Study material:

Paper: Animal Physiology and Biochemistry: Life Sustaining System (409T)
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Topic: ABO blood group, Rh factor and MN blood group.

Blood is a connective tissue and most of the crucial component of the circulatory system. In a healthy person, approximately 5 litres of blood circulate throughout the body. Even though components of blood are the same for all humans, there are various blood types. The discovery of ABO blood by Karl Landsteiner was a landmark in understanding the characteristics of blood in Human. The international society of blood transfusion has identified 38 human blood types based on the surface antigens on the red blood cells. The most common types are ABO, Rh and MNS blood types.

ABO blood group:

ABO antigens are glycoproteins encoded by genes present on Chromosome 9. The red blood cells have a base glycoprotein moiety made up of fructose, Galactose and N-acetylglucosamine. The ABO grouping is of two antigens- Antigen A and Antigen B. The ABO blood grouping system is classified into four types based on the presence or absence of antigens on the red blood cells surface and plasma antibodies.

- Group A - contains antigen A and antibody B.
- Group B – contains antigen B and antibody A.
- Group AB – contains both A and B antigen and no antibodies (neither A or B)
- Group O – contains neither A nor B antigen and both antibodies A and B are present.

The ABO group system is important during blood donation or blood transfusion as mismatching of blood group can lead to clumping of red blood cells with various disorders.

Rh blood group:

Rh factor is another antigen present on red blood cell surface. Based on its presence and absence, a person can be classified as either Rh positive or negative. Landsteiner and Weiner coined the term Rh- factor in 1937. So, far, more than 45 different antigens are identified in the Rh- system. Rh blood grouping is most commonly used along with ABO blood grouping.

MNS blood group:

MNS blood group antigens are expressed on the surface of red blood cells. These are encoded by two highly polymorphic genes, glycophorin A and glycophorin B. The glycophorin A codes for M or N antigen, whereas glycophorin B codes for S or s antigen and N antigen. The genes can recombine to produce over 40 different antigens.