look for human leukocyte antigens (HLA): this is known as HLA typing. A close match makes it more likely that a transplant will be successful.



Steps involved in a stem cell transplant

Collection

Stem cells are collected from one of three sources:

- **Bone marrow:** by a bone marrow aspiration (a surgical procedure done in an operating room)
- **Peripheral blood:** by a nonsurgical procedure, using the blood that circulates through your body (peripheral blood stem cell transplant); this is the most common source of stem cells
- **Umbilical cord:** by collecting the stem cells in the cord (umbilical cord blood transplant) after a baby is born



Conditioning

You are given one or more chemotherapy medications, with or without radiation therapy. **Chemotherapy** is given intravenously (IV) through a central venous catheter (a thin tube placed into a large vein). **Radiation** is total body irradiation: small doses of radiation are given to your entire body to destroy the cancer cells.

You may have side effects in the first few weeks to months after the stem cell transplant. These could include fatigue, muscle weakness, and a reduced appetite. You will be at higher risk of:

- Infections, easy bleeding and bruising, blood clots, and low red blood cell count (anemia)
- Nausea, vomiting, and hair loss
- Mouth sores, rashes, and swelling
- Damage to your heart, lungs, and liver

Infusion

The stem cells are added to your bloodstream through a central venous catheter. This process usually takes a few hours. The stem cells then travel to your bone marrow to make new blood cells. Engraftment means the new stem cells are working and starting to rebuild your immune system.

Three complications can arise:

- **Graft-versus-host disease (GVHD)** happens when the donor's T-cells (the graft) think your healthy cells are foreign bodies, so they attack and damage them. This is a potentially serious complication. A close blood match lowers this risk.
- **Graft failure** happens when the transplanted stem cells (the graft) fail to move into the bone marrow to make new blood cells. This is extremely rare in autologous SCT (stem cells from your own body).
- **Post-transplant lymphoproliferative disorder (PTLD)** is a group of rare disorders that cause out-of-control growth of lymphocytes with SCT from a donor. This is often caused by the Epstein-Barr virus, a type of herpes virus.



Are you a candidate?

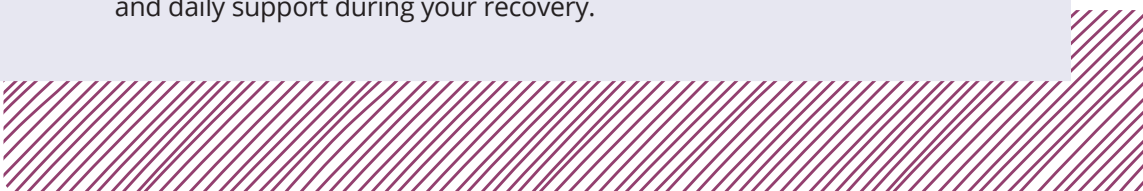
Your healthcare team will consider a number of factors to decide if you are a good candidate for a stem cell transplant:

- Your overall health
- Your type and stage of blood cancer
- Your history of cancer treatment
- Your age: older people are more likely to have complications
- How likely your cancer is to respond well to the transplant
- Whether a suitable donor is available, or you can use your own stem cells



Preparing for a stem cell transplant

Here are some things to consider and do to prepare for your stem cell transplant.

- **Medical tests:** Tests are done before the transplant to make sure you are healthy enough to have the procedure. These tests may include:
 - Blood tests
 - Bone marrow aspiration and biopsy
 - Chest x-ray
 - Computed tomography (CT or CAT) scans
 - Dental examination
 - Electrocardiogram (EKG)
 - Echocardiogram (ECHO)
 - Lumbar puncture
 - Pulmonary function test
 - Skeletal survey
 - Urine tests
 - **Fertility:** High doses of chemotherapy and radiation can affect reproductive cells in men and women. If you want to have children in the future, discuss options to preserve your fertility (such as harvesting and storing sperm or egg cells) before the transplant.
 - **Central venous catheter (CVC):** You will have a central line (central venous catheter) inserted through your skin into a large vein, usually in your upper chest.
 - **Arrange for a caregiver:** You need an adult to give you medical, emotional, and daily support during your recovery.
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After your stem cell transplant

Discharge

You are ready for discharge when:

- Engraftment has taken place. This means you are producing enough healthy white blood cells, red blood cells, and platelets.
- You have no signs of infection.
- You can tolerate medications.
- You are able to eat and drink to get enough fluids and nourishment.
- There are no severe treatment complications.
- You are medically stable and physically able to function outside the hospital.

Infection

Call your healthcare team right away if you have any symptoms of infection:

- Fever or chills
- Coughing, sneezing, runny nose, sore throat, or shortness of breath
- Nausea, vomiting, or diarrhea
- Blood in your urine or pain when you urinate
- A rash or cold sores

Follow-up

Follow-up is extremely important:

- If things are going well, the central venous catheter can be removed.
- At some visits, bone marrow aspirations and biopsies will be done to check blood cell growth in the bone marrow.
- For most people, the first few months to one year after transplant are a time of recovery. As you regain your strength, you may slowly start up your daily activities.



One year or more after transplant

Even after your cancer treatment has ended, you will need to schedule appointments with your cancer team for routine check-ups and health screenings.

Immunizations After the transplant, you will lose the protection you had from vaccines that you received as a child. You need to get those vaccines once your immune system has recovered.

Long-term complications Many transplant recipients have long-term side effects even years after the transplant. Examples include an underactive thyroid gland and depression. It is very important that you continue follow-up with your transplant team and your primary care provider in the years after transplant. This will help you get the right screenings and preventative care to maintain your health in the long term.



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