

Blood count

The full blood count (FBC) is a common test that can help to diagnose a wide range of illnesses, infections and diseases. The doctor takes a blood sample, using a needle inserted into a vein in the hand or crook of the 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 the blood, such as unusually high or low numbers of blood cells. If an abnormality is found, the doctor will usually arrange further diagnostic tests to determine the underlying cause of the abnormality.

Test procedure

In most cases, no special preparation is needed before the test. The procedure normally takes place like this:

- At the surgery, you are asked to sit or lie down.
- Your arm is banded with a tourniquet to increase blood volume in the 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 reduce the risk of infection.
- The doctor inserts the needle into a vein and draws the blood. The blood may be collected inside a syringe or vial. Some patients experience discomfort during this procedure but this is usually minimal.
- Once the blood sample has been taken, the doctor asks you to press gauze or cotton wool against the injection site to minimise bleeding. The injection site is covered with an adhesive dressing. You may have minor bruising at the injection site for a day or two.

Blood explained

The main component of blood (60%) is the liquid called plasma. Blood cells account for the other 40 per cent. The blood cells include:

- **Red blood cells** – known as erythrocytes. Every red blood cell contains haemoglobin, a complicated protein that carries oxygen. Haemoglobin contains iron, which is important to carry 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** – these help to clot the blood to stop bleeding.

Blood 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 the plasma ('haematocrit' or 'packed cell volume')
- Determines the count of each of the white cell sub-sets
- Calculates the mean haemoglobin level in the red cells ('mean cell haemoglobin')
- Measures the mean size of the red cells (mean cell volume)
- Checks the size and shape of the blood cells (blood smear).

Frequently detected abnormalities in an FBC

A person's results obtained from a blood count are compared to charts that list the normal range of number and ratio 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 FBC 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. 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 the 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 (leucopaenia) 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 or an inflammatory disease.
- **Platelets** – low levels (thrombocytopenia) may be the result of taking some drugs or may leukaemia, HIV or an autoimmune disorder. High levels (thrombocythaemia) may suggest the presence of a bone marrow or inflammatory disease.

Your doctor may arrange further tests to help determine the cause of the abnormality. Ask your doctor for further information about these tests.

Blood smear

A 'blood smear' means that a thin film of your blood sample is examined under a microscope. A blood smear can reveal:

Abnormal size or shape of cells, which may suggest a disease such as sickle cell anaemia
The presence of blood-borne parasites such as malaria.

This test is not always accurate

The FBC test is not foolproof and errors sometimes occur. If this happens, the 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
- Contamination of the sample
- Alcohol in the blood.

Where to get help

- Your doctor
- Australian Red Cross, National Donor Information Line Tel. 131 495

Things to remember

- The full blood count (FBC) test looks for abnormalities in the 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.

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

Australian Centre for Blood Diseases

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