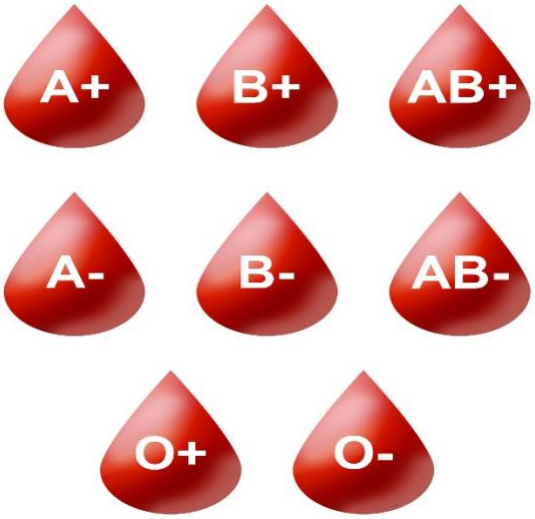
Blood Groups and Blood Transfusions

There are more than 20 genetically determined blood group systems known today, but the ABO and Rh systems are the most important ones used for blood transfusions. Not all blood groups are compatible with each other. Mixing incompatible blood group leads to blood clumping or agglutination, which is dangerous. *Nobel Laureate and Karl Landsteiner was involved in the discovery of both the ABO and Rh blood groups.*

- **Cattle**: There are 11 major blood group systems in cattle, A, B, C, F, J, L, M, R, S, T and Z. The B group has over 60 different antigens, making it difficult to closely match donor and recipient. Newborn calves lack this antigen, acquiring it in the first 6 months of life.
- **Sheep**: Seven blood group systems have been identified in sheep (A, B, C, D, M, R and X). Similar to cattle, the B system is highly polymorphic.
- **Goats**: Five major systems have been identified in goats; A, B, C, M and J.
- **Horse:** There are over 30 blood groups in horses, of which only 8 are major systems are internationally recognized (A, C, D, K, P, Q and U).

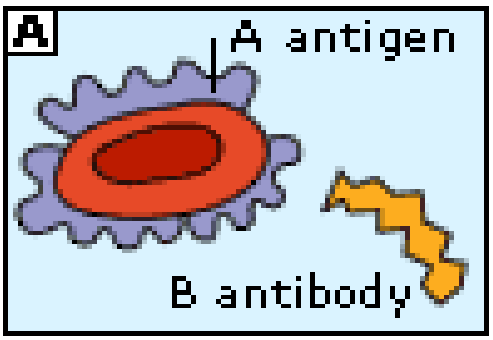
ABO blood grouping system:

There are 4 main blood groups (types of blood) – A, B, AB and O. blood group is determined by the genes which you inherit it from your parents. Each group can be either Rh positive or Rh negative, which means in total there are 8 blood groups.



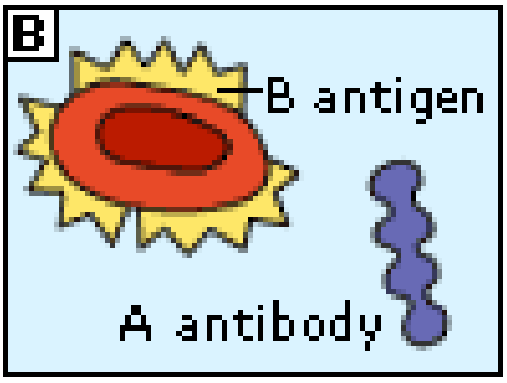
Blood group A:

If you belong to the blood group A, you have A antigens on the surface of your red blood cells and B antibodies in your blood plasma.



Blood group B:

If you belong to the blood group B, you have B antigens on the surface of your red blood cells and A antibodies in your blood plasma.

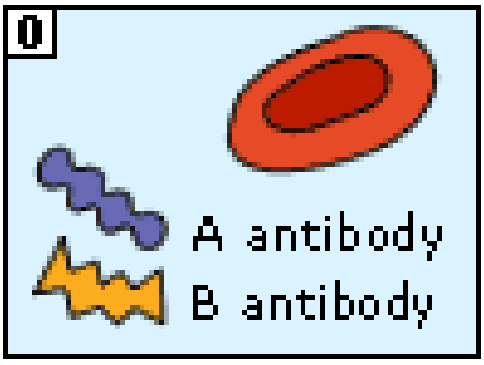


Blood group AB:

If you belong to the blood group AB, you have both A and B antigens on the surface of your red blood cells and no A or B antibodies at all in your blood plasma.

Blood group O:

If you belong to the blood group O, you have neither A or B antigens on the surface of your red blood cells but you have both A and B antibodies in your blood plasma.



Antigen: is glycol-protein agent present on RBCs (membrane surfaces) a on their surface.

Antibody: protein molecules that are produced in the body of cells called lymphocytes and that act primarily as a defense against invasion by foreign substances.

Rh factor blood grouping system:

Many people also have a so called Rh factor on the red blood cells surface. This is also an antigen and those who have it are called Rh^+. Those who haven't are called Rh. A person with Rh^- blood does not have Rh antibodies naturally in the blood plasma. But a person with Rh^- blood can develop Rh antibodies in the blood plasma if he or she receives blood from a person with Rh^+ blood. A person with Rh^+ blood can receive blood from a person with Rh^- blood without any problems.

Blood group notation:

According to above blood grouping systems, you can belong to either of following 8 blood groups:

A Rh^+	**B Rh^+**	**AB Rh^+**	**0 Rh^+**
A Rh^-	**B Rh^-**	**AB Rh^-**	**0 Rh^-**

Blood Transfusions

A person with A^+ blood receives B+ blood. The B antibodies in the A+ blood bind the antigens in the B^+ blood and agglutination occurs. This is dangerous because the agglutinated red blood cells break after a while and their contents leak out and become toxic.