

Histio UK Connect – Let's Talk

an inclusive online discussion platform for each of the different Histiocytic disorders.

Find your Histio Champion Community at www.HistioUKConnect.org

ABOUT HISTIO UK

Histiocytosis UK is a registered Charity in England & Wales Number: 1158789. We are a national organisation supporting research and projects into Histiocytic Disorders. We support parents and patients, individuals and families affected by all histiocytic disorders these include:

Haemophagocytic lymphohistiocytosis (HLH)

Langerhans Cell Histiocytosis (LCH)

Juvenile xanthogranuloma (JXG)

Rosai-Dorfman disease (RD)

Erdheim-Chester ECD)

Diabetes insipidus (DI)

Our website at www.histiouk.org provides useful information on this range of conditions and topics, it explains the work we do, our research and our information support programs.

If we can be of any assistance, please contact us at histio@histiouk.org

Histio UK is reliant on voluntary donations. To make a donation, please go to: www.histiouk.org and follow the donate button.

If you are a Health Professional and would like more information on or would like to join our HLH Across Speciality Collaboration, Histiocytosis Registry or our Specialist Advisory Group please email histio@histiouk.org.

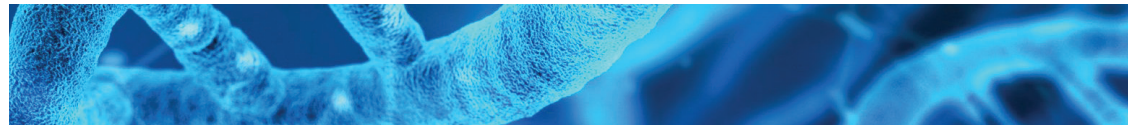
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Funded by:



LANGERHANS CELL HISTIOCYTOSIS (LCH)

An Adult Guide



INTRODUCTION

This booklet provides information and advice on the condition Langerhans Cell Histiocytosis (LCH) and how to deal with the diagnosis and subsequent treatment. It is not a replacement for the information you will get from your consultant and his or her team.

LCH varies a lot, so you need to focus on you and how the disease is affecting you. Your consultant will be able to help with the specific questions about your disease and treatment. It is a good idea to write down things you want to know, so that you remember everything you would like to ask when you see your medical team. It is also useful to have a notebook to write down what you are told, as it can be difficult to take everything in at the time.

This booklet has been divided into three sections:

- [Information about LCH](#)
- [How to cope](#)
- [Where to get support](#)

Many of the terms you will come across may be unfamiliar, at least initially.

There is a detailed glossary at the end of the booklet.

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THE DISEASE

WHAT IS LANGERHANS CELL HISTIOCYTOSIS (LCH)?

Langerhans Cell Histiocytosis is a rare disease – about 1 in 200,000 children become ill with it and there are about 50 new cases each year in the UK. Adults can also be affected, but the incidence is unclear. Doctors and scientists often call it an ‘orphan’ disease because it is so rare. As a result, research into why it happens and how it can best be treated has been limited.

LCH is one of several diseases known as the ‘histiocytoses’ or ‘histiocytic disorders’ as they involve cells in the body known as histiocytes. A histiocyte is a type of white blood cell which normally helps to fight infection. However, in those suffering from LCH, the histiocytes gather together in large numbers causing damage to healthy parts of the body, such as the bone, skin, lymph nodes, lungs, liver, spleen, bone marrow and pituitary gland.

IS LCH A CANCER?

For many years there was controversy about the nature of LCH, but it is now classified as a cancer because it is a clonal growth of immature Langerhans cells (meaning that all the cells grow from a single altered cell). In more than half the cases the cells have a mutation (alteration to the DNA) called V600E in the BRAF gene and there are related mutations in most other cases. V600E is found in tumours such as melanoma and thyroid cancer but in these cases is associated with many other abnormalities. Although LCH may require treatment with chemotherapy drugs used to treat other cancers, it is not a fully developed malignant cancer. It is not contagious, nor is it believed to be inherited.

HOW DOES LCH AFFECT PATIENTS?

Some patients have no symptoms at all and the disease is found ‘by accident’ when they are investigated for something unrelated. More often however, they have symptoms caused by the LCH affecting a particular part of the body. Adults may be affected by pulmonary LCH (PLCH), and almost all patients with this form of the disease are or have been smokers. Apart from the lungs, the most commonly affected ‘system’ is the skeleton.’ Bone LCH usually causes pain and/or swelling and may affect one or several bones. The bones of the skull, spine and limbs are most commonly affected. Skin involvement is present in about a third of patients and the skin is the 2nd most commonly involved organ. Skin LCH can mimic numerous skin conditions. Less commonly LCH may affect the ears, lungs, liver, spleen, brain, lymph nodes (‘glands’) and rarely the gut. Some patients develop symptoms due to a lower production of certain hormones (e.g. excessive thirst and excessive fluid intake due to diabetes insipidus) and in a small number of patients LCH causes a reduction in the number of blood cells (haematological dysfunction). Lower numbers of blood cells may make them feel tired, appear pale and result in them being more susceptible to bruising/bleeding and infection. In addition to symptoms caused directly by the effect of LCH on specific organs/parts of the body, general symptoms such as fever and weakness may also be present.

Although it is possible for LCH to affect people in many different ways it is not uncommon for LCH patients to appear well - this can make the diagnosis even harder to take in.

WHAT HAPPENS TO PATIENTS AFTER THEY HAD LCH?

It is important to know that the vast majority will recover completely from LCH. Some however, are left with persistent/recurring problems and for a very small number of patients with multi-system LCH, it can be a life-threatening condition. After successfully completing treatment, most patients will have follow-up clinic appointments. LCH sometimes comes back (‘reactivates’) and may need treatment again. If this happens, treatments for LCH that have worked for them before may be effective again. The same or different treatment may then be required. Patients are also monitored for possible permanent consequences of the disease (e.g. a low production of certain hormones) and may need treatment for these late effects.

LCH IS DIVIDED INTO TWO MAIN GROUPS – SINGLE SYSTEM AND MULTI-SYSTEM

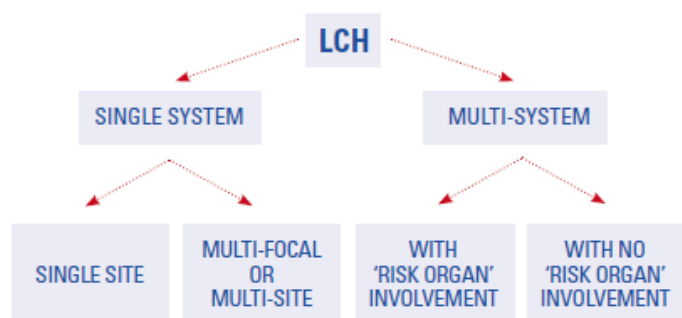
Single system disease

When LCH is described as a 'single system' disease, it means that it is only affecting one system in the body – for example, skin, bone or an organ. The majority (>70%) of patients have single system disease. If the LCH is only present in one place in that particular system, it is called single site and if in more than one place, it is called multi-site or multi-focal disease. Therefore, a patient with several affected bones, but no disease elsewhere, is considered to have 'single system, multi-focal' disease.

Multi-system disease

When LCH is found in more than one 'system', for example, in both the skin and bone, it is described as 'multi-system' disease. Patients with 'multi-system' disease affecting the liver, spleen or bone marrow, are considered to have a more serious form of LCH. This is then described as multi-system disease with 'risk organ' involvement and may require more intensive treatment.

This classification helps doctors to decide what treatment is required and for how long it should be given.



HOW IS LCH DIAGNOSED?

The diagnosis of LCH is usually made by performing a biopsy of an affected part of the body. A biopsy is the removal of a small piece of tissue while a patient is under an anaesthetic. This piece of tissue is then examined under a microscope.

Doctors will be carrying out a number of further tests. These tests are done to see how LCH affects that part of the body and if any other systems are involved (multi-system disease). This information helps the medical team to decide on the best treatment for you.

Some of the following tests may be carried out:

- **Blood tests** these are done to check how many of the different types of blood cells there are and to assess how well the liver and kidneys are working.
- **Urine test** to evaluate how concentrated/dilute the urine is.
- **X-ray** pictures of the chest and of the bones (also known as a skeletal survey).
- **Ultrasound Scan** – sound waves are used to build up a picture of the inside of the body. A clear gel is spread over the skin and a microphone is passed over the body. The sound waves bounce off the organs inside the body and are picked up by the microphone. A computer turns the sound waves into pictures.
- **CT Scan** – A CT (Computerised Tomography) scan takes a number of x-ray pictures of the body from different angles and uses a computer to convert them into cross-sectional x-ray pictures or 'slices' of the body. Depending on how big a part of the body is being scanned this can take between a few seconds and a few minutes. CT scans are painless.

- **MRI Scan** – Magnetic Resonance Imaging (MRI) Scan uses magnetic and radio waves to take pictures of the body. It is painless, but usually takes longer than a CT scan and is quite noisy.
- **Biopsy** – the removal of a small piece of tissue from an organ or part of the body for microscopic examination. Most often the biopsy is done of affected bone or skin but biopsies may also need to be carried out on the liver, lung or bone marrow.
- **Water Deprivation Test** – if doctors suspect there is a hormone problem known as diabetes insipidus, you may need to undergo a water deprivation test. This is a test to measure how much urine is made and how concentrated it becomes when no water is given to a patient for a certain amount of time (also called fluid deprivation test).

To complete all of these tests can take between a few days and a couple of weeks and may involve a stay in hospital.

HOW IS LCH TREATED?

LCH is different to almost all cancers because in some cases it may 'burn itself out' without any treatment. We don't know how or why this happens.

In other cases, treatment is needed to get the disease under control and prevent too much damage. Treatment may involve an operation (surgery) and/or medication. The treatment will be tailored to you and will depend on the extent and sites of your disease.

MAIN TREATMENT OPTIONS:

Smoking

Patients with pulmonary LCH should stop smoking.

Surgery

The diagnosis of LCH is made by taking a small sample of tissue from an affected part of the body (biopsy). If there is only a single bony lesion, the biopsy is sometimes combined with curettage (scraping out of the abnormal tissue in the lesion). These procedures may initiate a process of healing in the LCH lesion and sometimes this is all that is required.

Medication

Steroids – corticosteroids are medicines used to reduce inflammation and stop the body's immune system acting in the wrong way. You may be given prednisolone (a type of steroid) which is usually taken by mouth. Steroids can also be injected into an LCH lesion.

Chemotherapy – this is used to destroy LCH cells and is generally given intravenously. This means that the chemotherapy medicine is diluted in fluid and given straight into a vein (into the bloodstream). Some chemotherapy medicines may be taken by mouth.

Kinase inhibitors – recently drugs have been developed that target mutated molecules such as BRAF V600E. These have been used in some cases of LCH and can cause LCH lesions to shrink or go away. However, when treatment is stopped the disease usually returns.

Your oncologist or haematologist will decide on a treatment plan for you once all the relevant tests are completed. A protocol is a special plan that will detail your treatment if medication is required.

If you need chemotherapy, you will probably need a central line. This is a tube that is inserted into a large blood vessel and tunnelled under the skin to where it can be easily accessed. It allows blood samples to be taken and treatment, including chemotherapy, to be given easily and painlessly. The central line is put in under general anaesthesia and can stay in place until the end of your treatment. Your hospital will provide more information about the types of central lines they offer.

If you are unwell or require very intensive treatment, you may need to be in hospital. Most patients, however, receive all their intravenous treatment by visiting their hospital's out-patient or day-care facility. This may only be available at your treating oncologist/haematologist's hospital or it may be available at your local hospital under a shared care arrangement with a local doctor. Some treatment, like that taken by mouth, can be given at home.

While on chemotherapy and for up to 6 months afterwards, you will be susceptible to infections. This is known as being immunocompromised. You may develop a fever or become unwell you need to contact your treating team immediately for advice. You may need immediate hospital admission and treatment with antibiotics.

WHAT ARE THE SIDE-EFFECTS OF THE MEDICATION?

The main drugs used to treat LCH and their common side effects are described below.

Different drugs cause different side effects. Everyone is different and will react to treatment in a different way. Some patients may have very few side effects while others will have a lot. Almost all side effects are only short-term and will gradually disappear once the treatment has stopped.

- **Steroids** – Prednisolone/Prednisone - this is a type of corticosteroid (steroid) that can reduce inflammation and suppress the immune system. It is usually given by mouth, in the form of pills to swallow, pills that dissolve in water, or as a liquid medicine.

Possible side-effects include: irritation of the stomach lining (indigestion/ discomfort/pain), increased appetite, weight gain, changes in behaviour (mood swings/difficulty in sleeping/anxiety/irritability), increase in blood sugar level (like someone with diabetes), high blood pressure, increased risk of infection due to suppression of the immune system, impaired wound healing, irregular or absent periods, and inflammation of the pancreas.

- **Chemotherapy** – Drugs used to treat cancer. These drugs work by killing cells that are in the process of multiplying (by dividing and forming new cells).

The main areas of the body that may be affected by chemotherapy are those where cells rapidly divide and grow. Examples include the lining of the mouth causing a sore mouth, the digestive system causing diarrhoea, skin and hair, causing hair loss, and the bone marrow (spongy material that fills the bones and produces new blood cells), causing low blood counts.

There are three main types of blood cells:

- **Red blood cells which carry oxygen around the body**
- **White blood cells which fight infections**
- **Platelets which help the blood to clot to prevent bleeding and bruising**

Chemotherapy reduces the production, and therefore, the number of blood cells in the body. Too few red blood cells cause anaemia, and the person becomes tired and pale. If there are too few white blood cells, particularly ones called neutrophils (neutropenia), the person is at increased risk of infection. Too few platelets means the person is at increased risk of excessive bleeding when injured, having nose-bleeds or bruising easily. If the counts get really low, you may need a red cell transfusion or platelet transfusion. Only a small number of LCH patients require transfusions, but in some more severe cases, transfusions play an important part in supporting patients. Transfusions are also needed to support those patients who undergo intensive chemotherapy.

As the chemotherapy affects your immune system, you may need antibiotics to help fight infections. This means, if you have a temperature of 38°C or more or becomes unwell (even with a normal temperature), you should immediately contact your medical team. You may need tests, antibiotics and admission to hospital for a few days. You may also be asked to avoid using paracetamol and ibuprofen since these drugs lower high temperatures and may mask an infection. In addition, if you are in contact with someone who has chickenpox, shingles or measles, then you should let your hospital know as these are potentially dangerous infections for a patient with a low (suppressed) immune system. Both you and the rest of your family should ideally have the annual flu jab during the autumn/winter.

Chemotherapy can cause nausea and vomiting. Anti-sickness medicines, known as anti-emetic drugs, are given to control this side effect.

Hair loss can occur, but this does not always happen with the chemotherapy used to treat LCH. Fortunately, all hair loss from chemotherapy is temporary and hair growth returns once treatment has stopped.

The chemotherapy normally used to treat LCH does not affect fertility, but you should discuss your particular treatment with your oncologist/haematologist for more information.

Chemotherapy can cause increased skin sensitivity to sunlight, therefore avoid intense sunlight and use sun block during treatment.

The two most commonly used chemotherapy drugs for LCH are Vinblastine and 6-Mercaptopurine.

Vinblastine – is a chemotherapy drug that is injected into your blood stream through the central line. This drug is administered by a 'push' rather than a slow drip through. The process only takes about 10 minutes, but you may be in hospital for longer since a number of checks need to be carried out before the drug is given.

Once completed, you will be able to go home.

In addition to the side-effects previously described, Vinblastine can sometimes, though rarely, cause tingling sensations in the hands and feet, hoarseness, constipation, muscle weakness and bone pain. It may also cause damage to the skin if it is injected directly into a vein (rather than through a central line) and then leaks into the skin.

6-Mercaptopurine – is a chemotherapy drug taken either as tablets or in a liquid form. It is usually taken at home.

In addition to the other side effects already mentioned, 6-mercaptopurine may affect the liver and this will be monitored by your doctor.

Sometimes other drugs are used to treat LCH, for instance when the above-mentioned drugs are not successful or when the disease returns. Should this become necessary, your doctor will discuss the different options with you.

- **Kinase inhibitors** – These have been used in some cases of LCH and can cause LCH lesions to shrink or go away. Treatment with kinase inhibitors has shown promise in patients with neuro-degeneration. However, when treatment is stopped the disease usually returns.

It is not yet known how long treatment with kinase inhibitors can be safely continued. Side effects include, skin irritation, fatigue, joint pain, raised blood pressure, diarrhoea, nausea and patchy hair loss. In adults skin cancers are common. Kinase inhibitors can be very useful in cases that are difficult to treat.

WHAT ARE CLINICAL TRIALS?

Clinical trials are an essential step in the development of treatment for various diseases and are necessary for improving the outcome for patients. Clinical trials are the only way to find out if a new treatment approach to a disease is better than the standard treatments currently used. Patients volunteering to take part in a trial are randomly assigned to either receiving the standard treatment or a different or experimental treatment. This is known as a randomised trial and is the most common way in which treatments are compared. This process (randomisation) ensures that the groups are similar in every way other than the fact that they receive different treatments. Any difference in outcome between the groups is then likely to be caused by the difference in the treatment and not by other differences between the groups. If an experimental treatment proves to be better than the standard treatment and does not cause unacceptable side effects, it is recommended as the new standard treatment for future patients. This is how new treatments or approaches to treatment are introduced to patients.

The conduct of clinical trials is carefully regulated to ensure patients' well-being is protected. Patients will only be able to participate in a trial if there is an open trial at that time, if they meet the eligibility criteria, and if their treating hospital is taking part. Patients must understand the implications of taking part in a clinical trial and give written consent (agreement) to allow them to be enrolled on a trial. If a trial is available to you your doctor will explain it in more detail and you will be given the necessary information to allow you to decide whether to take part or not. While on a clinical trial you will be very closely monitored.

Unfortunately, few controlled trials have been carried out in adults, but as the disease is now being diagnosed more frequently, it is hoped that this will change.

HOW DO I COPE WITH THE DIAGNOSIS?

LCH can be difficult to diagnose and can be mistaken for other things.

You may have been afraid that you have had a serious form of cancer and feel relieved that LCH is likely to be curable. You may feel angry that it was not picked up earlier. You will probably feel confused as you will not have heard of LCH before and worried and scared about what it means for you. The consultant and the rest of the medical and nursing team are there to help you through this very difficult time, they will explain the disease and the treatment you will need.

It is very likely at this stage that you will not take in much of the information you are given. You may be in shock and find it hard to function as normal. Don't worry if you have not asked all of the questions you meant to. You will have plenty of opportunities to do so later.

Telling friends and family can be emotionally difficult, and also takes a huge amount of time. It may help to tell one family member or friend and ask them to ring round others. Some patients also set up a webpage. This means that the latest information can be quickly passed on to friends and family who desperately want to know what is happening, while not taking up all your time and energy having to repeat everything. It also gives people an easy way to let you know they care. Despite your best efforts, you will probably still find the telephone rings constantly. Do not feel bad about using the answerphone. Let people leave messages and call them back if and when you want to.

HOW DO I GET THE INFORMATION I WANT?

When you are worried and meeting a doctor that you may not know very well, it is easy to forget what you meant to ask, and what you have been told. If you can, try to take notes when you attend the main meetings with the consultant. It might be better to take a friend or relative along with you, as they might be able to pay more attention to some of the discussion and take notes for you. It is often the case that you will remember different pieces of information and you may have different questions or concerns. Write down any questions beforehand, so that you do not forget them, and make sure you know whom to contact if you have any more questions, or urgent queries.

HOW DO WE DEAL WITH THE TREATMENT?

While it is good to keep things as normal as possible, worries about infections and the physical effects of the chemotherapy can make that impossible. How you change what you do depends on you and your family and on advice from your doctors.

As well as the time spent dealing with hospital appointments and related tasks, the emotional trauma can make it hard to keep up with all the usual everyday jobs and work. Do not be shy to ask for help – friends and family are often grateful to be able to do something concrete, so ask them to make a meal, do the ironing, mow the lawn, pick up the prescriptions. There may also be organisations that can help, such as local charities that will offer support or services such as doing your shopping. MacMillan provides social workers and community adult workers to support patients and their families, so ask for a referral in your hospital or contact them yourselves.

There are variations in what your local health service may offer. Some areas offer community nurses (or home nursing teams) who will come to your house to take blood tests, change dressings etc, which will save you a hospital trip. Your local pharmacist may be able to supply some of the less specialised medications, on prescription from your GP, which can be more convenient than using the hospital pharmacy. There may also be a 'shared care' arrangement with a doctor in your local hospital so that you can go to a closer hospital for blood tests, chemotherapy or if you get an infection.

Your appetite may be affected by the chemotherapy and steroids and can change a lot depending on where they are in the treatment schedule. If you are worried about your nutrition, talk to your medical team who will be able to advise you, or refer you to a dietician.

During the period of treatment, you will have ups and downs. Although the first shock of diagnosis will fade and you will feel that at least action is being taken to deal with the illness, worries about your progress and prognosis will come back from time to time, particularly if things do not go according to plan. It can be difficult to maintain the stability of your home environment and minimise the impact on your family. Help and support from close family and friends, online support networks or your community group can all help to keep your spirits up.

Treatment can range from just the initial biopsy or surgery to 6 months or even 2 years chemotherapy in other cases. It is helpful when you are given some idea of what treatment is planned and how long it might carry on for, so that you can try and organise your life to cope with this situation. Talk to your Consultant about this but keep in mind that it may need to change depending on your response to treatment.

WHAT HAPPENS AT THE END OF TREATMENT?

Even though the treatment is stressful, many patients find the end of treatment difficult. Some patients have said they felt the disease had only been kept at bay while the drugs were being given. When treatment ends, it can feel as if the 'safety net' has been taken away, so you feel more worried about the return of symptoms. This uncertainty can be eased a little by the regular follow-up that you will receive and by talking to your medical team about any concerns you have.

If the disease recurs, known as reactivation, most patients will again respond well to treatment. Your consultant will discuss the treatment options with you. Reactivation occurs in about one third of patients who had disease in more than one system/site but reactivation is rare in most other patients.

WHAT RESOURCES ARE THERE FOR FAMILY SUPPORT?

Families should be able to gain support from the group of professionals who work with their consultant. They are known as a multi-disciplinary team (or MDT) and usually include nurses, social workers, and psychologists.

Your GP will be kept informed by the hospital, but it is also useful to keep him or her up to date yourself. They can be a useful source of support for the whole family as he or she may be able to refer you for specialised support locally if needed.

Counselling can be useful. Your GP may be able to refer you to a counsellor if required. 'Relate' provides counselling for couples, which can help to mitigate the strain that can be placed on your relationship with your partner.

It is not always easy to find the help you need and you may need to ask a few people before you find the right support for you. As well as talking to your GP, try talking to the medical team at your hospital or shared care hospital, your community nurse, nurse specialist or social worker.

WHERE CAN I GET FINANCIAL SUPPORT?

In the UK the NHS covers all medical treatment and tests free of charge. However, serious illness inevitably puts a strain on family finances (travel, parking, loss of income etc).

You can also contact the Disability Benefits Centre or the Citizens Advice Bureau for further information. Macmillan has information on their website regarding benefits and flexible working.

It is vital that you talk to your employer to explain what is going on and find out what they can provide in terms of flexibility.

A carer's allowance may also be available. This is means-tested, so depends on your income. For further information, talk to your outreach nurse or social worker.

HOW DO I FIND OTHER PATIENTS?

One of the real difficulties for patients with a rare disease, such as LCH, is being able to talk to other patients, who have been through, or are going through the same experience as you. Your local medical team may be able to put you in touch with other families who have been affected by LCH.

Histio UK has an online forum called **Let's Talk** and can be found at www.HistioUKConnect.org which provides a useful source of support and information from other patients.

GLOSSARY

Absolute Neutrophil Count (ANC) – this refers to the number of a particular type of white blood cell (neutrophil) per volume of blood. Neutrophils are important for fighting infections.

Acute – disease or symptoms of rapid onset or short duration.

Alanine transaminase (ALT) – this is a blood test used in the diagnosis and study of acute liver disease.

Alkaline phosphatase (ALP) – this is an enzyme found throughout the body. High blood levels can indicate liver disease or bone problems.

Allergy – an extreme sensitivity to a substance, which may need to be avoided.

Alopecia – hair loss.

Anaemia – occurs when the number of red blood cells per volume of blood is reduced.

Anaesthetic – this is used to sedate or temporarily cause sleep so that surgery can be carried out painlessly.

Analgesic – medication used to reduce pain.

Antibiotic – medications that destroy or stop the growth of bacteria and so helps treat bacterial infection.

Anti-emetic – medicines that controls nausea and vomiting.

Anti-fungal – medications that destroy or stop the growth of fungi and so helps to treat fungal infection.

Anti-pyretic – medications that reduce fever (pyrexia) by lowering the body temperature, for example, paracetamol.

Aspartate transaminase (AST) – this is a blood test used in the diagnosis and study of acute liver disease.

Biopsy – the removal of a small piece of tissue from an organ or part of the body for microscopic examination.

Blood Count (BC) – the numbers of different blood cells in a volume of blood. A full blood count (FBC) measures the amount of haemoglobin, red cells and white cells as well as platelets per volume of blood.

Blood group – this is how a person's blood may be classified and the most common types are A, B, AB and O.

Blood transfusion – this involves giving blood previously donated by one person to another person.

Bone marrow – this spongy material in the centre of the large bones produces all the different blood cells.

Catheter – a thin flexible tube used to pass fluid into the body or to drain fluid out.

Cell – the living units from which animals and plants are built (for example, blood cells, brain cells). They are so tiny that thousands of cells could sit on a pin head.

Central line – a tube inserted under the skin into a large vein to make the giving of medication and the taking of blood samples easier.

Central Nervous System (CNS) – the brain and the spinal cord.

Chemotherapy (Chemo) – chemical substances (medication) used to treat cancer as well as LCH.

Chronic – describing a disease of long duration, often of gradual onset. The term does not imply anything about the severity of a disease.

Computerised Tomography (CT) scan – takes a number of x-ray pictures of the body from different angles and uses a computer to convert them into cross sectional x-ray pictures or 'slices' of the body. A higher radiation dose is received by the patient than with some conventional X-ray techniques, but the diagnostic information obtained is far greater.

Culture – when infection is suspected, samples of blood, urine, throat secretions etc. are taken and tested to try to identify the type of infection and the most appropriate treatment required. Cytotoxic – a drug that damages or destroys Cells.

Diagnosis – the exact name and type of the illness.

Electrolytes – a general term for the many minerals necessary to provide the proper environment for the cells of the body. These minerals include calcium, potassium, sodium, and chloride.

Emesis – vomiting.

Erythrocyte sedimentation rate (ESR) – the distance red blood cells travel in one hour in a sample of blood as they settle to the bottom of a test tube. The sedimentation rate is increased in inflammation, infection, cancer, rheumatic diseases, and diseases of the blood and bone marrow.

Febrile neutropenia – having a raised body temperature/fever while having low levels of white blood cells which fight infection (neutrophils) in the circulating blood.

Gastro intestinal – relating to the stomach and the intestines.

Gastrostomy tube – a tube inserted through the wall of the abdomen directly into the stomach.

This is a surgical procedure and is done under general anaesthesia. It can be used to give drugs, liquids and liquid food. This is also called a PEG tube.

Glomerular Filtration Rate (GFR) – a test to see how well the kidneys are working.

Haematology – the study of blood and blood diseases.

Haematuria – blood in the urine.

Haemoglobin – the substance within red blood cells that carries oxygen to the tissues of the body. The concentration of haemoglobin in blood is used as a measure of how many red cells there are per volume of blood.

Haemorrhage – bleeding

Histopathology – the microscopic study of cells in disease.

Hydration – this reflects how much body water a person has. Dehydration means too little, well hydrated means normal and over hydrated means too much.

Hypotension – low blood pressure.

Immune system – the body's defence against infection, disease and foreign substances.

Immunoglobulin – antibodies (type of protein) that are produced by certain white blood cells and play an essential role in the body's immune system. It is sometimes necessary to give immunoglobulin (antibodies) collected from donors to patients to support their immune system (e.g. IVIG, ZIG).

Immuno-suppression – reduced function of the immune system leading to an increased risk of infection

Infusion – the introduction of a fluid into a vein (into the blood stream).

Intravenous (I.V.) – the administration of a drug or fluid directly into a vein (into the blood stream).

Kidney – organ that removes waste substances from the body and also maintains the body's mineral and water balance.

Kinase Inhibitor - drugs that target the altered molecules in LCH. Their place in treatment is still under investigation.

Lesion – a change in tissue structure due to injury or disease. Ulcers, tumours, abscesses etc. may all be referred to as lesions.

Leucocytes – white blood cells.

Leucocytosis – a higher than normal concentration of white blood cells in the circulating blood.

Leucopenia – a lower than normal concentration of white blood cells in the circulating blood.

Liver – this part of the body takes part in many complex functions necessary for life, including digestion, production of certain blood proteins and elimination of many of the body's waste products.

Lymph nodes – these are more commonly known as 'glands' and are located in many places throughout the body. Lymph nodes filter the lymphatic fluid and store special cells that play an important role in defending the body against infections.

Lymphocytes – white blood cells responsible for the production of antibodies and for the direct destruction of invading organisms.

Nasogastric tube (NG tube) – a thin tube that is inserted through the nose, down the throat and into the stomach. It can be used to give drugs, liquids and liquid food.

Nasojejunal tube (NJ tube) – a thin tube that is inserted through the nose, down the throat, through the stomach and into the small bowel. It can be used to give drugs, liquids and liquid food.

Nausea – feeling sick.

Neurology – branch of medical science dealing with the nervous system.

Neutrophils – white blood cells that fight acute infection.

Oncology – the study, diagnosis and treatment of tumours, especially cancers.

Paediatric – the branch of medicine that specialises in the study and treatment of children.

Palliation – to relieve a symptom (like pain) but not necessarily a cure.

Pancytopenia – decrease of red cells, white cells and platelets in the blood.

PET scan – Positron Emission Tomography

Scan – uses short-lived radioactive substances linked to a substance commonly used by the body (eg sugar) to produce three-dimensional colour pictures of where in the body this substance is being used.

Plasma – the liquid portion of blood. It's a fluid which contains water and other components in which red cells, white cells and platelets are suspended.

Platelets – the tiny cells in circulating blood which aid blood clotting.

Prognosis – an estimate of the outcome of a disease based on the patient's current condition and accumulated medical knowledge about that disease and its best treatment.

Pyrexia – fever or abnormally high body temperature.

Reactivation – return of symptoms and signs of disease after a period of improvement (often used in the context of LCH).

Radiotherapy – the use of high-energy radiation to kill cells and shrink lesions.

Red blood cell – this is the cell in the blood that carries oxygen and contains the pigment haemoglobin. It is produced in the bone marrow.

Regression – a decrease in the size of a lesion or in the extent of disease in the body.

Relapse – the return of signs and symptoms of disease after a period of improvement (often used in the context of cancer).

Remission – a period of well-being with no signs of disease. There is no longer any evidence of the disease using the available investigations.

Renal – relating to kidneys.

Respiratory – related to the process of breathing.

Sepsis – infection.

Septicaemia – bacteria within the bloodstream causing someone to be very unwell.

Shingles – a painful or itchy rash in a particular area of the body caused by the same virus that causes chickenpox. People can only get shingles if they previously had chickenpox. Someone who has not had chickenpox can catch chickenpox from a person with shingles if they were in direct touching contact with the rash.

Sinuses – hollow spaces within the bones of the face.

Spleen – an organ near the stomach that forms part of the immune system. It is made up mainly of white blood cells.

Stomatitis – sore mouth.

Temperature spike – when body temperature suddenly rises.

Thrombocytopenia – less than the normal number of platelets in the blood.

Total Parenteral Nutrition (TPN) – a method of delivering nutrition or other substances directly into a vein (IV), bypassing the digestive system.

Toxicity – unpleasant or dangerous side-effects of treatment.

Urinary tract – the organs and structures involved with the production and removal of urine (i.e. kidneys, ureters, bladder, urethra).

Varicella – Chickenpox – an infection caused by the Varicella Zoster virus (VZV). The same virus causes shingles.

Viruses – a group of very small organisms that can produce disease. Viral infections include the common cold, chickenpox, measles, mumps and cold sores.

White blood cells – cells in the blood that are important in fighting infection (neutrophils, lymphocytes, etc).

Zoster Immunoglobulin (ZIG) – antibodies against Chickenpox (obtained from donors who previously had chickenpox). This can be given to individuals with lowered immunity who have not had chickenpox before to protect them if they came into contact with someone who has chickenpox.

