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## Blood groups and types

ABO and rhesus are both types of antigens found on the surface of red blood cells. There are lots of other types but these are the most important.

The main reasons to know your blood group are if you need to have a blood transfusion or if you are pregnant.

### What is a blood group?

Red blood cells (erythrocytes) have certain proteins on their surface, called antigens. Also, your plasma contains antibodies which will attack certain antigens if they are present.

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### ABO blood types

These were the first type discovered.

- If you have type A antigens on the surface of your red blood cells, you also have anti-B antibodies in your plasma.
- If you have type B antigens on the surface of your red blood cells, you also have anti-A antibodies in your plasma.
- If you have type A and type B antigens on the surface of your red blood cells, you do not have antibodies to A or B antigens in your plasma.

- If you have neither type A nor type B antigens on the surface of your red blood cells, you have anti-A and anti-B antibodies in your plasma.

It is not known what the functions of the A and B antigens are. People who don't have either (blood group O) are still just as healthy. There is some evidence that people of different blood groups may be more or less susceptible to certain diseases – for example, blood clots in the blood vessels (thromboembolism) and [malaria](#). There is no evidence that people with different blood groups should follow different diets.

## **Rhesus types**

Most people are 'rhesus positive'. This means they have rhesus antigens on their red blood cells. But, about 3 in 20 people do not have rhesus antibodies and are said to be 'rhesus negative'.

## **Blood group names**

Your blood group depends on which antigens occur on the surface of your red blood cells. Your genetic make-up, which you inherit from your parents, determines which antigens are present on your red blood cells. Your blood group is said to be:

- A+ (A positive) if you have A antigens and rhesus antigens.
- A- (A negative) if you have A antigens but don't have rhesus antigens.
- B+ (B positive) if you have B antigens and rhesus antigens.
- B- (B negative) if you have B antigens but don't have rhesus antigens.
- AB+ (AB positive) if you have A antigens, B antigens and rhesus antigens.
- AB- (AB negative) if you have A antigens and B antigens but don't have rhesus antigens. This is the rarest blood group in the UK.

- O+ (O positive) if you have neither A nor B antigens but you do have rhesus antigens. This is the commonest blood group in the UK.
- O- (O negative) if you don't have A, B or rhesus antigens.

### **Other blood types**

There are many other types of antigens which may occur on the surface of red blood cells. However, most are classed as 'minor' and are not as important as ABO and rhesus.

## **How is blood group testing done?**

Basically, a sample of your blood is mixed with different samples of plasma known to contain different antibodies. For example, if plasma which contains anti-A antibodies makes the red cells in your blood (erythrocytes) clump together, you have A antigens on your blood cells. Or, if plasma which contains rhesus antibodies makes the red cells in your blood clump together, you have rhesus antigens on your blood cells.

By doing a series of such tests it is possible to determine what antigens are on your red blood cells and therefore determine your blood group. Routine blood grouping checks for your ABO and rhesus status. Other red cell antigens are tested for in certain other situations.

## **Blood transfusions and cross-matching**

If you have a blood transfusion, it is vital that the blood you receive is well matched (compatible) with your own. For example, if you receive blood from a person who is A positive and you are B positive then the anti-A antibodies in your plasma will attack the red blood cells (erythrocytes) of the donated blood.

This causes the red cells of the donated blood to clump together. This can cause a serious or even fatal reaction in your body. Therefore, before a blood transfusion is done, your blood group is tested. Then a donor bag of blood is selected with the same ABO and rhesus blood group as yourself.

Then, to make sure there is no incompatibility, a small sample of your blood is mixed with a small sample of the donor blood. After a short time the mixed blood is looked at under a microscope to see if there has been any clumping of blood. If there is no clumping, then it is safe to transfuse the blood.

## Blood groups and pregnancy

A blood group test is always done on pregnant women. If the mother is rhesus negative and the unborn baby is rhesus positive (inherited from a rhesus positive father) then the mother's immune system may produce anti-rhesus antibodies.

These may attack and destroy the baby's blood cells. This is rarely a problem in a first pregnancy. However, without treatment, this can become a serious problem in subsequent pregnancies, as the mother's immune system will be 'sensitised' after the first pregnancy. This is called rhesus disease, but it is rare nowadays as it can be prevented with injections of a medicine called anti-D immunoglobulin.

## Donating blood

Giving blood is simple and saves lives. The blood transfusion service needs people of all blood groups to donate blood, but especially if you have one of the rarer blood groups. By donating blood, you will find out what blood group you are.

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## Further reading

- [Lab Tests Online® – UK](#)
- [Dean L](#); ABO Blood Group. Medical Genetics Summaries. Bethesda (MD): National Center for Biotechnology Information (US); 2012–[updated 2015 Jul 27].

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