

## Blood tests

The main reasons to know your blood group are if you need to have a blood transfusion or if you are pregnant. You cannot request a blood test just to know your blood group on the NHS.

## What is blood made up of?

### Blood cells

These can be seen under a microscope and make up about 40% of the blood's volume. Blood cells are made in the bone marrow by blood 'stem' cells. Blood cells are divided into three main types:

### Red cells (erythrocytes)

These make blood a red colour. One drop of blood contains about five million red cells. A constant new supply of red blood cells is needed to replace old cells that break down. Millions of red blood cells are made each day. Red cells contain a chemical called haemoglobin. This binds to oxygen and takes oxygen from the lungs to all parts of the body.

### White cells (leukocytes)

There are different types of white cells which are called neutrophils (polymorphs), lymphocytes, eosinophils, monocytes and basophils. They are part of the [immune system](#). Their main role is to defend the body against infection.

- Neutrophils engulf germs (bacteria) and destroy them with special chemicals.
- Eosinophils and monocytes also work by swallowing up foreign particles in the body.
- Basophils help to intensify inflammation.

Inflammation makes blood vessels leaky. This helps specialised white blood cells get to where they are needed. Lymphocytes have a variety of different functions. They attack viruses and other germs (pathogens). They also make antibodies which help to destroy pathogens.

## **Platelets**

These are tiny and help the blood to clot if we cut ourselves.

## **Plasma**

This is the liquid part of blood and makes up about 60% of the blood's volume. Plasma is mainly made from water but also contains many different proteins and other chemicals, such as:

- Hormones.
- Antibodies.
- Enzymes.
- Glucose.
- Fat particles.
- Salts.

In order to constantly make blood cells, haemoglobin and the constituents of plasma, you need a healthy bone marrow and nutrients from food including iron and certain vitamins.

When blood spills from your body (or a blood sample is taken into a plain glass tube) the cells and certain plasma proteins clump together to form a clot. The remaining clear fluid is called serum.

## **How is a blood test normally done?**

- The vein used for blood sampling is usually on the inside of your elbow or the back of your wrist.
- A tight band (tourniquet) is usually placed around your upper arm. This makes the vein fill with blood and makes it easier for the blood sample to be taken.
- The skin over the vein may be cleaned with an antiseptic wipe.

- A needle is then inserted into the vein through the clean skin, causing a sharp pricking sensation. The needle is connected either to a syringe, or directly to blood sample bottles.
- The tourniquet is undone. When the required amount of blood is taken, the needle is removed. The small wound is pressed on with cotton wool for a few minutes to stop the bleeding and prevent bruising. A sticking plaster may be put on. The blood is placed in bottles. There may be a slight ache following a blood test.

## How much blood is normally taken?

This depends on the sort of tests you are having done. Many tests can be done on the same sample of blood so you do not need to have a single bottle for each one: The bottles do not necessarily have to be completely filled either.

- Purple bottle – 3 ml – used for a full blood count (FBC) and ESR. An FBC needs 1 ml; a full 2.5 ml is needed if an ESR is also performed.
- Yellow bottle – 2.5 ml – this is used for a lot of different chemical tests, so it is usually completely filled.
- Other less common tests come in bottles up to 6 ml in volume and blood culture bottles are the largest size at 10 ml.

If you need a lot of tests therefore, you could end up having about 30 ml of blood (about six medicine teaspoons) taken out of your arm. It's worth saying that the body can well cope with this, as the volume is soon made up by the blood production system in the bone marrow. Considering that about 500 ml of blood are given by blood donors during each donation, this is certainly not an excuse for tea and biscuits!

## Variations of blood taking

Some blood tests require several samples taken over a period of time. For example, they may be done to check how you respond to something. If you require repeated samples fairly close to each other (over the following few hours or so), a doctor may insert a 'butterfly' needle into the vein, which can be taped to the skin. Samples of blood can then be taken without using a needle each time.

If only a small amount of blood is needed then a few drops of blood can be squeezed out from a small prick in the tip of the finger or earlobe. For example, only a small amount of blood is needed for checking the blood sugar (glucose) level, using a test strip of paper.

Some blood tests are taken from an artery in the wrist. For example, to measure the level of oxygen in the artery. This is usually only done in hospital in certain circumstances.

Children who need a blood test may be given cream to put on at home before the test to numb the skin.

## **Fasting blood test**

You may be told not to eat or drink anything except water before certain blood tests. The amount of time you will be requested to fast varies from test to test and even sometimes from doctor to doctor. The fasting time for a blood glucose test for example is usually 8 to 10 hours. For a fasting cholesterol test it can be 9 to 12 hours. Fasting tests are usually done in the morning so you can fast through the night. Recent guidelines advise that fasting may not be necessary when having a cholesterol check, but be guided by your doctor.

## **Are there any complications from blood taking?**

Sometimes a bruise develops where the needle was inserted. This is much less likely to happen if you press over the site with cotton wool for several minutes with your arm left straight (not bent).

As with any wound, an infection may develop where the needle was inserted. See your doctor if the wound site becomes red and inflamed. Rarely, some people feel faint during a blood test. Tell the person doing the test if you feel faint, as you should immediately lie down to prevent fainting.

# Different blood samples

Blood can be tested for many different things. The person who requests the blood test will write on the form which tests they want the laboratory to do. Different blood bottles are used for different tests. For example, for some tests the blood needs to clot and the test is looking for something in the serum. For some tests, the blood is added to some chemicals to prevent it from clotting. If the blood glucose is being measured then the blood is added to a special preservative, etc. This is why you may see your blood added to blood bottles of different sizes and colours.

Blood tests are taken for many different reasons - for example, to:

- **Help diagnose certain conditions, or to rule them out** if symptoms suggest possible conditions.
- **Monitor the activity and severity of certain conditions.** For example, a blood test may help to see if a condition is responding to treatment.
- **Check the body's functions** such as liver function and kidney function when you are taking certain medicines which may affect the liver or the kidneys.
- **Check your blood group** before receiving a blood transfusion.

## Common blood tests

- **FBC blood test** - this is also called a full blood count. It checks for anaemia and other conditions which affect the blood cells.
- **UE blood test** - this is often written as 'U+E', U and Es' or 'U&E' and stands for urea and electrolytes. It is used as a measure of kidney function.
- **GFR blood test** - this is another measure of kidney function.
- **LFT blood test** - this stands for liver function test.
- **Blood sugar (glucose) level.**
- **HbA1c blood test** - this is a test used in the diagnosis and management of diabetes.
- **GTT.**

- [Blood clotting tests.](#)
- [Tests for inflammation.](#)
- [Blood cholesterol level.](#)
- [Immunology](#) – such as checking for antibodies to certain viruses and germs (bacteria).
- [Blood grouping.](#)
- [TSH blood test](#) – this stands for thyroid-stimulating hormone and is one of the tests for thyroid function.
- [CA 125 blood test](#) – this is a test for [ovarian cancer](#).
- [PSA blood test](#) – this is a test for [prostate cancer](#).
- [BNP blood test](#) – this is a test for [heart failure](#).
- [ANA blood test](#) – this is a test for [autoimmune conditions](#).
- [MCH blood test](#) – this is used in the investigation of [anaemia](#).
- [MCV blood test](#) – this is used in the investigation of [anaemia](#).
- [INR blood test](#) – this is a test for blood clotting for people on [anticoagulants](#).
- [CK blood test](#) – this is a test for [heart attacks](#), and muscle and brain conditions.
- [B12 blood test.](#)
- [FSH blood test](#) – a test for ovarian function and [polycystic ovary syndrome](#).
- [CEA blood test](#) – a test for [bowel cancer](#).
- [LDH blood test](#)- a test for tissue damage in the body.

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## Further reading

- [Lab Tests Online® - UK](#)

- [Nordestgaard BG, Langsted A, Mora S, et al](#); Fasting is not routinely required for determination of a lipid profile: clinical and laboratory implications including flagging at desirable concentration cut-points—a joint consensus statement from the European Atherosclerosis Society and European Federation of Clinical Chemistry and Laboratory Medicine. *Eur Heart J.* 2016 Jul 1;37(25):1944–58. doi: 10.1093/eurheartj/ehw152. Epub 2016 Apr 26.
- [Jorgensen HL, Lind BS](#); Blood tests – too much of a good thing. *Scand J Prim Health Care.* 2022 Jun;40(2):165–166. doi: 10.1080/02813432.2022.2104436.

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