# Acute Lymphocytic Leukemia (ALL): Stem Cell Transplant

## What is a stem cell transplant?

Stem cells are immature cells that are the starter cells for all types of blood cells. A stem cell transplant uses stem cells to replace bone marrow that contains cancer. The bone marrow with cancer is first destroyed with high-dose chemotherapy (chemo). Sometimes this is done along with radiation to the whole body. Healthy stem cells are then put in the body. Over time, these stem cells will grow and become new, healthy bone marrow.

## When might a stem cell transplant be used for ALL?

A doctor may advise a stem cell transplant if:

- Your leukemia is no longer responding to standard treatment.
- Your leukemia responds to treatment but comes back.
- Your leukemia cells have certain changes that mean it will likely get worse more quickly.
- You are younger, healthy enough for a transplant, or both.
- You have a matched stem cell donor.

## Types of stem cell transplant

There are 2 kinds of stem cell transplants:

- **Allogeneic transplant.** This means the stem cells come from another person.
- **Autologous transplant.** This means the stem cells are collected from your own body and saved.

Allogeneic transplant is used for ALL. This means you get stem cells from a matched donor. In many cases, this may be a family member. But stem cells may also come from a matched, unrelated donor who has the same tissue type as you.

## What happens during a stem cell transplant for ALL

Stem cell transplant is a complex procedure that's hard on your body. Talk about the risks and benefits with your healthcare provider. If possible, it's best to wait for an induced remission and for chemo side effects to wear off before the transplant. Here is a general description of how a stem cell transplant is done:

## How stem cells are collected

# From the blood

This is the most common source of stem cells for a transplant. Your donor may get growth factor shots (injections) for a few days. This pushes their bone marrow to make a lot of stem cells and move them into their blood. The process for collecting stem cells from the blood is called apheresis. It’s a lot like giving blood, but it takes longer. A thin, flexible tube (catheter) is used to take blood from your donor's vein. It goes into a cell separation device that removes the stem cells. Then the rest of the blood is returned to the donor. This process may need to be done more than once to collect the right amount of cells.

# From the bone marrow

Stem cells may also be taken from your donor's bone marrow. This process is done while medicines are used to make your donor sleep and not feel pain (general anesthesia). A thick needle is used to make several holes (punctures) in the pelvic or hip bone. Then a syringe is used to pull out the bone marrow. These stem cells may be frozen until they are needed. Or they might be filtered and then sent right to you. The donor's hip bones may feel sore for a few days. Over the next month or so, the donor's body replaces all of the cells that were removed.

## Having the transplant

- You may be admitted to the hospital the day before the transplant process starts.
- After the chemo or radiation therapy is finished, you'll get the stored stem cells through a needle in your arm. This is a lot like getting a blood transfusion. You may have a strange taste in your mouth during the process. This is from the preservative used to freeze the stem cells.
- You'll then have to wait for your stem cells to start multiplying. You may have to limit your time around people to prevent getting an infection. Once part of your white blood cell count (absolute neutrophil count) reaches a safe level, you can often go home. This may happen in a few weeks, or it may take longer.
- You will need to take precautions to prevent infection while in the hospital and after you're home. Follow all instructions from your healthcare team.
- For the next few months, you'll need to have your blood drawn often to check your blood cell counts. This can be done on an outpatient basis.

## Possible short-term side effects

Most of the short-term side effects of a stem cell transplant are from the high doses of chemo or radiation. These should go away over time as you recover from the transplant. Common side effects can include:

- Infections
- Low blood cell counts
- Bleeding
- Low blood pressure
- Shortness of breath
- Chest pain or tightness
- Coughing
- Fever or chills
- Hair loss
- Nausea
- Vomiting
- Mouth sores
- Loss of appetite
- Diarrhea
- Severe tiredness (fatigue)
- Weakness

## Possible long-term side effects

Some side effects of a stem cell transplant may be long-lasting or show up many years later, such as:

- Growth of another kind of cancer
- Lung problems
- Damage to other organs, such as the heart, kidneys, or liver
- Lack of menstrual periods, which may mean ovary damage and inability to have children (infertility)
- Vision problems caused by damage to the lens of the eye (cataracts)
- Damage to joints including the hips, leading to the need for a hip replacement

Another possible long-term side effect is graft-versus-host disease. This can only occur with an allogeneic transplant. It happens when the immune system cells in the donor's stem cells attack your body. The cells can attack your skin, liver, gastrointestinal tract, mouth, or other organs. This can cause symptoms, such as:

- Skin rashes with itching and blistering
- Yellowing of the skin and eyes (jaundice)
- Severe diarrhea and belly cramps
- Nausea and vomiting
- Fatigue
- Muscle aches

## Making a decision

It's important to talk about the details of stem cell transplant with your healthcare provider. Make sure you understand the possible risks and benefits.