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Full blood count and blood film

Different conditions can cause an abnormality in a blood count. Therefore, if an abnormality is found, you often need further tests to find the cause. These tests include a full blood count test and a blood smear test. In the United States, a full blood count is called a 'complete blood count' (CBC for short) and so you might see reference to this in American articles or TV shows.

What is a full blood count test?

A full blood count (FBC) test is one of the most common blood tests done. A blood sample is taken which is prevented from clotting by using a preservative in the blood bottle. The sample is put into a machine which automatically:

- Counts the number of red cells, white cells and platelets per millilitre of blood.
- Measures the size of the red blood cells and calculates their average (mean) size.
- Calculates the proportion of blood made up from red blood cells (the haematocrit).
- Measures the amount of haemoglobin in the red blood cells.

What does a full blood count test look for?

The main abnormalities which can be detected are:

- Anaemia - this means that you have fewer red blood cells than normal, or have less haemoglobin than normal in each red blood cell. The most common reason for an FBC to be done is to check for anaemia. There are many causes of anaemia. The average size of the red cells can give a clue as to the cause of some anaemias. For example, the most common cause of anaemia in the UK is a lack of iron. (Iron is needed to make haemoglobin.) With this type of anaemia, the average size of the red blood cells is smaller than normal. The cause of iron deficiency can be benign (for example, heavy periods), or very serious (for example bowel (colorectal) or stomach cancer).
- **Too many red cells** - this is called polycythaemia and can be due to various causes.
- **Too few white cells** - this is called leukopenia. Depending on which type of white cell is reduced it can be called neutropenia, lymphopenia or eosinopenia. There are various causes.
- **Too many white blood cells** - this is called leucocytosis. Depending on which type of white cell is increased it is called neutrophilia, lymphocytosis, eosinophilia, monocytosis or basophilia. There are various causes - for example:
    - Various infections can cause an increase of white blood cells.
    - Certain allergies can cause an eosinophilia.
    - Leukaemia is a type of blood cancer where there is a large number of abnormal cells, usually white blood cells. The type of leukaemia depends on the type of white cell affected.
- **Too few platelets** - this is called thrombocytopenia. This may make you bruise or bleed easily. There are various causes.
- **Too many platelets** - this is called thrombocythaemia (or thrombocytosis). This is due to disorders which affect cells in the bone marrow which make platelets. Thrombocytosis is a 'soft' indicator for cancer ie it is linked with an increased likelihood of there being a cancer somewhere, but does not tell us where the cancer is, or if there definitely is one.

What are the normal values for a full blood count test?

The FBC test provides a number of results that provide information about red and white blood cells and platelets. The normal values for each of these three main blood cells are:

- **Haemoglobin**: the normal adult range is:
  - 130-170 g/L for men.
  - 115-150 g/L for women.
- **White blood cell count**: the normal adult range is 4.0-10.0 x 10^9/L.
- **Platelet count**: the normal range for adults is 150-400 x 10^9/L.

These 'normal ranges' provide a guide. However haemoglobin, white blood cell and platelet levels can vary with factors such as age, pregnancy and with different hospital laboratories. The importance of the test result therefore needs to be considered in the context of each individual person.

What is a blood film?

This is a thin film of blood which is examined under a microscope. This is used to look for abnormal shapes of cells which cannot be detected by the automated machine. For example, to detect the characteristic 'sickle' shape of the red blood cells which occur in sickle cell anaemia. Also, infecting germs such as the malaria parasite can be seen in a blood smear.

Do I need further tests?

Lots of different conditions can cause an abnormality in a blood count. Therefore, if an abnormality is found, you often need further tests to find the cause. For example, anaemia is the most common abnormality.

If you are found to have anaemia, you may be advised to have another blood test to check on the level of iron or certain vitamins in your blood. And, if these tests are normal then other tests may be needed - it is important to work out the reason for the anaemia, rather than just treating it.

A bone marrow biopsy is sometimes needed to find the cause of anaemia and other blood cell problems. It is in the bone marrow that the blood cells are made from blood 'stem' cells. A sample (biopsy) of bone marrow can be examined under the microscope and tested to help to find the cause of the abnormality.

Various other tests may be advised, depending on the abnormality found in the blood count.

Further reading

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