
Blood count

Summary

- A full blood count (FBC) test looks for abnormalities in your blood, such as unusually high or low numbers of blood cells.
 - This common blood test can help to diagnose a wide range of illnesses, infections and diseases.
 - Your doctor may arrange further tests to help determine the cause of the abnormality.
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The full blood count (FBC) is a common test that can help to diagnose a wide range of illnesses, infections and diseases. The doctor, nurse or technician takes a blood sample from you using a needle inserted into a vein in your hand or the crook of your elbow.

The blood sample is collected inside a special vial that contains a chemical to prevent the blood from clotting. The sample is sent to a laboratory and put into a machine for analysis. The FBC test looks for abnormalities in your blood, such as unusually high or low numbers of blood cells. If an abnormality is found, your doctor will usually arrange further tests to find the cause of the abnormality.

Blood count procedure

In most cases, no special preparation is needed before the test. The procedure normally includes the following:

- At the surgery, you are asked to sit or lie down.
- A tourniquet is put around your arm and tightened to increase blood volume in your veins. The doctor, nurse or technician may ask you to clench and unclench your fist to help swell your veins with blood.
- The injection site is wiped with an alcohol preparation to clean the site and reduce the risk of infection.
- The doctor, nurse or technician inserts a needle into your vein and draws the blood, which is collected inside a syringe or vial. You may experience some discomfort during the procedure, but this is usually minimal.
- Once the blood sample has been taken, the person taking the sample will ask you to press gauze or cotton wool against the injection site to minimise bleeding. They will cover the injection site with an adhesive dressing. You may have minor bruising at the injection site for a day or two.

Blood explained

Approximately seven to eight per cent of your body weight is blood. This means a person who weighs 70 kg has approximately 5 to 5.5 litres of blood.

Blood has four main components. The main component (60 per cent) is the liquid called plasma, which is made up of water, fat, protein, sugar and salts. Blood cells make up the other 40 per cent and include:

- **red blood cells** – known as erythrocytes. Every red blood cell contains haemoglobin, a protein that carries oxygen. Haemoglobin contains iron, which is important for carrying oxygen around the body
- **white blood cells** – known collectively as leukocytes. These are cells of the immune system that fight infection. The different types of white blood cells include lymphocytes, eosinophils, monocytes, neutrophils and basophils.
- **platelets** – help to clot the blood to stop bleeding.

Blood has numerous functions which include: transporting oxygen and nutrients to the tissues, transporting white cells and antibodies to fight infection, forming blood clots to prevent bleeding, and carrying waste products to the liver and kidneys which assist in filtering and cleaning the blood.

Full blood count assessment

The full blood count test:

- counts the total number of red cells, white cells and platelets in the sample
- determines the ratio of red cells to plasma ('haematocrit' or 'packed cell volume')
- determines the count of each of the white cell subsets
- works out the average haemoglobin level in the red cells ('mean cell haemoglobin')
- measures the average size of the red cells (mean cell volume)
- if required, reviews the blood cells under a microscope (blood smear/film).

Abnormalities in a full blood count

The results of a full blood count are compared to charts that list the normal range of numbers and ratios for each type of blood cell. A result above or below the normal range may indicate an abnormality.

Many illnesses, diseases or infections other than the ones listed below can cause an abnormal full blood count result. Abnormalities of the blood sample may include:

- **red blood cells and haemoglobin** – low levels (anaemia) may suggest not enough iron in the diet, blood loss or certain chronic diseases (such as kidney disease). High levels (polycythaemia) may suggest polycythaemia vera, kidney disease, chronic lung disease or physiological changes due to living in areas of high altitude
- **red blood cell to plasma ratio** – a lower-than-normal ratio of red blood cells to plasma suggests the person may have anaemia. The opposite finding suggests that the person may be dehydrated or has too many red cells (polycythaemia)
- **white blood cells** – low levels (leucopenia) may suggest the person has a viral infection, bone marrow disease or has been exposed to chemo- or radiotherapy. High levels (leucocytosis) may suggest bacterial infection, an inflammatory disease or bone marrow disease
- **platelets** – low levels (thrombocytopenia) may be the result of taking some medications, viral infection, bone marrow disorders, or an autoimmune disorder. High levels (thrombocythaemia) may suggest the presence of a bone marrow disease or an inflammatory condition.

Ask your doctor for further information about these tests.

Blood smear

A 'blood smear' is when a thin film of your blood sample is examined under a microscope.

A blood smear can reveal:

- a range of diseases including red blood cell disorders (such as sickle cell anaemia)
- the presence of blood-borne parasites such as **malaria**
- a white blood cell disorder such as **lymphoma** or **leukaemia**.

Full blood count and accuracy

The full blood count test is not foolproof and errors sometimes occur. If this happens, your doctor will want to repeat the test. Errors may include:

- failure of the equipment – for example, the blood clots in the vial
- incorrect labelling of the sample
- incorrect handling of the specimen – for example the sample is left in the sun and deteriorates
- contamination of the sample
- alcohol in the blood.

Where to get help

- Your **GP (doctor)**
- **Australian Red Cross, National Donor Information Line Tel. 13 14 95**

This page has been produced in consultation with and approved by:

Australian Centre for Blood Diseases

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