

Blood groups

The circulatory system consists of the heart, blood vessels and blood. The blood carries oxygen and nutrients to each cell and picks up waste products (such as carbon dioxide) for elimination. The bulk of blood is made up of plasma. Floating in plasma are the red blood cells that carry oxygen, the white cells that form part of the immune system, and clotting agents called platelets.

The two main ways to classify blood groups are the ABO system and the Rh system. Together, they comprise the eight main blood groups. Other blood group systems exist and, to date, researchers have identified around 300 minor factors.

The ABO group

The four different blood groups in the ABO system are A, B, AB and O. A person's blood group is determined by a pair of genes, one each inherited from their mother and father. Each blood group is identified by its own set of molecules (called antigens), which are located on the surface of red blood cells. When a person needs a blood transfusion, it is important that the donated blood matches their particular blood group.

The Rh factor

A person's blood type used to be called their 'Rhesus type' but now we simply say 'Rh type'. Our Rh type is determined by a pair of genes, one inherited from each parent. Blood is either Rh-positive or Rh-negative, depending on whether or not certain molecules are present.

A person who is Rh-negative will experience a severe immune system reaction if Rh-positive blood gets into their bloodstream. This can happen during pregnancy if an Rh-negative woman carries an Rh-positive baby. If blood cells from the baby travel across the placenta, the woman's immune system will regard the Rh-positive cells as a threat. Specialised white blood cells will make antibodies designed to kill Rh-positive blood cells.

If the woman later conceives another Rh-positive baby, her immune system will flood the fetus with antibodies. These antibodies then destroy the baby's red blood cells. If left untreated, this can result in severe anaemia or even death. This is called haemolytic disease of the newborn (HDN).

Preventing haemolytic disease of the newborn

HDN is now rare, since Rh-negative mothers are immunised with an immunoglobulin derived from donated blood products throughout the pregnancy and within 72 hours of giving birth.

The immunoglobulin works by breaking down the baby's red blood cells inside the mother's bloodstream before her immune system has time to react.

Blood transfusion

A blood transfusion is the transfer of blood or blood components from one person to another. The donated blood must match the recipient's blood type or complications will occur.

'O negative' blood can be given to anybody if necessary, but it is always preferable to match the exact blood group. The most common types of transfusion include red cells or other components such as plasma or platelets. Whole blood transfusions are very uncommon and only occur in particular circumstances.

Generally, both receiving and donating blood are safe medical procedures in Australia.

Blood groups in Australia

A person's blood group is described by the appropriate letter (A, B, AB or O) and by whether or not their blood is Rh positive or Rh negative.

According to the Australian Red Cross Blood Service, the percentage of blood group frequency in Australia is:

- **O positive** – 40 per cent
- **O negative** – 9 per cent
- **A positive** – 31 per cent
- **A negative** – 7 per cent
- **B positive** – 8 per cent
- **B negative** – 2 per cent
- **AB positive** – 2 per cent
- **AB negative** – 1 per cent.

Where to get help

- Your doctor
- Australian Red Cross Blood Service Tel. 13 14 95

Things to remember

- The two major classifications of blood are the ABO system and the Rh system.
- The four blood groups are A, B, AB and O. Each of these will be either Rh positive or Rh negative.
- Donor blood must match the recipient's blood group or serious reactions can occur.

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

Australian Red Cross Blood Service

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