

Leukaemia

Introduction

This has been prepared to help you understand more about leukaemia. There are several forms of leukaemia, so sometimes in this information we talk about 'leukaemias'. Leukaemias are disorders of blood cell production which can occur in people of any age.

Many people feel understandably shocked and upset when they are told that they have leukaemia. This information is intended to help you understand the diagnosis and treatment of the disease. We also include information about available support services.

We cannot advise you about the best treatment for you. You need to discuss this with your own doctors. However, we hope this information will answer some of your questions and help you in thinking about the questions you want to ask your doctors.

What is Cancer?

Cancer is a disease of the body's cells. Our bodies are constantly making new cells: to enable us to grow, to replace worn-out cells, or to heal damaged cells after an injury. Normally, cells grow and multiply in an orderly way. Occasionally, however, some cells behave abnormally. They multiply in an uncontrolled way, and these cells may grow into a lump, which is called a tumour.

Tumours can be benign (not cancerous) or malignant (cancerous). Benign tumours do not spread outside their normal boundary to other parts of the body. A malignant tumour is made up of cancer cells. If these cells are not treated they may spread into surrounding tissues.

If the cancer cells spread beyond their normal boundaries then the tumour is malignant, that is, it is a cancer.

Sometimes cells break away from the original (primary) cancer and spread to other organs. When these cells reach a new site they may continue to grow and form another tumour at the site. This is called a secondary cancer or metastasis.

In some cancers, it is the body's blood cells which multiply abnormally. These cancers are called leukaemia, myeloma and lymphoma.

The blood

Blood is pumped around the body in the circulatory system. It supplies food, oxygen, hormones and other chemicals to all the body's cells. It also helps to remove waste products and is important in fighting infection.

Blood is made of clear liquid called plasma and three types of cells: red blood cells, platelets and white blood cells.

All blood cells come from the same type of cell, known as stem cells. Early on, they develop into either myeloid or lymphoid cells.

- Myeloid cells include all red blood cells, platelets and the white blood cells that are known as granulocytes and monocytes.
- Lymphoid cells include all other white blood cells, known as lymphocytes.

Red blood cells collect oxygen from your lungs and carry it to all parts of your body. If you don't have enough red blood cells you have anaemia. Anaemia can make you look pale, may cause headaches and make you feel tired, dizzy and irritable.

Platelets are needed to help your blood to clot following an injury. A reduced number of platelets may cause prolonged bleeding or easy bruising.

White blood cells play a major role in the body's defence against infection. A decrease in white blood cells puts you more at risk of getting infections.

Blood cells are made in bone marrow, the spongy part in the centre of your bones.

When the body is healthy, the numbers of red cells, white cells and platelets in the blood are kept in balance. Diseases of the blood cells, like leukaemia, can cause this balance to be thrown out.

Leukaemia

Leukaemia is cancer of blood-forming cells. Leukaemia causes large numbers of immature white blood cells to be produced.

These abnormal cells, called leukaemia blasts, can't carry out the normal functions of white blood cells. They crowd the bone marrow and spill into the blood and may then spread into organs such as the liver, spleen, lungs and kidneys. Occasionally, they may also spread into the fluid surrounding the brain and spinal cord.

Because there are so many abnormal white cells crowded into the bone marrow, the marrow can't make enough normal red blood cells, white blood cells and platelets.

Types of Leukaemia

Leukaemia occurs in several forms. Some forms appear suddenly and progress rapidly over days to weeks: they are called acute leukaemia. Others are less apparent and progress slowly over months to years: they are called chronic leukaemia.

Leukaemias are named according to the type of white blood cells involved. The myeloid leukaemias are those, which involve the granulocytes; the lymphoid leukaemias are those, which involved the lymphocytes.

Acute Lymphoid Leukaemia (ALL)

Acute lymphoid leukaemia is most common in children and accounts for only a small percentage of adult leukaemias.

It affects immature lymphocytes. Normal lymphocytes are responsible for fighting infection: when bacteria or viruses attack the body, lymphocytes respond by producing anti-bodies or special lymphocyte killer cells. When you have acute lymphoid leukaemia, the lymphocytes cannot function properly, and you may develop a serious infection. In addition, the disease causes many abnormal lymphocytes to be produced, crowding out the normal red blood cells and platelets.

Chronic Lymphoid Leukaemia (CLL)

This leukaemia also affects the lymphocytes, but develops more slowly than acute lymphoid leukaemia.

This disease affects adults and does not occur in children.

The disease progresses slowly, so the normal cells are not crowded out as rapidly as in the acute form of the disease. If you have chronic lymphoid leukaemia, you may not feel any symptoms until the later stages of the disease.

Acute Myeloid Leukaemia (AML)

This leukaemia mainly affects adults, but can occur in children and adolescents.

Acute myeloid leukaemia mainly affects the myeloid cells known as granulocytes. This disease creates an excessive number of young myeloid cells and a shortage of mature myeloid cells. The young myeloid cells can block blood vessels.

Chronic Myeloid Leukaemia (CML)

Chronic myeloid leukaemia can occur at any age but is uncommon below the age of 20 years.

It stops myeloid cells from functioning properly. It occurs in two stages: first, there is a slow multiplication of abnormal cells. Then, it can quickly change into an acute stage.

What causes Leukaemia?

The causes of leukaemia are not known. Some factors appear to influence its development. These risk factors only explain a very small number of leukaemia cases. Having one or more of these factors does not mean that you will definitely develop leukaemia. If you are concerned about any of these factors you should talk to your doctor.

Genetic factors: Down's syndrome children and children with some other rare congenital abnormalities have an increased risk of acute leukaemia.

Genetic factors may play a role in the development of chronic lymphoid leukaemia. Chronic lymphoid leukaemia is more common in men and seems to run in families.

Radiation: leukaemia occurs at higher than average rates among people exposed to intense radiation. These include survivors of atomic bomb explosions in Japan, people exposed to radiation after the Chernobyl nuclear plant disaster, and people who received large amounts of radiation necessary for treatment of certain medical conditions in the past.

Chemicals: workers exposed to benzene have an increased risk of acute myeloid leukaemia. Smoking appears to increase risk of acute myeloid leukaemia.

Country of origin: in certain areas of the world, such as south-west Japan, parts of Africa and the Caribbean, a particular type of leukaemia can be spread among local residents by a virus known as HTLV (Human T Cell Leukaemia Lymphoma Virus).

Diagnosis

People with symptoms of leukaemia will have blood tests and bone marrow tests, which can confirm whether or not the disease is present.

The symptoms of leukaemia are similar to symptoms of some other common conditions. If you are concerned about your symptoms you should consult your doctor.

Symptoms of acute Leukaemia

The symptoms of acute leukaemia usually appear quite suddenly as this type of leukaemia develops quickly.

- Weakness, tiredness and looking 'washed out' may be due to reduced numbers of red blood cells.

- Prolonged bleeding, for example, heavy nosebleeds, or bruising easily, may be due to a decrease in platelets.
- A tendency to get infections and associated high temperatures may be due to your white blood cells not functioning properly.
- Pain in the bones and joints may also occur.

Symptoms of chronic leukaemia

The symptoms of chronic leukaemia develop over months or years. They are similar to those of acute leukaemia but also include enlargement of the lymph nodes, spleen and liver. Anaemia may be a symptom of chronic myeloid leukaemia.

Most people with chronic lymphoid leukaemia are not even aware that they have the disease and may only be diagnosed during an examination for another medical problem.

Chronic myeloid leukaemia usually progresses slowly at first but may change to a more active phase and become more like an acute leukaemia after several years.

What doctors and other health professionals will I see?

Your general practitioner will refer you for initial tests to confirm whether or not you have cancer. If a diagnosis of cancer is made, he or she will also refer you to a specialist who will advise you about treatment options. Specialists and health workers who care for people with leukaemia include:

- Surgeons: who are responsible for biopsies and other surgical procedures
- Haematologists: diagnose and treat people with blood diseases
- Medical oncologists: who are responsible for chemotherapy
- Radiation oncologists: who are responsible for radiotherapy
- Dieticians: who recommend the best diets to follow while you are in treatment and recovery
- Nurses: who assist you through all stages of your hospitalisation and cancer experience.
- Social workers and occupational therapists: who will advise you on support services available and help you to resume normal activities.

How leukaemia is diagnosed

Leukaemia can be diagnosed by examining samples of your blood and bone marrow under a microscope. A lymph node biopsy may also be recommended. Blood tests and bone marrow tests are also ways of checking progress, so they will continue during and after treatment.

Blood test

Leukaemia is suspected if a blood test shows large numbers of abnormal white blood cells and low numbers of red blood cells, platelets and normal white blood cells.

Bone Marrow Biopsy

A bone marrow biopsy is usually needed to diagnose the type of leukaemia. A small amount of fluid is collected from the bone marrow with a syringe and a small core of bone marrow is removed. The samples are then examined under a microscope. Having a bone marrow biopsy may be painful, so a local anaesthetic is always used. You may also be given a sedative, to increase your comfort during the procedure.

Lymph node biopsy

If you have an inflamed lymph node, your doctor may recommend a biopsy to see if this is related to leukaemia. Tissue is removed from the affected lymph node for examination under a microscope. You may have a local or general anaesthetic, depending on where the affected node is. The procedure could be done while you are an outpatient, or during a brief stay as an inpatient.

Lumbar puncture ('spinal tap')

Your doctor may recommend a lumbar puncture to check for leukaemic cells in the fluid, which surrounds the brain and spinal cord.

In a lumbar puncture, a fine needle is put into a space between bones in your lower back and some fluid extracted from around your spine. This is then examined under a microscope.

A local anaesthetic is used to reduce the pain and discomfort felt during this procedure. Some people worry about having this procedure: you may choose to have a sedative if you wish. Discuss this with your doctor.

Treatment

In recent years, a lot of progress has been made in the treatment of acute leukaemia, particularly acute lymphoid leukaemia. The main treatment used is chemotherapy. For some people, stem cell transplantation may be a further option.

People with chronic lymphoid leukaemia may not need treatment for many years but have regular checkups and blood tests to monitor the disease. People with chronic myeloid leukaemia, in its early stages, are usually given moderate doses of chemotherapy or interferon injections.

Chemotherapy

Chemotherapy is the treatment of cancer using anti-cancer (cytotoxic) drugs. The aim is to kill cancer cells while doing the least possible damage to normal cells. The drugs work by stopping cancer cells from dividing and multiplying.

Chemotherapy drugs are commonly taken intravenously, that is, they are injected into a vein. To avoid having repeated injections, a long-lasting intravenous catheter is usually used. The drugs can then be added to a fluid drip attached to the catheter.

When moderate doses are required, chemotherapy drugs may be given in tablet form or as simple injections under the skin. Chronic lymphoid leukaemia and chronic myeloid leukaemia are usually treated in this way. If chronic myeloid leukaemia changes to a more active phase after several years, stronger chemotherapy may be given.

For some people, chemotherapy for acute leukaemia will mean spending several weeks in hospital. Others may be able to stay at home but will need regular hospital visits for checkups and further treatments.

Three different phases of chemotherapy are used to treat acute leukaemia – induction therapy, consolidation therapy and continuation therapy.

Induction therapy

Treatment begins with induction therapy, which usually lasts for four to six weeks. This is a phase of vigorous treatment aimed at destroying as many abnormal white blood cells as possible to obtain a remission.

You are said to be in remission when your blood and bone marrow show no detectable signs of leukaemia.

Patients with acute lymphoid leukaemia will receive extra therapy after remission is achieved. As microscopic collections of leukaemia cells may have spread to the spinal fluid, anti-cancer drugs are injected directly into the fluid around your spine. Radiotherapy may also be given. In children, the use of radiotherapy is avoided wherever possible because of its potential side effects, which may affect their growth and development.

Consolidation therapy

After remission has been achieved, ongoing therapy is used to prevent the return of the leukaemia (called a relapse). The goal of this second phase of treatment is to kill any undetected cancer cells that may have survived the first treatment. Different anti-cancer drugs are used to try to overcome possible resistance by the leukaemia cells to any one drug.

Continuation therapy

Continuation therapy is the final stage of treatment for childhood acute lymphoid leukaemia. It is given over a longer period of time (two or three years), but its aim is the same: to destroy remaining cancer cells. In acute myeloid leukaemia, however, the role and duration of continuation chemotherapy is still being studied.

In general, this phase of treatment is not as intense as the first two phases. It may sometimes be replaced by stem cell (bone marrow) transplantation.

Side effects of chemotherapy

The most important effect of chemotherapy is that it kills leukaemia cells. However, it may have side effects. Normal cells are better able to renew themselves after chemotherapy than leukaemia cells, but some normal cells that multiply rapidly (like hair cells) may be affected by chemotherapy.

Reactions vary with different drugs, with different people and from one course of treatment to the next. Doses of chemotherapy which are moderate, such as those, used for treatment of chronic leukaemia, usually cause few side effects.

The most common side effects are nausea and vomiting, feeling off-colour and tired, hair loss, diarrhoea, constipation and a sore mouth. If normal blood cells are affected, there may also be problems with infection and bleeding.

Remember that measures are always taken to either prevent or control any reactions. Ask your doctor or nurse for information on your specific chemotherapy.

Ask for advice on any possible reactions you may experience and the best ways for you to cope with them.

Stem cell (bone marrow) transplantation

This treatment allows you to have higher doses of chemotherapy than usual; this may increase your chance of being cured. For younger patients with acute leukaemia who have achieved remission this treatment significantly increases the chance of long-term remission and possible cure.

Stem cell transplantation is rarely used as the initial treatment for children with acute lymphoid leukaemia because excellent results are usually achieved with chemotherapy.

Stem cells are early-stage blood cells that develop in bone marrow (the soft tissue inside bones). High doses of chemotherapy can harm stem cells. Stem cells, infused into you just like a blood transfusion, can rescue your bone marrow from the effects of the treatment.

There are two sources of stem cells: autologous, where you act as your own donor and allogeneic, where someone else (usually a tissue-matched family member, but sometimes a matched, unrelated person) donates. If you act as your own donor, the stem cells will be collected before you receive high-dose chemotherapy. This may be when you are recovering from another course of treatment with chemotherapy plus growth factor injections, or after injections of a growth factor alone. The growth factor stimulates the bone marrow to produce large numbers of stem cells for collection.

Autologous stem cells are commonly collected from the bloodstream in a process called apheresis. Blood is taken by syringe from a vein (usually in your arm) or from a small tube going through a vein in the neck or chest. The blood is then passed through a machine that can separate the blood cells by spinning them at very high speed. A computer is used to separate the stem cells, which are placed in a collection bag, and the remaining blood cells are returned to your body. An anticoagulant is used in the process and this may cause a tingling in your fingers or lips. Let the nurse know if this happens and adjustments can be made.

Sometimes, stem cells are collected directly from the bone marrow in a procedure done in an operating theatre under general anaesthetic.

The transplantation of stem cells takes place after the completion of high-dose chemotherapy. The cells find their way into the bone marrow spaces and engraft, eventually resulting in the restoration and production of normal blood cell numbers. The length of time this takes determines how long you will be in hospital. Specific information about the type of transplant you will be having should be available from your doctor or nurse.

Side effects of stem cell transplantation

While you are having treatment, you will be prone to infections, may bruise and bleed more easily, and may become weak, with little energy. Other possible side effects include mouth infection and ulcers, nausea, vomiting, diarrhoea or bleeding from the bladder. Let your nurse and doctor know if you experience any of these symptoms so that they can be treated.

Immunotherapy with interferon

Interferon is a protein that is normally produced by the body and has anti-cancer effects. It is often used in the treatment of chronic myeloid leukaemia. Interferon is given by daily injection under the skin.

Side effects of interferon treatment

Interferon can cause flu-like symptoms (fever, chill and sweats) one to two hours after the injection. Some people have the injection before they go to bed, so these symptoms do not interfere too much with day-to-day life. Other side effects include tiredness, loss of appetite and muscle pain.

All-trans-retinoic acid

This form of vitamin A is used to treat a type of acute myeloid leukaemia called acute promyelocytic leukaemia. It is usually used with chemotherapy and has shown markedly improved results in these patients.

Some people experience headaches, dry skin, dry mouth and bone pain while taking this treatment.

Palliative treatment

Palliative treatment is treatment that relieves or soothes pain and other distressing symptoms of illness. Palliative care is available for all people who experience pain and distress associated with cancer, whatever their stage of cancer treatment. It is a particularly important type of treatment for people with advanced cancer, who cannot be cured but can expect to live without undue pain and distress.

Palliative care includes pain relief using painkilling drugs and other measures. Pain is usually well controlled with oral medication.

General practitioners, specialist and specialist palliative care teams in hospital all play important roles in palliative treatment for people with early and advanced cancer.

Prognosis/Outlook

For most people, remission may last for several years before new problems arise. During remission, they will be able to lead a normal life. Younger adults who achieve remission are potentially curable with high-dose chemotherapy and stem cell transplantation.

Most children with acute lymphoid leukaemia can expect to be completely cured and many former patients are now adults with children of their own. The outlook is also excellent for children with acute myeloid leukaemia. For most people, chronic leukaemia can be controlled and a normal lifestyle enjoyed for long periods of time. Many people want to know about the risk of their leukaemia returning or relapsing. As everyone is different it is not possible to give definite answers. Factors such as the particular type of leukaemia you have, your symptoms and your age all affect your prognosis, so it is best to discuss your situation with your doctor.

Making decisions about treatment

Sometimes it is difficult to make decisions about what is the right treatment for you. You may feel that everything is happening so fast that you do not have time to think things through. Some people find that waiting for test results and for treatment to begin is very difficult.

While some people feel they are overwhelmed with information, other may feel that they do not have enough. You need to make sure that you understand enough about your illness, the possible treatment and side effects to make your own decisions.

If you are offered a choice of treatments, you will need to weigh up the advantages and disadvantages of each treatment. If only one type of treatment is recommended, ask your doctor to explain why other treatment choices have not been advised.

Some people with more advanced cancer will always choose treatment, even if it only offers a small chance of cure. Others want to make sure that the benefits of treatment outweigh any side effects. Still others will choose the treatment they consider offers them the best quality of life. Some may choose not to have treatment but to have any symptoms managed as they arise in order to maintain the best possible quality of life.

Talking with doctors

You may want to see your doctor a few times before making a final decision on treatment. The first consultation when you are told you have cancer is usually stressful and you may not remember very much. It is often difficult to take everything in, and you may need to ask the same question more than once. You always have the right to find out what a suggested treatment means for you, and the right to accept or refuse it.

Before you see the doctor, it may help to write down your questions. There is a list of questions to ask your doctor at the end of this section, which may assist you. Taking notes during the session can also help. Many people like to have a family member or friend to go with them, to take part in the discussion, take notes, or simply listen. Some people find it is helpful to tape record the discussion.

Talking with others

Once you have discussed treatment options with your doctor, you may want to talk them over with family or friends, with nursing staff, the hospital social worker or chaplain, or your own religious or spiritual adviser. Talking it over can help to sort out what course of action is right for you.

A second opinion

You may want to ask for a second opinion from another specialist. This is understandable and can be a valuable part of your decision-making process. Your specialist or local doctor can refer you to another specialist and you can ask for your records to be sent to the second-opinion doctor. You can still ask for a second opinion even if you have already started treatment or still want to be treated by your first doctor.

Taking part in a clinical trial

Your doctor may suggest that you consider taking part in a clinical trial.

Clinical trials are a vital part of the search to find better treatments for cancer. Doctors conduct clinical trials to test new or modified treatments and see if they are better than existing treatments. Many people all over the world have taken part in clinical trials that have resulted in improvements to cancer treatment. However the decision to take part in a clinical trial is always yours.

If your doctor asks you to take part in a clinical trial, make sure that you fully understand the reasons for the trial and what it means for you. Before deciding whether or not to join the trial, you may wish to ask your doctor:

- What treatments are being tested and why?
- What tests are involved?
- What are the possible risks or side effects?
- How long will the trial last?
- Will I need to go into hospital for treatment?
- What will I do if any problems occur while I am in the trial?

If you decide to join a randomised clinical trial, you will be given either the best existing treatment or a promising new treatment. You will be chosen at random to receive one treatment or the other, but it will always be the best treatment available.

If you do join a clinical trial, you have the right to withdraw at any time. Doing so will not jeopardise your treatment for cancer.

It is always your decision to take part in a clinical trial. If you do not want to take part, your doctor will discuss the best current treatment choices with you.

Recovery and follow-up care

After the completion of your treatment, you will need to have regular check-ups. Your doctor will decide how often you will need check-ups, as everyone is different. They will gradually become less frequent if you have no further problems.

If the disease flares up, or relapses, it can often be treated successfully. The treatment used for the relapse is often different from the first treatment.

Seeking Support

When you are first diagnosed with cancer, you may feel a variety of emotions, such as fear, sadness, depression, anger or frustration. It may be helpful to talk about your feelings with your partner, family members or friends, or with a hospital counsellor, social worker, psychologist or your religious or spiritual advisor.

Sometimes you may find that your friends and family do not know what to say to you: they may have difficulty with the feelings as well. Some people may feel so uncomfortable that they avoid you. They may expect you to 'lead the way' and tell them what you need. This can

be very difficult to bear and can make you feel very lonely. You may feel able to approach your friends directly and tell them what you need. You may prefer to ask a close family member or a friend to talk with other people for you.

Diet

A balanced nutritious diet will help you to keep as well as possible and cope with the cancer and any side effects if treatment. Depending on the kind of treatment you have had, you may have special dietary needs. A dietician can help to plan the best foods for your particular situation – ones that you find tempting, easy to eat and nutritious.

The Resource and Wellness Centre has a resident dietician. For an appointment please call 03 2698 7300 or email contact@cancer.org.my

Relaxation techniques

Some people find relaxation or meditation helps them to feel better. The Resource and Wellness Centre offers relaxation and meditation classes, Telephone 03 2698 7300 or email contact@cancer.org.my for further information.

Sexuality and cancer

We are all sexual beings and intimacy adds to the quality of our lives. Cancer treatment and the psychological effects of cancer may affect you and your partner in different ways.

Some people may withdraw through feelings of being unable to cope with the effects of chemotherapy and radiotherapy on themselves or their partner. Others may feel an increased need for sexual and intimate contact for reassurance.

Communication is essential in addressing any concerns or problems, which may arise. Talk about your feelings with your partner. Try different positions and practices to find out what feels right and is satisfactory for both of you. If you have difficulties in continuing with your usual sexual activities, discuss this with your doctor or with a trained counsellor so that you may obtain the best advice.

Cancer Support Groups

Cancer support groups offer mutual support and information to people with cancer and, often, to their families. It can help to talk with others who have gone through the same experience. Support groups can also offer many practical suggestions and ways of coping. Call the Resource and Wellness Centre for information on support groups. Telephone 03 2698 7300 or email contact@cancer.org.my

Caring for someone with cancer

Caring for someone with cancer can be very stressful, particularly when it is someone you care about very much. Look after yourself during this time. Give yourself some time out, and share your worries and concerns with someone outside.

You may have to make many decisions. You will probably have to attend many appointments with doctors, support services and hospitals. Many people have found it helpful to take with them another member of the family or a close friend. It also helps to write down questions beforehand, and to take notes during the appointment.

Cancer support group membership is generally open to patients and carers. A support group can offer the chance to share experiences and ways of coping.

Cancer Information and Support Service

The Resource and Wellness Centre is a service of the National Cancer Society of Malaysia. It is a telephone information and support service for people affected by cancer. It is a

confidential service where you can talk about your concerns and needs with specially trained staff. The staff can send you written information and can put you in touch with appropriate services in your own area. Telephone 03 26987300 or e-mail contact@cancer.org.my

Information Checklist

You may find the following checklist helpful when thinking about the questions you may want to ask your doctor about illness and treatment.

1. What type of cancer do I have?
2. How extensive is my cancer?
3. What treatment do you advise for my cancer and why?
4. Will a doctor who specialises in non-Hodgkin's lymphoma perform my treatment?
5. Are there other treatment choices for me? If not, why not?
6. Are there any clinical trials of new treatments that I should know about?
7. What are the risks and possible side effects of each treatment?
8. Will I have to stay in hospital, or will I be treated as an outpatient?
9. How long will the treatment take? How much will it affect what I can do? How much will it cost?
10. Will I have a lot of pain with the operation? What will be done about this?
11. If I need further treatment, what will it be like and when will it begin?
12. Will the treatment affect my sexual relationships?
13. How frequent will my check-ups be and what will they involve?
14. Are there any problems I should watch out for?
15. I would like to have a second opinion. Can you refer me to someone else?
16. Is my cancer hereditary (one that runs in families)?

If there are answers you do not understand, feel comfortable to say 'can you explain that again' or 'I am not sure what you mean by...'

Glossary

Most of the words listed here are used in this section, other are words you are likely to hear used by doctors and other health professionals who will be working with you.

Acute

Occurring suddenly or over a short period of time

Allogeneic

Tissue from a donor.

Anaemia

A reduced amount of the substance (haemoglobin) that carries oxygen in the blood. Anaemia may cause tiredness and fatigue, breathlessness and paleness.

Anaesthetic

A drug given to stop a person feeling pain. A local anaesthetic numbs part of the body; a general anaesthetic causes temporary loss of consciousness.

Antibody

A protein that is made in lymph tissue to destroy infections and other potentially harmful 'invaders' in the body.

Anticoagulant

A substance that prevents blood clotting.

Apheresis

The process in which blood is temporarily taken from the body, one or more parts of it removed, and the blood transfused back into the body.

Autologous

Tissue from oneself.

Benign

Not cancerous.

Biopsy

The removal of a sample of tissue from the body, for examination under a microscope, to assist diagnosis of a disease.

Blasts

Immature cells

Bone marrow

The soft, spongy tissue in the centre of your large bones that produces white blood cells, red blood cells and platelets.

Catheter

A flexible tube inserted into a narrow opening so that fluids can be introduced or removed.

Cells

The 'building blocks' of the body. A human is made of millions of cells, which are adapted for different functions. Cells are able to reproduce themselves exactly, unless they are abnormal or damaged, as are cancer cells.

Chemotherapy

Treatment of cancer with drugs that destroy cancer cells, or prevent or slow down cell growth.

Chronic

Persisting over a long period of time

Circulatory system

The vessels and organs that enable blood to flow around the body.

Congenital

Diseases or deformities, which are present at birth or which, being transmitted by the parents, show up some time after birth.

Engraft

When transplanted bone marrow begins to produce red blood cells, white blood cells and platelets.

Erythrocytes

A red blood cell. Erythrocytes owe their red colour to haemoglobin, the substance, which carries oxygen from the lungs to the cells of the body.

Granulocyte

A type of white blood cell that has granules in the cells' cytoplasm. Granulocytes are formed in the bone marrow (myeloid tissue). They help the body to fight infection.

Growth factor

A substance that stimulates cells to reproduce and rapidly multiply.

Immunotherapy

The prevention or treatment of disease using substances that alter the immune system's response.

Intravenous

Into a vein. An intravenous drip gives drugs directly into a vein.

Leucocyte

White blood cell

Leukaemic blast

An abnormal white blood cell formed in the bone marrow

Lymph nodes

Also called lymph glands. Small, bean-shaped structures which form part of the lymphatic system. Lymph is the fluid that flows through this system and carries cells that help to fight disease and infection. The lymph nodes filter the lymph to remove bacteria and other harmful agents, such as cancer cells.

Lymphocyte

A type of white bloody cell formed in lymph nodes. It is part of the body's immune system, which helps to fight infection.

Plasma

The fluid portion of blood in which the blood cells and platelets are suspended.

Platelets

Part of the blood. Platelets are important for blood clotting.

Prognosis

An assessment of the course and likely outcome of a person's disease.

Relapse

The return of a disease after a period of improvement or remission.

Remission

The decrease or disappearance of the symptoms of a disease. A person is said to be in complete remission when there is no evidence of active disease.

Stem cell

A stem cell is a 'parent' cell from which blood cells evolve, which grows in bone marrow.

Tissue

Refers to a collection of cells, which are specialised for a particular body function. So the parts of the lymphatic system- the lymph nodes and vessels – are composed of lymph tissue.

Tumour

Literally means a lump but is mainly used to describe a cancer that grows as a lump. Tumours can be benign or malignant.

White blood cell

Also known as leucocytes. One of the two main types of cell present in blood. Play a major roll in fighting infection.

