

Stem cell transplant

A stem cell transplant is used to increase the chance of a cure or remission for various cancers and blood disorders.

It usually involves intense chemotherapy followed by an infusion of stem cells. The treatment requires close nursing and medical care for a number of weeks. It can be a gruelling treatment and there are risks. Your specialist can advise when the likely benefits of this procedure outweigh the risks.

There is now a great deal of research about using stem cell transplants for many other conditions - for example, damage to heart tissue (such as after a heart attack) or for damage to the nervous system (such as dementia or Parkinson's disease).

What is a stem cell transplant?

A stem cell transplant may be used so that you can have intensive high-dose [chemotherapy](#) (and sometimes [radiotherapy](#)) to kill cancerous cells. The chemotherapy is higher than conventional chemotherapy and also kills the stem cells in the bone marrow that would normally make blood cells. Therefore, following the chemotherapy, you are given back (transplanted) stem cells which can then make normal blood cells again.

A stem cell transplant is sometimes called a bone marrow transplant. However, stem cells can be obtained from blood as well as from the bone marrow. So, the term stem cell transplant is now used.

What is the bone marrow, and what are stem cells and blood cells?

Bone marrow

Blood cells are made in the bone marrow, by stem cells. Bone marrow is the soft sponge-like material in the centre of bones. Large flat bones such as the breastbone (sternum) and pelvis contain the most bone marrow. To make blood cells constantly you need a healthy bone marrow. You also need nutrients from your diet, including iron and some vitamins.

Stem cells

Stem cells are immature (primitive) cells. There are two main types in the bone marrow - myeloid and lymphoid stem cells. These derive from even more primitive cells called common pluripotent stem cells. Stem cells constantly divide and produce new cells. Some new cells remain as stem cells and others go through a series of maturing stages (precursor or blast cells) before forming into fully formed (mature) blood cells.

Blood cells

Mature blood cells are released from the bone marrow into the bloodstream. Mature blood cells are red cells (erythrocytes), white cells (leukocytes) and platelets. [See the separate leaflet called Blood.](#)

Stem cells rapidly multiply to make millions of blood cells each day. Because of this they are more easily killed by chemotherapy than most other cells in the body. This is because chemotherapy medicines work by killing rapidly dividing cells (such as cancer cells).

When is a stem cell transplant used for treatment?

A stem cell transplant is an option which is considered for various cancer conditions, especially [blood cancers](#). Examples include:

- [Leukaemia](#).
- Lymphoma ([Hodgkin's lymphoma](#) or [non-Hodgkin's lymphoma](#)).
- [Myeloma](#).

Your specialist will advise when it may be an appropriate option. As a rule, it is not often a first-line treatment.

Conventional chemotherapy or other treatments tend to be used first. However, the treatment of cancer and leukaemia is a changing and developing area of medicine. Techniques such as stem cell transplant continue to be refined and improved and may be considered in various different circumstances.

The higher doses of chemotherapy and radiotherapy that can be used in conjunction with a stem cell transplant can improve the chance of a cure for some conditions in certain circumstances.

There is now a great deal of research about using stem cell transplants for many other conditions. For example:

- For damage to heart tissue (for example, after a heart attack).
- For damage to the nervous system (for example, dementia or Parkinson's disease).
- For the treatment of [diabetic foot ulcers](#).
- In the management of [sickle cell disease](#).

Where are stem cells obtained from?

An autologous transplant

This means that the stem cells used for the transplant come from your own body. They are usually collected when you are free of any sign of disease (when you are in remission) following conventional chemotherapy or other treatments. The stem cells can be used soon after being collected. They can also be frozen, stored and used in the future if needed. An autologous stem cell transplant is also called stem cell support, as the stem cells come from your own body. So, strictly speaking, it is not a transplant from a donor.

An allogenic transplant

This means the stem cells used for the transplant come from someone else – a donor. This is often a close relative such as a brother or sister where there is a good chance of a close match. Unrelated donors are sometimes matched to people needing a transplant.

Stem cells can be collected:

- From the bone marrow. This involves a small operation to collect some marrow from the pelvic bone.
- From the blood. Some stem cells occur in the blood (most are in the bone marrow). The stem cells in the blood can be collected (harvested) by a machine called a cell separator. The blood flow is diverted from a vein in the arm to pass through the machine which separates out the stem cells. The procedure takes about 4–6 hours. Medicines are given for a few days before this procedure to stimulate the body to make more stem cells in the bone marrow which spill out into the blood.
- From blood taken from the umbilical cord of a newborn baby.

How is a stem cell transplant performed?

It is very similar to a blood transfusion. Following the intense course of chemotherapy (and sometimes radiotherapy), the solution containing stem cells is given into one of your veins via a drip. The stem cells travel through your bloodstream and end up in your bone marrow. Here they start to make blood cells.

It can take several weeks for your bone marrow to recover, to take up the transplanted stem cells and to make enough new blood cells. During this time you will need to be in hospital and be closely monitored. You may need several blood transfusions during this time until you are making enough blood cells. Antibiotic medicines are given to minimise the risk of infection. Also, medicines are given to help the stem cells to multiply as quickly as possible.

Stem cell transplant risks

There is a risk of serious problems with a stem cell transplant. For example:

- Infection is the main risk. Following the intense chemotherapy, and before the time your bone marrow is working again, you have very low immunity. During this time you are at risk of serious and life-threatening infections. This is why antibiotics are given and you will be nursed away from other people until your bone marrow recovers. This can take several weeks.

- Bleeding problems from the low level of platelets after the chemotherapy.
- If you have a transplant from a donor, there is some risk that the match will not be perfect, and the donor cells may react with your body's cells. This is called graft-versus-host disease. This is not always serious but sometimes it can be.
- Rarely, the transplanted stem cells fail to work.
- There is a risk of short-term and long-term side-effects from intense chemotherapy (and/or radiotherapy).

Your specialist will discuss with you the risks and possible side-effects of a stem cell transplant.

Further reading

- [Guideline on the Management of Primary Resistant and Relapsed Classical Hodgkin Lymphoma](#); British Committee for Standards in Haematology and the British Society of Blood and Marrow Transplantation (2013)
- [Bone Marrow Transplantation and Peripheral Blood Stem Cell Transplantation](#); National Cancer Institute (US)
- [Hodgkin's lymphoma: ESMO Clinical Practice Guidelines for diagnosis treatment and follow-up](#); European Society for Medical Oncology (2014)
- [Myeloma: diagnosis and management](#); NICE Guidance, (February 2016 – last updated October 2018)
- [Haematological cancers: improving outcomes](#); NICE Guidance (May 2016)
- [Non-Hodgkin's lymphoma: diagnosis and management](#); NICE Guideline (July 2016)
- [Multiple myeloma: diagnosis, treatment and follow-up](#); ESMO Clinical Practice Guideline (2017)
- [Ansell SM](#); Hodgkin lymphoma: 2016 update on diagnosis, risk-stratification, and management. *Am J Hematol.* 2016 Jun;91(4):434-42. doi: 10.1002/ajh.24272.
- [Inamoto Y, Lee SJ](#); Late effects of blood and marrow transplantation. *Haematologica.* 2017 Apr;102(4):614-625. doi: 10.3324/haematol.2016.150250. Epub 2017 Feb 23.
- [Zhang Y, Deng H, Tang Z](#); Efficacy of Cellular Therapy for Diabetic Foot Ulcer: A Meta-Analysis of Randomized Controlled Clinical Trials. *Cell Transplant.* 2017 Dec;26(12):1931-1939. doi: 10.1177/0963689717738013.

Disclaimer: This article is for information only and should not be used for the diagnosis or treatment of medical conditions. Egton Medical Information Systems Limited has used all reasonable care in compiling the information but makes no warranty as to its accuracy. Consult a doctor or other healthcare professional for diagnosis and treatment of medical conditions. For details see our [conditions](#).

Authored by:	Peer Reviewed by: Dr Adrian Bonsall, MBBS	
Originally Published: 19/11/2023	Next review date: 26/03/2018	Document ID: doc_4885

View this article online at: patient.info/cancer/blood-cancers/stem-cell-transplant

Discuss Stem cell transplant and find more trusted resources at [Patient](#).



To find out more visit www.patientaccess.com
or download the app



Follow us

