'Self' (autologous) stem cell transplants

This page is about stem cell transplants that use your own stem cells ('autologous' stem cell transplants). Most stem cell transplants for lymphoma are autologous transplants. Some people have stem cells from a donor ('allogeneic' stem cell transplants).

On this page

What is a 'self' (autologous) stem cell transplant?

What's involved?

What happens afterwards?

What is 'self' (autologous) stem cell transplant and when is it done?

A stem cell transplant replaces your blood stem cells (cells that can make new blood cells) if they have been destroyed by high-dose chemotherapy. 'Autologous' means something that 'comes from you', as opposed to someone else. In an autologous stem cell transplant, your own blood stem cells are collected and stored. You are then given high-dose anti-cancer treatment after which your own blood stem cells are given back to you.
A stem cell transplant allows your doctor to give you high-dose treatment in a way that still makes it possible for you to make new blood cells. For some people, this is more likely to cure their lymphoma or make their remission (no evidence of lymphoma) last longer than is standard chemotherapy.

You might have a stem cell transplant:

- as part of your first treatment, if your doctor thinks your lymphoma is likely to **relapse** (come back)
- if your lymphoma relapses after previous treatment
- if your lymphoma is **refractory** (doesn’t respond) to previous treatment.

This kind of treatment is sometimes called ‘high-dose therapy and stem cell support’ or ‘high-dose therapy and stem cell rescue’.

A stem cell transplant is an intensive form of treatment and requires a lot of **preparation**. Afterwards, it can take many months to fully recover.

You may like to watch our video, in which Hannah shares her experience of autologous stem cell transplant.

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**What’s involved in an autologous stem cell transplant?**

Autologous stem cell transplants follow a pathway:

- **preparation**
- **stem cell mobilisation** (movement)
- **stem cell collection** (harvest)
- **high-dose anti-cancer therapy** (conditioning)
- **stem cell transfusion**
- **waiting for blood counts to recover** (engraftment).
Preparation

The weeks and months before your stem cell transplant involve a great deal of preparation. You have:

- Discussions with your medical team about what is involved.
- Tests to make sure you are well enough to have a stem cell transplant. These include blood tests and tests to check how well your organs are working, eg your lungs, heart and kidneys.
- Fitting of a central venous catheter (sometimes called a ‘central line’, eg a PICC line or Hickman® or Groshong® line). This is a line (thin tube) in your vein that stays in place throughout your treatment making it easier for your medical team to give you drugs.
- Other tests and scans to check on your lymphoma if needed.
- Chemotherapy, if needed, to reduce your lymphoma as much as possible. Chemotherapy can also stimulate your bone marrow to make more stem cells as it recovers, which can help with stem cell mobilisation (movement).

High-dose treatment could affect your fertility. Speak to your doctor about whether this is likely and about how you can preserve your fertility.

As part of your preparation for your transplant, think about the support you might need at home and work during your treatment and recovery. Your medical team can give you advice on this. It usually takes 3–6 months to recover from an autologous stem cell transplant and many people do not feel well enough to return to work during this time.

Stem cell movement

Your stem cells are collected from your bloodstream. Before this happens, you need treatment to move your stem cells from your bone marrow to your bloodstream – you might hear this called ‘mobilisation’.

During this stage, you have daily injections of a naturally occurring growth factor, eg G-CSF. Growth factor stimulates production of stem cells in your bone marrow and helps the stem cells move into your bloodstream. You don’t need to go to hospital for the injections. Your medical team can show
you, or someone else, how to do them at home or can arrange for a nurse to do them for you.

Most people have few side effects. The most common side effect of G-CSF are muscle and bone aches and pains. You might find paracetamol helpful if you do have pain, but you may need something stronger. Your medical team can advise you which painkillers are suitable for you and can give you more information about any other side effects you might experience.

In people with lymphoma, G-CSF injections are usually given a few days after chemotherapy. The chemotherapy helps reduce your lymphoma as much as possible. It can also increase your number of stem cells.

The exact number of injections needed varies, but you usually have growth factor injections for 7–10 days. Regular blood tests are done to see how your blood counts are responding. As your white blood cell count starts rising, your stem cells are collected.

Your doctor might suggest other treatments to move your stem cells into your bloodstream, often together with growth factors. Other treatments might be needed if your first course of treatment doesn’t move enough stem cells.

**Stem cell collection**

When you have enough stem cells in your bloodstream, they are collected using a machine called a ‘cell separator’. You might hear the term ‘stem cell harvest’ used to describe this. Your blood is taken from a line in one arm and passed through the machine. The cell separator collects stem cells and the rest of your blood is returned into your other arm. This process takes a few hours.
The stem cells are measured, frozen and stored. If not enough stem cells are collected, you might be given another dose of G-CSF. You are then asked to return the next day to have more stem cells collected. Some people who don’t have enough stem cells in their bloodstream may also be given plerixafor (Mozobil™), which causes stem cells to be released into the blood. It can take 1–3 days to collect enough stem cells for a transplant.
Some people do not have enough stem cells collected for a stem cell transplant. Should this be the case for you, your doctor will discuss your options with you. Rarely, it might be possible to collect stem cells directly from your bone marrow or you might be able to have an allogeneic stem cell transplant, which uses donor cells.

**High-dose anti-cancer treatment**

A few days before your transplant, you are admitted to hospital for your high-dose anti-cancer treatment:

- Most people with lymphoma have high-dose chemotherapy.
- Some people also have total body irradiation or TBI (whole-body radiotherapy) just after or before their chemotherapy.

You might hear this stage called ‘conditioning’.

BEAM chemotherapy is often used as the high-dose treatment:

- **B** – BiCNU® or BCNU or carmustine
- **E** – etoposide
- **A** – Ara-C or cytarabine
- **M** – melphalan.

You have these chemotherapy drugs for a week. There is more information about BEAM and the side effects it can cause available from Macmillan Cancer Support.

You might have a different chemotherapy regimen. Your medical team should give you more information about your high-dose treatment, including what drugs you are having and what side effects you might experience.

After your high-dose treatment, you usually have to wait about a day for the chemotherapy to leave your system before you have your stem cell transfusion. You might have your stem cell transfusion sooner or later than this depending what chemotherapy drugs you had.
Stem cell transfusion

On the day of your transplant, your stem cells are thawed out and given back to you through your central line. It is a very straightforward procedure that takes around 1–2 hours, depending on the number of bags of stem cells you need to have.

You are monitored while the stem cells are given. They can be given more slowly if you feel unwell. Please tell the nurse if you have any problems.

Your medical team usually call your transplant day ‘day zero’. They measure your recovery time starting from this day.

Waiting for engraftment

The stem cells make their way from your blood to your bone marrow where they start to make new blood cells. This process is called ‘engraftment’. It takes around 8–12 days for the first blood cells to appear in your blood following engraftment. It can take longer. You can usually only go home when your body is making enough new blood cells.

While you are waiting for your blood counts to recover, you have supportive care treatments. These help to protect your body while your blood counts are low and to treat the side effects of your high-dose treatment. You might have:

- **Blood transfusions** if you are **anaemic** (low red blood cells). Anaemia can make you very tired and sometimes short of breath.
- Platelet transfusions if you have **thrombocytopenia** (low platelets). Platelets help with blood clotting. Tell your nurse if you notice any signs of bleeding like blood in your urine or faeces (poo), bleeding gums or a nosebleed.
- Treatments for side effects from your high-dose treatment, like **sore mouth, diarrhoea, nausea and vomiting**. Radiotherapy can cause **sore skin**, similar to sunburn.
When your levels of neutrophils (a type of white blood cell) are low, this is called ‘neutropenia’. Neutrophils fight infection, so you are at high risk of infection while they are low. You can’t have transfusions of neutrophils as they can react against your other cells and don’t last long in your bloodstream. Measures to reduce your risk of infection include:

- close monitoring for signs of infection. Please note, you might have an infection without an increase in temperature or pulse so tell your nurses if you feel unwell.
- good hygiene – your room should be cleaned every day and you must shower and wash your hands regularly.
- treatments to prevent infection, like antibiotics and mouthwashes.
- another growth factor injection to boost your blood counts, usually 7 days after your transplant.
- eating the right things (sometimes called a ‘neutropenic diet’) – some foods are not recommended because they are more likely to carry bacteria, eg unpasteurised cheese and takeaway food.
- rules for visitors, especially in the days just after your transplant.

People with an infection shouldn’t visit and some hospitals ask that young children don’t visit at all. Visitors might be asked to wear protective clothing and should always wash their hands and use an antibacterial hand rub when visiting. You are not allowed flowers or plants in your room as they can increase your risk of infection.

What happens after autologous stem cell transplant?

Most people go home 2–3 weeks after having their stem cell transplant. However, it can be longer, particularly if you develop a serious infection or other complications.

You are seen in the clinic every week at first to check your blood counts are recovering well. You then have appointments each month. Around 3 months after your transplant you are likely to have a CT scan or PET/CT scan to see how the lymphoma has responded to the treatment.
You have regular tests to check on your recovery. Gradually, you are seen less often. Your follow-up appointments are to check that your lymphoma has not relapsed (come back) and to look out for late effects (side effects that develop months or years after treatment).

Although you might be allowed home in just a couple of weeks, it takes 3–6 months for you to recover completely. Your blood counts may still be low. It is also likely that you will still be having side effects from your high-dose treatment. You may therefore feel unwell and very tired. Give yourself time to recover. Most people feel well enough to return to work between 3 and 6 months after their transplant.

It is very important that you are aware that you are more likely to get an infection while you are recovering from a stem cell transplant. Make sure you know what to look out for and how to reduce the risk of getting an infection. Your medical team should give you numbers to call at any time of day if you are worried.

If you have thrombocytopenia (low platelets), you are at increased risk of bruising and bleeding. Take precautions to avoid injuring yourself and contact your medical team if you have any signs of bleeding.

Your medical team should advise you on other factors you should consider during your recovery. These might include:

- **taking care of your skin** and protecting it from the sun – your skin may be more sensitive than usual for many months. You also have a slightly higher risk of skin cancer so it is important that you protect your skin.
- **exercise** – keeping active helps recovery. Start with gentle exercise and ask your medical team what type and intensity of exercise is safe.
- **travel** – if you plan to travel, ask your doctor when it is safe to do so. Many travel insurance companies don’t cover people for some time after their stem cell transplant.

Recovering from a stem cell transplant can be a difficult time. You might find our information on living with lymphoma helpful.

We also have online forums where you can ask questions and get support from other people affected by lymphoma or a stem cell transplant.
References

These are some of the sources we used to prepare this information. The full list of sources is available on request. Please contact us by email at publications@lymphoma-action.org.uk or phone on 01296 619409 if you would like a copy.


Further reading

- Stem cell transplants
- Donor (allogeneic) stem cell transplants
- Chemotherapy regimens
- The immune system
- Glossary
- Living with lymphoma
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