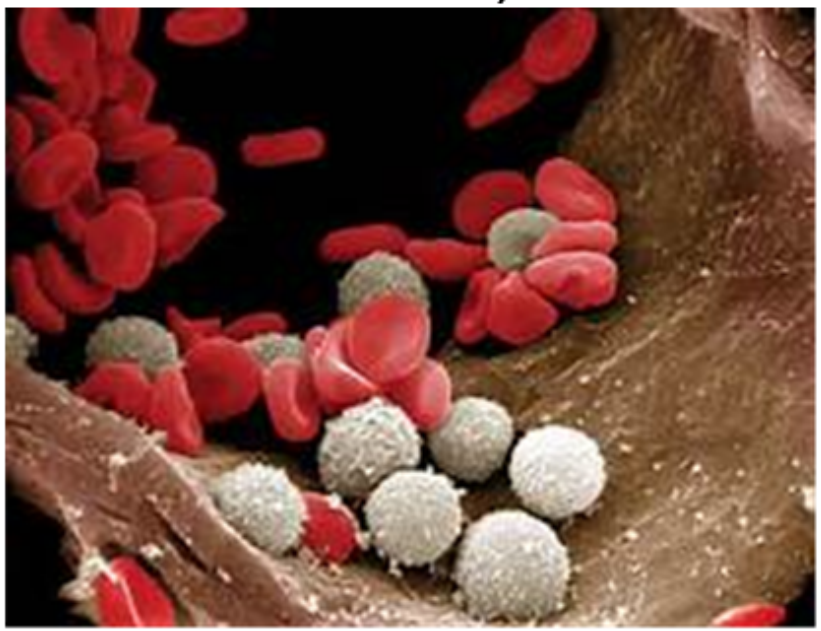
Blood Typing

- Blood Transfusions are the transfer of blood from one individual to the blood of another.

- Blood types need to be compatible in order for transfusions to be successful.

- If blood types are not compatible 'agglutination' (clumping of red blood cells) occurs

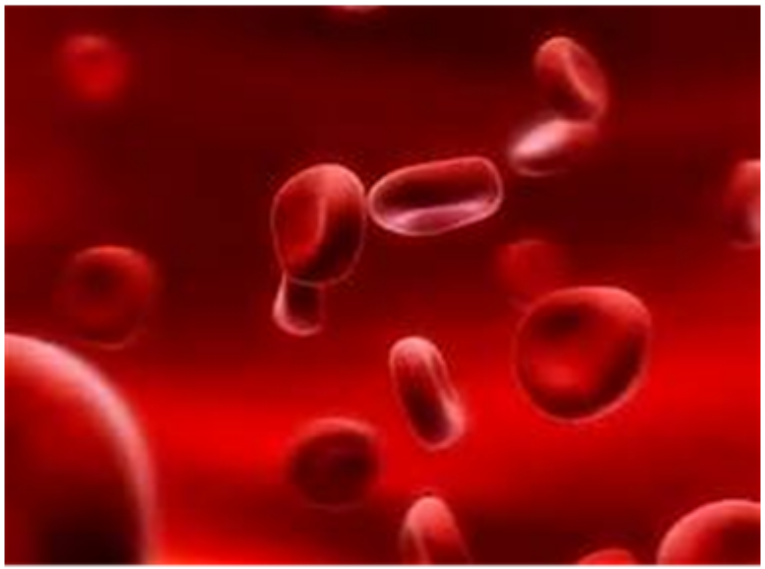


Blood Typing

- Blood Typing involves 2 main aspects

1. Determining ABO blood group

2. Determining if the individual is Rh- or Rh+



ABO Blood Typing

- Based on the presence or absence of two possible antigens (type A antigen and type B antigen) on the surface of red blood cells (antigens are things that trigger an immune response to produce antibodies)

- If a person has the type A antigen he has type A blood

- If a person has the type B antigen he has type B blood

- If a person has both type A and type B antigens he has type AB blood

- If a person has neither A nor B antigens he has type O blood

- Whichever blood type is present, that person will have the opposite antibodies in the plasma (ex. Type A blood has 'anti-B' antibodies in the plasma, AB blood has neither antibody, and O blood has both)

ABO Blood Typing

- Blood compatibility is very important if someone needs blood

- Plasma antibodies cannot combine with the antigens on the surface of red blood cells or agglutination occurs (ex. anti - A bodies cannot be combind with Type A antigens)

- This means that Type A blood cannot be combined with Type B blood because it would combine type A antigens with anti - A bodies

- Basically, all blood types can exist with their own type, but in order for two types to coexist, antibodies must be able to combine with the any antigens on the surface of the red blood cells (remember A goes with B)

The ABO Blood System

Blood Type (genotype)	Type A (AA, AO)	Type B (BB, BO)	Type AB (AB)	Type O (OO)
Red Blood Cell Surface Proteins (phenotype)	 A agglutinogens only	 B agglutinogens only	 A and B agglutinogens	 No agglutinogens
Plasma Antibodies (phenotype)	 b agglutinin only	 a agglutinin only	NONE. No agglutinin	 a and b agglutinin

- Look at this chart. Determine which blood types can accept and donate to which blood types.

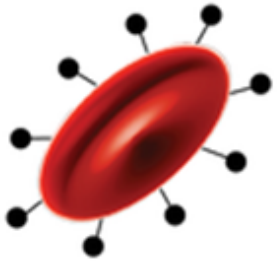
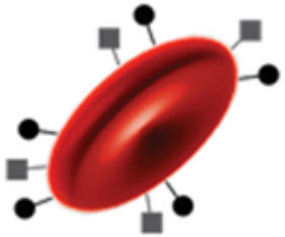
The ABO Blood System

Blood Type (genotype)	Type A (AA, AO)	Type B (BB, BO)	Type AB (AB)	Type O (OO)
Red Blood Cell Surface Proteins (phenotype)	 A agglutinogens only	 B agglutinogens only	 A and B agglutinogens	 No agglutinogens
Plasma Antibodies (phenotype)	 b agglutinin only	 a agglutinin only	NONE. No agglutinin	 a and b agglutinin

- Type A - can give blood to _____, can receive blood from _____
- Type B - can give blood to _____, can receive blood from _____
- Type AB - can give blood to _____, can receive blood from _____
- Type 0 - can give blood to _____, can receive blood from _____

The ABO Blood System

Blood Type (genotype)	Type A (AA, AO)	Type B (BB, BO)	Type AB (AB)	Type O (OO)
Red Blood Cell Surface Proteins (phenotype)	 A agglutinogens only	 B agglutinogens only	 A and B agglutinogens	 No agglutinogens
Plasma Antibodies (phenotype)	 b agglutinin only	 a agglutinin only	NONE. No agglutinin	 a and b agglutinin

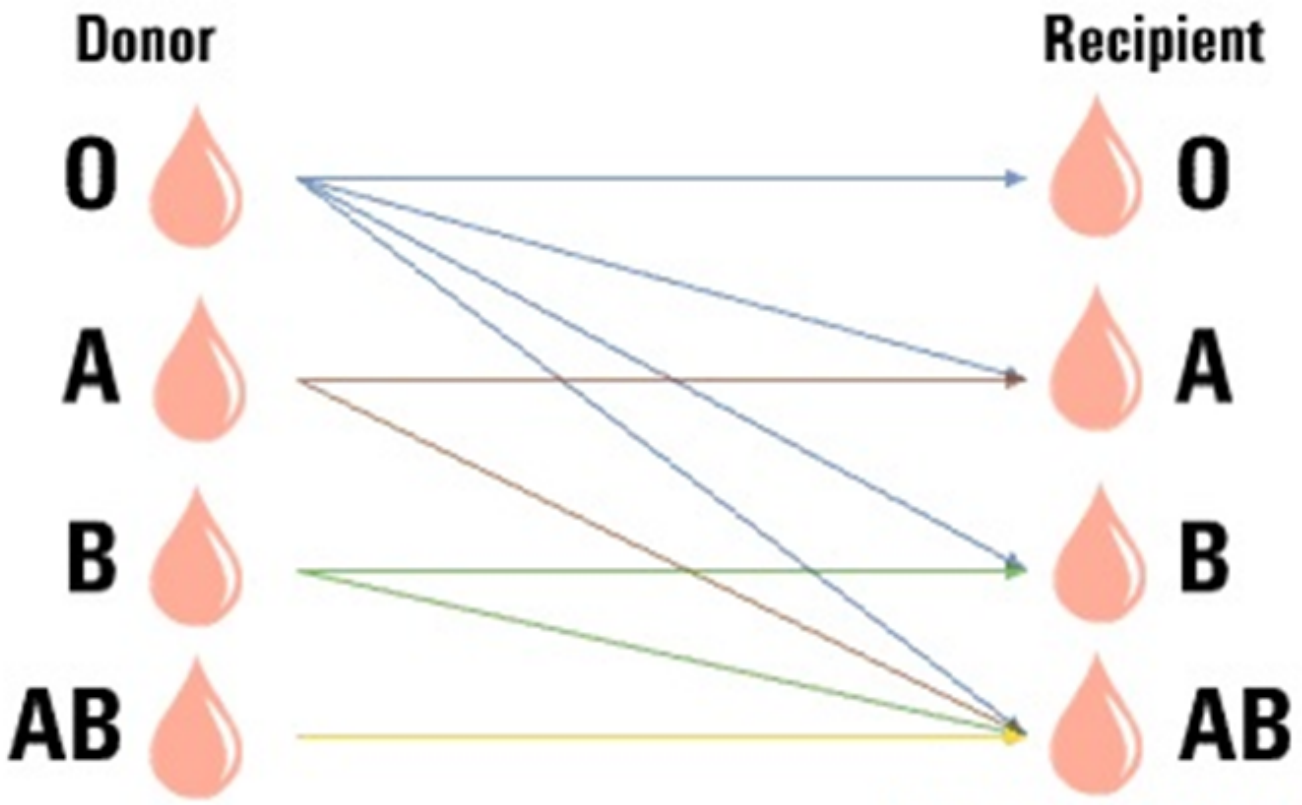
Blood Type	Antigen (RBC Membrane)	Antibody (plasma)	Can Receive Blood from	Can Donate Blood to
A (40%)		Anti-B antibodies	A, O	A, AB
B (10%)		Anti-A antibodies	B, O	B, AB
AB (4%)		No antibodies	A, B, AB, O	AB
O (46%)		Both Anti- A and Anti-B antibodies	O	O, A, B, AB

Group 0 can donate red blood cells to anybody. It's the universal donor.

Group A can donate red blood cells to A's and AB's.

Group B can donate red blood cells to B's and AB's.

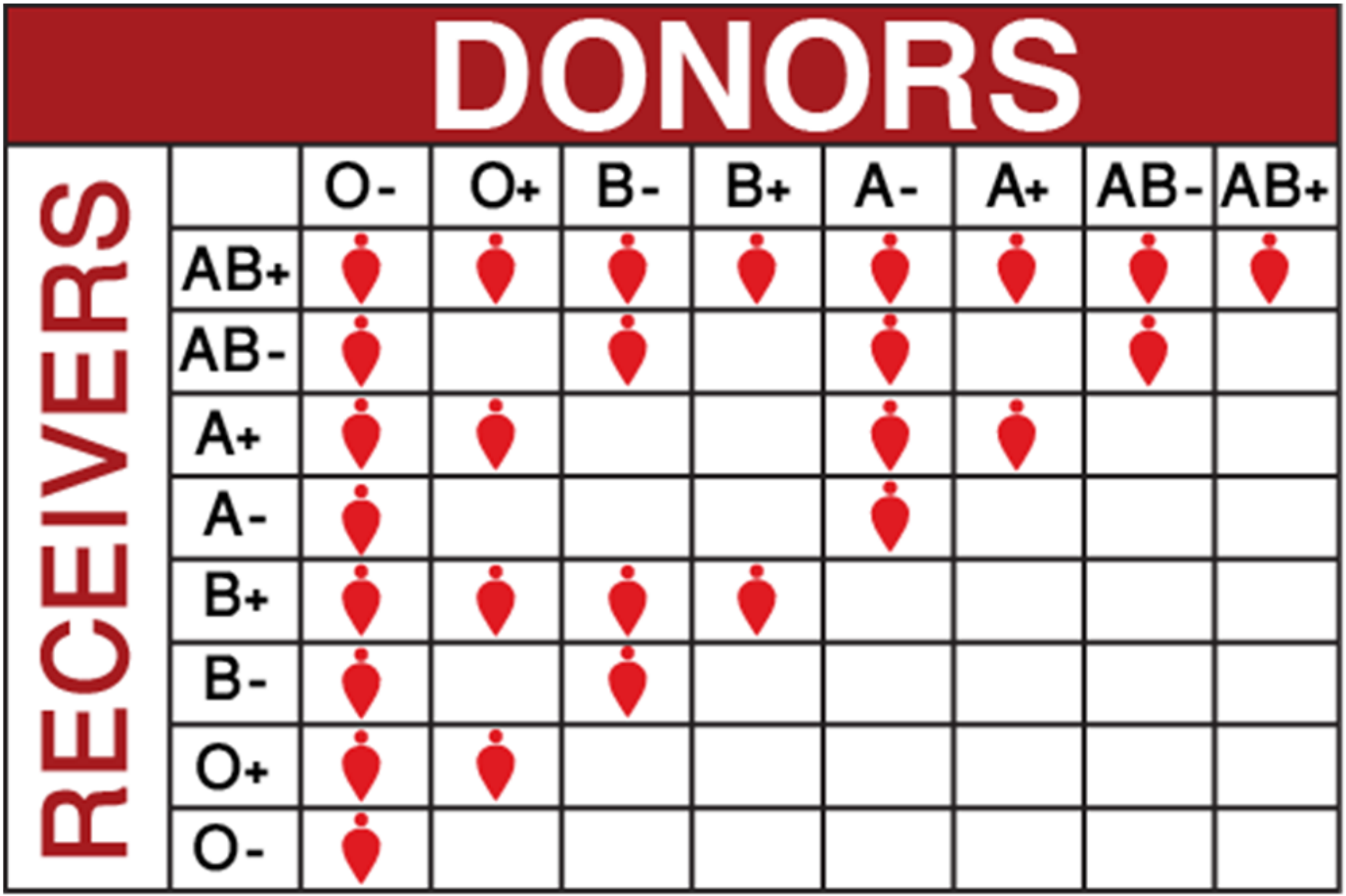
Group AB can donate to other AB's, but can receive from all others.



Source: American Red Cross

Rh Blood Typing

- Based on if the person has or does not have the Rh factor on the red blood cell
- Rh+ means that the person has the Rh factor / Rh- meas that the person does NOT have the Rh factor
- If you are a Rh+ you can give blood to other +, but you can receive blood from either + or -
- If you are a Rh-, you can only receive blood from another -, but you can give blood to anyone


DONORS
RECEIVERS
O-
O+
B-
B+
A-
A+
AB-
AB+
AB+
AB-
A+
A-
B+
B-
O+
O-

If your blood type is . . .

Type	You Can Give Blood To	You Can Receive Blood From
A+	A+ AB+	A+ A- O+ O-
O+	O+ A+ B+ AB+	O+ O-
B+	B+ AB+	B+ B- O+ O-
AB+	AB+	Everyone
A-	A+ A- AB+ AB-	A- O-
O-	Everyone	O-
B-	B+ B- AB+ AB-	B- O-
AB-	AB+ AB-	AB- A- B- O-