# Chronic Lymphocytic Leukemia (CLL): Stem Cell Transplant

## What is a stem cell transplant?

Stem cells are immature cells that are the starter cells for all types of body 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. 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 that makes healthy blood cells.

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

Stem cell transplants are not often used for CLL. But researchers are looking at how helpful they might be. If a stem cell transplant is used, it's likely part of a clinical trial. A stem cell transplant might be suggested if:

- Your CLL is no longer responding to standard treatment.
- Your CLL responded to treatment but came back quickly.
- Your CLL cells have certain factors that mean it will likely get worse more quickly.
- You are younger and healthy enough to go through transplant.

## Types of stem cell transplants

There are two 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 CLL. 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 CLL?

Stem cell transplant is a complex procedure that's hard on your body. It's done only by healthcare providers with special training. Discuss the risks and benefits with your provider. If you decide to have a transplant, go to a hospital that specializes in stem cell transplants, such as a major cancer center. The procedure is also expensive. Make sure to check with your insurance provider to see how much of it will be covered.

If possible, it's best to wait until the CLL is in remission. The following is a general description of how a stem cell transplant is done:

## How stem cells are collected

Stem cells may be collected in two ways.

# From the blood

This is the most common source of stem cells for a transplant. Your donor may get growth factor shots (injection) for several 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 get 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 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 several 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.
- You will be given chemotherapy, and maybe radiation therapy, to kill the stem cells in your bone marrow.
- After the chemotherapy 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 and take special precautions to prevent getting an infection. Once part of your white blood cell count (the absolute neutrophil count or ANC) reaches a safe level, you can usually go home. This may happen within several weeks, or it may take longer. Sometimes you can have this done as an outpatient.
- 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.

### What is a mini-transplant?

A mini-transplant is a type of allogeneic transplant that's sometimes used for a person with high-risk CLL who's older or isn't well enough to have a standard stem cell transplant. It’s also called a non-myeloablative transplant or a reduced-intensity allogeneic transplant.

The treatment is done with lower doses of chemotherapy and radiation. This doesn't fully destroy the cells in the bone marrow. It’s just enough to suppress or weaken the immune system. Then you get donor stem cells. These stem cells take over the bone marrow. They develop an immune reaction to the person's remaining stem cells and any remaining CLL cells and kill them. Because this treatment uses lower doses of chemotherapy or radiation, it often has less severe side effects.

### Possible short-term side effects

Most of the short-term side effects of a stem cell transplant are from the high doses of chemotherapy 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
- 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:

- Bone pain
- Growth of another kind of cancer
- Lung problems
- Damage to other organs, like the heart, kidneys, or liver
- Lack of menstrual periods. This may mean ovary damage and infertility.
- Vision problems caused by damage to the lens of the eye (cataracts)

Another possible long-term side effect is graft-versus-host disease (GVHD). This can occur only 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 (GI) tract, mouth, or other organs. This can cause symptoms like:

- Skin rashes with itching and blistering
- Yellowing of the skin and eyes (jaundice)
- Severe diarrhea and belly cramps
- Nausea and vomiting
- Damage to the liver, kidneys, or other organs
- Fatigue
- Muscle aches

## Talking with your healthcare provider

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