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## What is Stem Cell Transplantation?

Stem Cell Transplantation/ Bone Marrow Transplant, also known as haematopoietic stem cell transplantation, refers to a highly specialised procedure where stem cells are transplanted into the body for treatment of cancers or blood disorders.

Stem cells have the ability to:

- Renew by dividing themselves and creating more stem cells of their kind
- Mature into specialised cells that carry out a specific function

Because haematopoietic stem cells can grow into any of the cells found in the bloodstream, they can produce the cells that the body and immune system need to function. This makes it an exciting medical advancement and over a million transplants have been performed since the procedure was accepted in the early 1950s.

## What conditions can benefit from a transplant?

The procedure has been used successfully around the world in the treatment of certain cancers as well as blood and autoimmune disorders, including:

- **Acute Lymphoblastic Leukaemia (ALL)**
- **Acute Myeloid Leukaemia (AML)**
- **Lymphoma**
- **Myeloma**
- Aplastic Anaemia
- Autoimmune Disorders
- Certain solid tumours

## Are you a candidate for Stem Cell Transplantation?

Our team of experts will work with you to determine if you are a suitable candidate for stem cell transplantation. The evaluation process may include the following:

- Review of your medical history
- Blood tests
- Imaging scans, including chest X-rays and computed tomography (CT) scans
- Tests to check your heart, lung and other organ functions
- Bone marrow **biopsy**, which gives us a deeper understanding of your condition
- Psychosocial evaluation

## Types of Stem Cell Transplants

This is based on who gives the stem cells.

- Autologous transplants use stem cells from your own bone marrow or blood. Your bone marrow/blood stem cells are harvested and stored in advance. When you are admitted for the autologous transplant, you are usually given a course of high dose chemotherapy over several days with the aim to clear any remaining cancer cells, prior to the stem cell infusion.
- Syngeneic transplants use stem cells from an identical twin.

## What are the stages of the procedure?

### Stages of Stem Cell Transplant

by Centre for Clinical Haematology

The process of receiving a Stem Cell Transplant involves 4 main stages. The procedure has been used successfully around the world in the treatment of certain cancers as well as blood and autoimmune disorders.



1

Conditioning

The patient receives chemotherapy and/or radiation to kill the diseased cells and to change the immune system. The name of the therapy is based on the type of transplant. For an allogeneic or syngeneic transplant, it is usually called conditioning therapy or a conditioning regimen. For an autologous transplant, it is usually called intensive therapy.



2

Harvesting

This is the process of collecting or removing stem cells. The stem cells can come from the bone marrow, the peripheral blood or the umbilical cord (from a newborn). For autologous transplants, the stem cells are usually collected when the person is in remission and has recovered from other treatments.



3

Infusion

Healthy stem cells are infused into the body to replace the damaged cells. This is a non-surgical procedure similar to blood transfusion. A painless process in which stem cells are transplanted into the patient through intravenous (IV) infusion, the side effects from this procedure are rare.



4

Engraftment

Engraftment is a step in a successful stem cell transplant. The transplanted stem cells begin to grow and produce healthy red and white blood cells and platelets over the course of two to four weeks. During this process, the stem cells or marrow is given as an intravenous transfusion.

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- **Conditioning**

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- Conditioning or intensive therapy is used to:

- destroy any cancer cells that are still in the body
- make room in the bone marrow for the donor stem cells
- suppress your immune system to lower the chance of rejecting the transplanted stem cells

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It takes about 12-15 days prior to the infusion for stem cells to start producing new blood cells. Medication may be given during this time to boost the process of blood cell production. New cells include red blood cells, white blood cells, and platelets. Once production begins, engraftment is said to have taken place.

During this time, you may feel tired and weak. You are at risk of fever, infection, bleeding, damage to the organs and dietary problems. You will be kept isolated in a hospital room because of the increased risk of infection. You will have daily blood tests and regular temperature checks, and will be monitored for bleeding, nausea, vomiting, diarrhoea and any other problems.

CFCH has an experienced team of specialists that can provide you with a rapid diagnosis and treatment plan. Do weigh your options of cancer treatments in Singapore carefully.

## Recovery

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It may take a longer time for the bone marrow to recover after an allogeneic transplant than an autologous transplant. The hospital stay is often longer too. The reason is because an allogeneic transplant is a more intensive procedure, and it uses stem cells from a donor instead of your own stem cells.

Some patients may be required to stay in the hospital longer, should problems develop. The rate of recovery depends on your physical condition before the transplant, and the side effects you may have.

Many patients will not experience major problems after leaving the hospital, but it may still take up to a year to recover. It is normal to feel tired and weak for a few months. When you are discharged from hospital, our team will inform you of the necessary precautions including:

- preparing your home, making it safe
- foods you should and should not eat
- activities you can and cannot do
- how to care for your mouth and teeth
- when to call the transplant team for further assistance

### *Disclaimer:*

*The information on the Centre For Clinical Haematology website is intended for educational use. It should not be considered or used as a substitute for medical advice, diagnosis or treatment from a qualified health professional.*