stored. After you receive treatment to remove leukemia cells from your marrow, your stem cells will then be thawed and returned to you.

- From a family member or other donor: An allogeneic stem cell transplant uses healthy stem cells from a donor. Your brother, sister, or parent may be the donor. Sometimes the stem cells come from a donor who isn't related. Doctors use blood tests to learn how closely a donor's cells match your cells.

- From your identical twin: If you have an identical twin, a syngeneic stem cell transplant uses stem cells from your healthy twin.

After the transplant, the new blood cells will then develop from the transplanted stem cells and replace those that were destroyed by the treatment. You may have to stay in the hospital for several weeks or months to recuperate. The time needed differs for individuals.

ABOUT NCIS

The National University Cancer Institute, Singapore (NCIS) is the only comprehensive public cancer centre in Singapore treating both paediatric and adult cancers in one facility. Located at the National University Hospital (NUH), NCIS offers a broad spectrum of cancer care with expertise in prevention, screening, diagnosis, treatment, rehabilitation and palliative care.

CONTACT INFORMATION

National University Cancer Institute, Singapore (NCIS)

Radiation Therapy Centre and Breast Care Centre
NUH Medical Centre, Level 8
Chemotherapy Centre and Stem Cell Therapy Centre
NUH Medical Centre, Level 9
Cancer Centre
NUH Medical Centre, Level 10

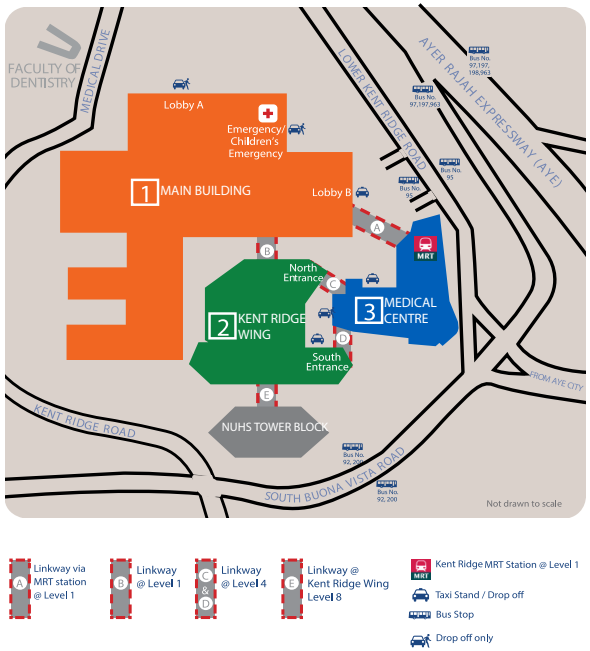
Opening Hours: 8:30am – 5:30pm
(Mon – Fri: except on Public Holidays)

For appointments, please contact
Tel: (65) 6773 7888 Email: CancerApptLine@nuhs.edu.sg

For International Patients and Visitors
The International Patient Liaison Centre (IPLC) is a one-stop centre to support all the medical needs of our foreign patients.

Tel: (65) 6779 2777 (24-hour Helpline) Fax: (65) 6777 8065
Website: www.nuh.com.sg/iplc

For all other general enquiries, please contact
National University Cancer Institute, Singapore (NCIS)
1E Kent Ridge Road,
NUHS Tower Block, Level 7, Singapore 119228
Email: ncis@nuhs.edu.sg
Website: www.ncis.com.sg



Nearest MRT Station : Kent Ridge Station (Circle Line)
Commuters can alight at the Kent Ridge Station, right at the doorstep of the NUH Medical Centre. Please exit the station via Exit C. NCIS is located on levels 8, 9 and 10 which are accessible via Lift Lobby B.

For more information on directions to NUH, log on to www.nuh.com.sg.

For more information on specific directions to NCIS Clinics, log on to www.ncis.com.sg.

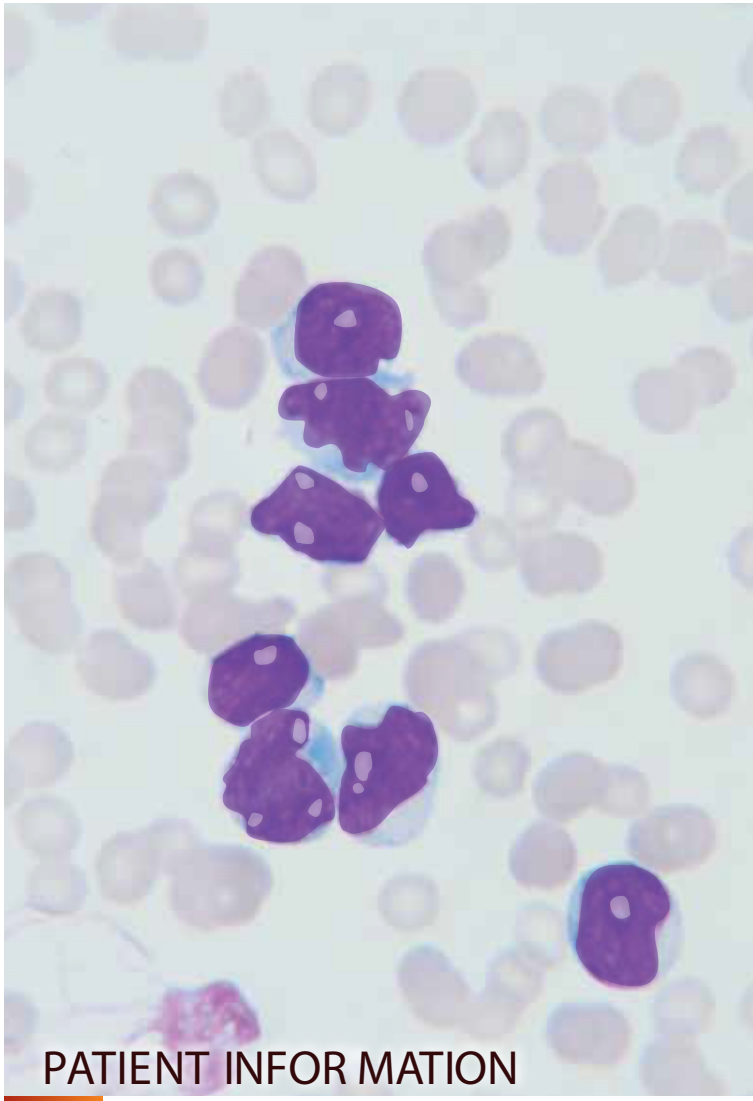
NUH National University Hospital

National University Hospital
5 Lower Kent Ridge Road,
Singapore 119074
Tel: (65) 6779 5555
Fax: (65) 6779 5678
Website: www.nuh.com.sg

Information in this brochure is given as a guide only and does not replace medical advice from your doctor. Please seek advice from your doctor if you have questions related to the surgery, your health or medical condition.

Information is correct at time of printing (Oct 2012) and subject to revision without notice.

National University Cancer Institute, Singapore



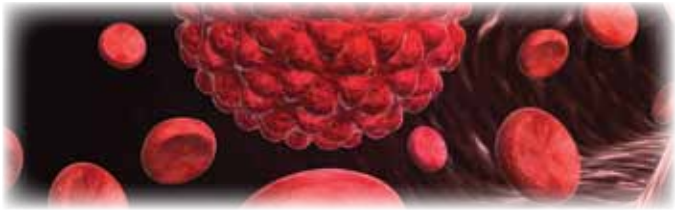
PATIENT INFORMATION

ABOUT LEUKEMIA

A member of the NUHS

WHAT IS LEUKEMIA?

Leukemia is cancer of the blood cells. It starts in the bone marrow, where blood cells are made. It causes an uncontrolled production of abnormal white blood cells, called leukemia cells. These cells do not function normally and over time, they crowd out the normal blood cells and usually lead to anemia, bleeding and infections.



WHO IS AT RISK?

- Prior exposure to chemotherapy and radiation therapy due to treatment for other cancers
- Genetic abnormalities such as down syndrome
- Exposure to intense radiation and certain chemicals
- Exposure to viruses like the Human T-Cell Leukemia virus

People who think they may be at risk should discuss this with their doctor.

WHAT ARE THE TYPES OF LEUKEMIA?

Leukemia is usually grouped into either chronic (conditions get worse slowly) or acute (conditions get worse quickly). This can be further sub-grouped into the following:

- Acute myelogenous leukemia (AML) is the most common type of leukemia
- Acute lymphocytic leukemia (ALL) is the most common type of leukemia in young children
- Chronic lymphocytic leukemia (CLL) is a common adult leukemia
- Chronic myelogenous leukemia (CML) mainly affects adults

The different types of leukemia will in turn determine the symptoms and ultimately the treatment prescribed.

WHAT ARE THE SIGNS AND SYMPTOMS?

Patients who have chronic leukemia may not experience any symptoms and their condition is usually detected from routine blood tests. However, for patients with acute leukemia, and as the conditions worsen for chronic leukemia patients, symptoms may include:

- Fever or chills
- Persistent fatigue or weakness
- Loss of appetite or weight
- Swollen lymph nodes, enlarged liver or spleen
- Easy bleeding or bruising or tiny red spots in your skin (petechiae)
- Shortness of breath or excessive sweating especially at night
- Bone pain or tenderness
- Frequent infections

Most often these symptoms can also be caused by problems other than cancer, only a doctor can tell for sure. For an accurate diagnosis, a doctor should be consulted if the symptoms above occur.

HOW IS LEUKEMIA DIAGNOSED?

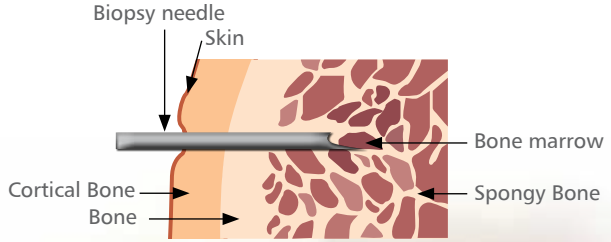
If you experience any of the symptoms mentioned, the doctor will need to run some tests to find out what is causing the problems. Your doctor may ask about your personal and family medical history.

You may have one or more of the following tests:

- **Physical Exam**: Your doctor checks for swollen lymph nodes, spleen, or liver.

- **Blood tests**: Your doctor will do a complete blood count to check the number of white blood cells, red blood cells, and platelets. Leukemia causes a very high level of white blood cells, and may also lead to low levels of platelets and haemoglobin, which is found inside red blood cells.

- **Biopsy**: A biopsy is the removal of tissue or fluid to look for cancer cells. Your doctor may suggest either a bone marrow aspiration (removing samples of the bone marrow fluid) or a bone marrow biopsy (removing a small piece of tissue or bone). After the samples are taken, the tissue will be checked for leukemia cells.



If leukemia cells are found, the next step is to run other tests to determine what type of leukemia you have or other signs of problem.

WHAT ARE THE TREATMENT OPTIONS?

There are different treatments available depending on the type of leukemia. Other factors include your age, your overall health, and your own preferences. The types of treatment that may be prescribed are as follows:

Chemotherapy
Chemotherapy is the use of drugs to help kill leukemia cells. Depending on the type of leukemia, you may receive a single drug or a combination of two or more drugs. The drugs are given into a vein, by mouth or into the cerebrospinal fluid. Once the drugs enter your system, they will spread throughout the body.

Chemotherapy is usually given in cycles. Each treatment cycle is followed by a rest period. You may have your treatment in a clinic, at the doctor's office. Some patients may need to stay in the hospital for treatment.

Targeted Therapy
Targeted therapy is the use of drugs to block the growth of leukemia cells, through the interference of specific targeted molecules. The drugs can be used to stop cancer cells progression, cause cancer cells death and even stimulate the immune system to recognize and destroy cancer cells, while sparing the normal cells.

Biological Therapy
Biological therapy is the use of substances that bolster one's immune response to leukemia. This can be administered through the vein or injected under the skin into a muscle. The drugs can either slow the growth of the leukemia cells or help the immune system destroy the cells.

Radiation Therapy
Radiation therapy is a cancer treatment that uses high energy x-rays or other types of radiation to kill leukemia cells or keep them from growing. In this case, radiation will be targeted at the spleen, the brain or other parts of the body where leukemia cells have collected.

Stem Cell Transplant
A stem cell transplant is the replacement of the abnormal bone marrow with stem cells or marrow free of leukemia from a compatible donor.

Before the stem cell transplant, you will receive either chemotherapy or radiation therapy in high dosages. In some cases, even both may be prescribed. This will destroy all your leukemia cells and normal blood cells in your bone marrow. After which, you will receive the healthy stem cells through a large vein.

The healthy stem cells may come from you or from someone who donates their stem cells to you:

- **From yourself**: An **autologous stem cell transplant** uses your own stem cells. Your stem cells are removed before you get the high-dose chemotherapy or radiation therapy. The cells may then be removed to treat any leukemia cells present. Your stem cells will be frozen and