Lab -7-

Comodominance :Blood group Inheritance

The two alleles are expressed equally, and neither allele is dominant or recessive

A blood type (also called a blood group) is a classification of blood based on the presence and absence of antibodies and also based on the presence or absence of inherited antigenic substances on the surface of red blood cells (RBCs).

These antigens may be proteins, carbohydrates, glycoprotein's, or glycolipids, depending on the blood group system. Some of these antigens are also present on the surface of other types of cells of various tissues.

Several of these red blood cell surface antigens can stem from one allele (or an alternative version of a gene) and collectively form a blood group system. Blood types are inherited and represent contributions from both parents.

Blood serum is blood plasma without clotting factors**.**

7-1 The ABO Blood Group System

There are four major blood groups determined by the presence or absence of two antigens – A and B – on the surface of red blood cells:

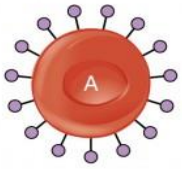
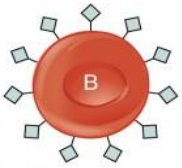
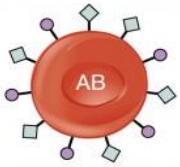
1- **Group A** – has only the A antigen on red cells (and B antibody in the plasma)

2- **Group B** – has only the B antigen on red cells (and A antibody in the plasma)

3- **Group AB** – has both A and B antigens on red cells (but neither A nor B antibody in the plasma) (**universal recipient).**

4- **Group O** – has neither A nor B antigens on red cells (but both A and B antibody are in the plasma) (**universal donor).**

Blood Type

	A	B	AB	O
Red Blood Cell Type				
Antibodies in Plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in Red blood Cell	A antigen	B antigen	 A and B antigens	None
Blood Types Compatible in an Emergency	A, O	B, O	A, B, AB, O (AB^+ is the universal recipient)	O (O is the universal donor)

Genotypes	Antibodies in serum	Antigens on RBCs	Blood group
I^AI^A or I^{Ai}	Anti-B	A	A
I^BI^B or I^Bi	Anti-A	B	B
I^AI^B	Neither	A and B	AB
ii	Anti-A and Anti-B	Neither	O

2-7 The Rh system

☐ **The Rh** blood group system (including the Rh factor) is one of thirty-five known human blood group system. It is the second most important blood group system, after ABO.

☐ **Rh antigens** are transmembrane proteins exposed at the surface of red blood cells. They be used for the transport of carbon dioxide and/ or ammonia across the plasma membrane.

- ☐ They are named for the **rhesus monky** in which they were first discovered. The commonly used terms Rh factor, **Rh positive and Rh negative** refer to the **D antigen** only.
- ☐ The **D antigen** is used to determine the risk of hemolytic disease of the new born (or **eryrthroblastosis fetalis**) for Rh disease management.
- ☐ The hemolytic condition occurs when there is an **incompatibility** between the blood types of the **mother and the fetus**. There is also potential **incompatibility** if the **mother is Rh nega**tive and the **father is positive**.

- When any incompatibility is detected, the mother often receives an injection at 28 weeks gestation and at birth to avoid the development of antibodies toward the **fetus**. (**Rh immune globulin injection).**
- The disorder in the fetus due to **Rh D incompatibility** is known as ***erythroblastosis fetalis*.**