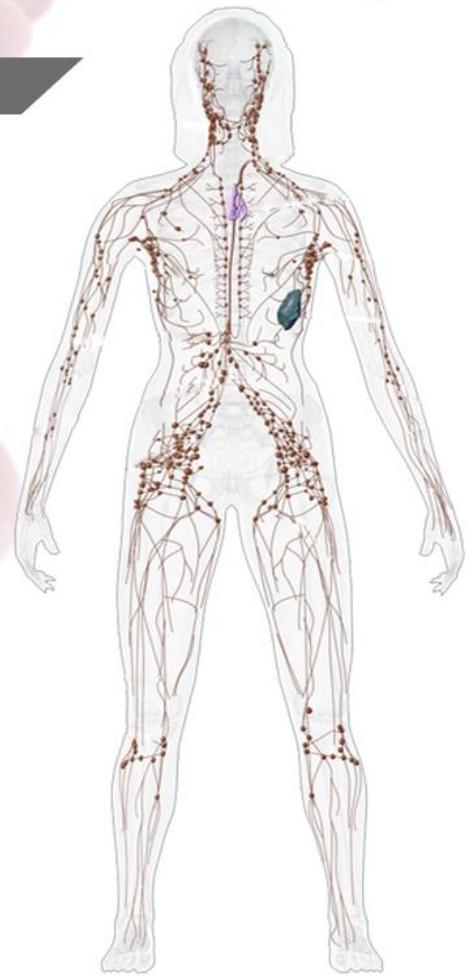




S Hematology and Lymphatic system

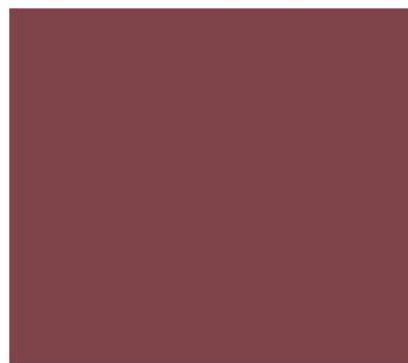
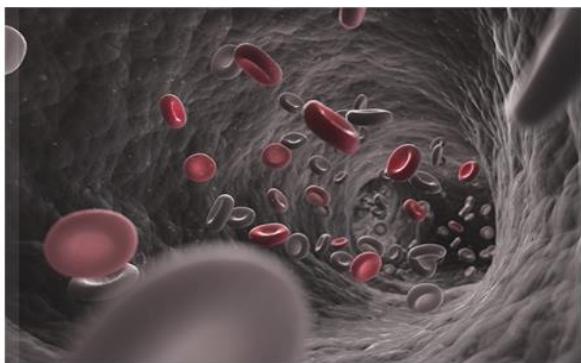
Subject | Online physiology



Done by | Maryam Ali

Corrected by | ...

Doctor | Salim



Blood Classifications

There are **three main** blood classification systems: **the classic groups**, **the minor groups** and **the Rhesus (Rh) blood grouping**.

The Classic Groups

*There are **four** classic blood groups: **A, B, AB and O**.

On the surface of the RBCs antigens (also known as agglutinogens) are present. If the antigens present are of the **A type**, the patient is said to have an **A** blood group, if the antigens present are of the **B type**, the patient is said to have a **B** blood group, if the antigens present are of **both the A type and the B type**, the patient is said to have an **AB blood** group and if there are **no antigens** present then the patient is said to have an **O** blood group. These antigens are genetically inherited from birth until death.

*People with the **A** blood group have **β -antibodies (anti-B agglutinin)** in the plasma, people with the **B** blood group have **α -antibodies (anti-A agglutinin)** in their plasma, people with the **AB** blood group have **no antibodies** in their plasma and people with the **O** blood group have **both α and β -antibodies in their plasma**.

*These **antigens** are also present in other tissues such as the **salivary glands, the kidneys, the liver, the lungs, the semen, intestine and the amniotic fluid**.

*These antibodies are not usually found in the plasma of newborn babies (at birth) as they only begin to appear by the **second month after birth**, probably due to the body getting exposed to antigens from food, bacteria or the atmosphere. Sometimes these antibodies do not appear at all even after the second month of birth, but this condition is very rare ,**unless the**

individual gets exposed to a blood group from another individual of the same ABO groups as in case of blood transfusion .

*The antibodies' concentration keeps on increasing from the age of 2 months until reaching its maximum at the age of 10 years and after that the concentration begins to drop. This is true for all antibodies and not only for the α and β antibodies mentioned above and this is why we say that elderly are more susceptible to disease and that their immunity is weak.

A, B, AB or O blood groups describe the **phenotype of the patient's blood group, now **we want to look at the genotype**:

Blood groups	Possible genotypes		
	AA	AO	
	HOMOZYGOTES	HETEROZYGOTES	
B	BB	BO	
	HOMOZYGOTES	HETEROZYGOTES	
AB	AB		
O	OO	TWO GENES ARE RECESSIVE	

The A and B alleles are **dominant while the O allele is **recessive** which is why there are **two** possible genotypes for the A and B blood types while only a **single possible genotype** for AB and O blood types

Minor Blood Groups

The surface of the RBCs not only contain the ABO antigens , but also contains many other series of genetically antigens , they appear in early in life and remain unchanged throughout life more than 100 blood antigens have been described out of which at least 15 well-defined RBC group systems exist in racial groups of these, only two are of major importance in clinical-medicine The ABO and rhesus (RH) system.

*anyway these are the importance blood groups:

MM , MN , NN , PP , Pp , kill or kell (not sure about the spelling) , **Lewis , kid , Lutheran , Duffy , and others**

Rh Blood Groups (rhesus blood groups)

the Rh system is described on the basis of the presence or absence of the rhesus antigens (D) on the surface of RBCs . if present , the individual is said to be (D positive) or (Rh positive)

85% of Europeans ,(90-95)% of Arabs and Africans , 98% of Asians are Rh+ or D+ → that mean they have D antigens and don't have antibodies against D antigens in their plasma

**** Rhesus Antigens**

There are at least 3 sets of alternative antigens in the Rh system :

D or d C or c E or e

However , **D is a strong antigen** and therefore clinically more importance than others . in **blood blanks** , Rh grouping is performed with **anti-D serum** .

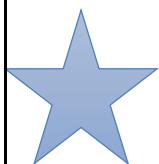
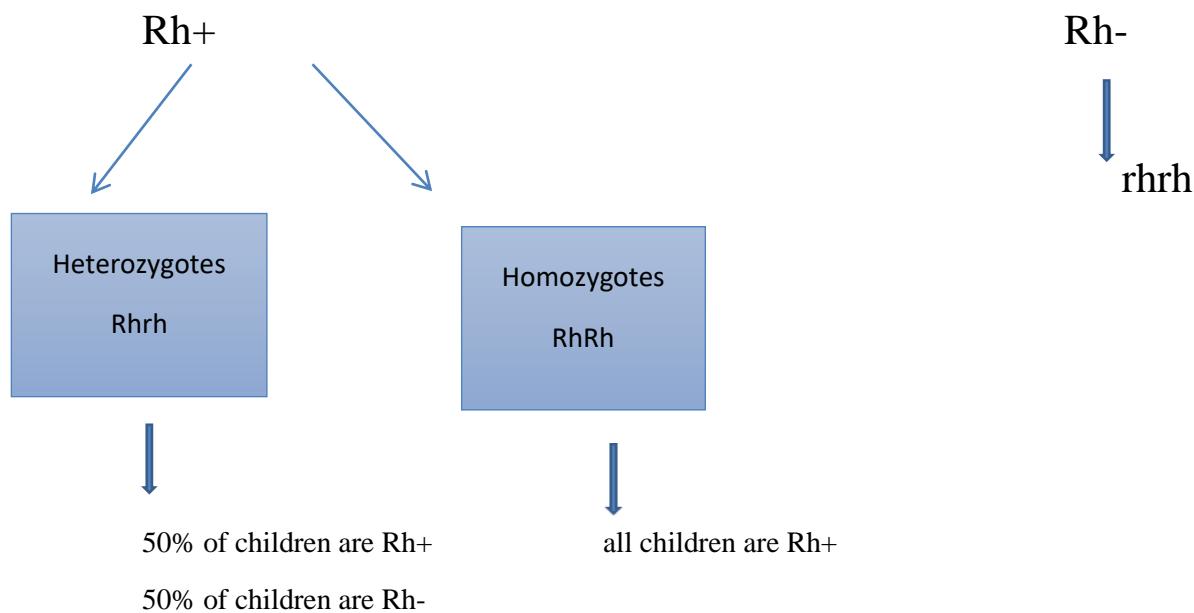
- Racial distribution of blood groups by present in the united states :

	A	B	AB	O	Rh+	Rh-
whites	41	10	4	45	85	15
Blacks	28	20	5	47	90	10
Chinese	28	23	13	36	99	1
Indians	3	0	0	97	100	0

- Racial distribution of blood groups by percentage in Jordan among 300 students :

A	B	AB	O	Rh+	Rh-
39	14	9	39	97	3

- So by these two racial distributions we can see that the highest blood group → O blood group
- In the previous two tables the doctor just read them



- RhRh (father)

x

rhrh (mother)



Fetus → Rhrh → Rh+

*If a woman is Rh-negative, and is pregnant, and the fetus is Rh-positive; then when some RBCs from the fetus pass into the maternal blood(which can happen especially during the

delivery) then the mother is going to produce D-antibodies then the antibodies will pass into the fetal blood and agglutination is going to occur.--> agglutination happens due to the binding antigens with antibodies

* so in any condition of transfusion blood there will be developing of antibodies in the plasma of the negative antigen presenting person .

Good luck 