

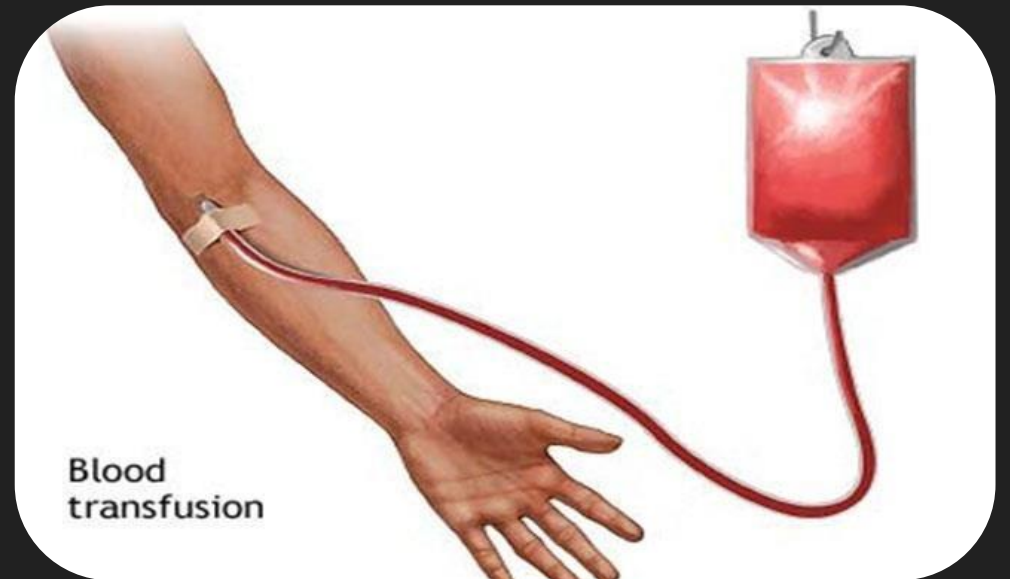
BLOOD TYPES

U3:L2

11 BIOLOGY

BLOOD TRANSFUSIONS

About 5 million Americans need blood transfusions every year, for all sorts of reasons. Sometimes, a transfusion is an emergency (like losing blood after an accident). Sometimes it's expected (as with treatment for cancer).

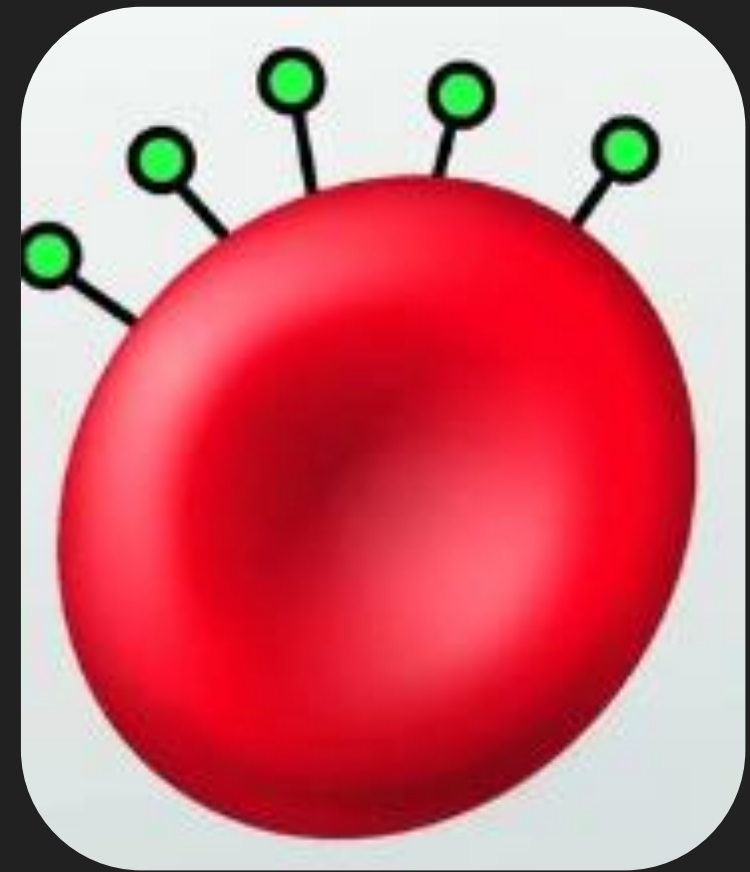


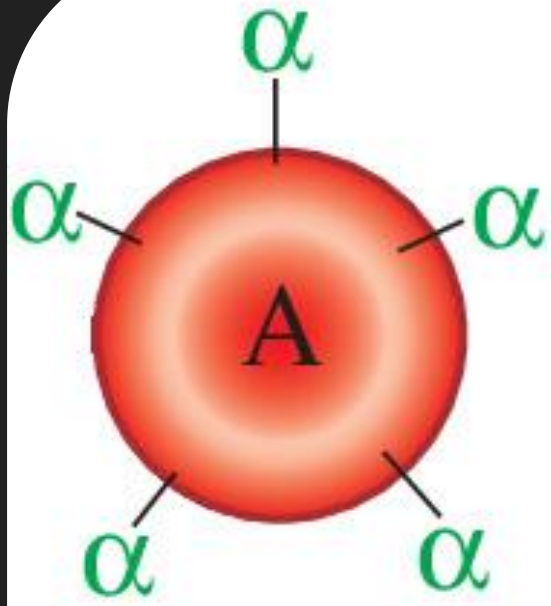
antigens

All blood contains the same basic components (red cells, white cells, platelets, and plasma), but not everyone has the same types of **markers** on the surface of their red blood cells.

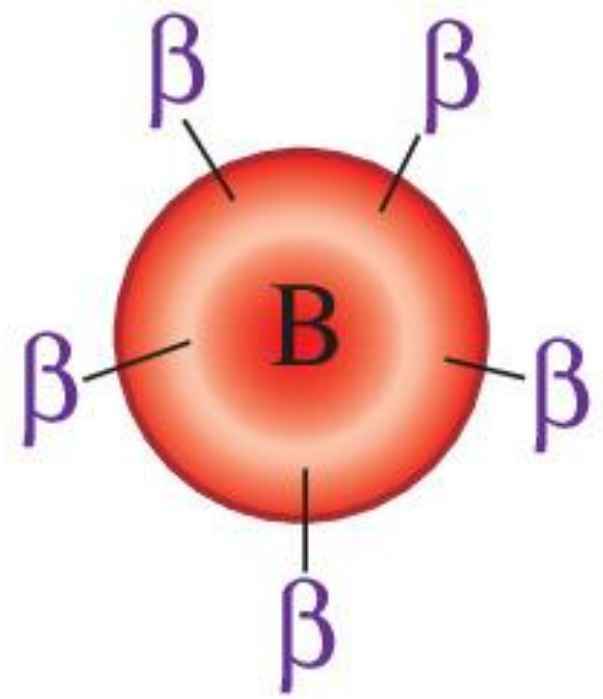
These markers (also called **antigens**) are **proteins** and sugars that our bodies use to identify the blood cells as belonging in our own system.

Blood cell markers are microscopic. But they can make the difference between blood being accepted or rejected after a transfusion. So medical experts group blood into types based on the different markers.

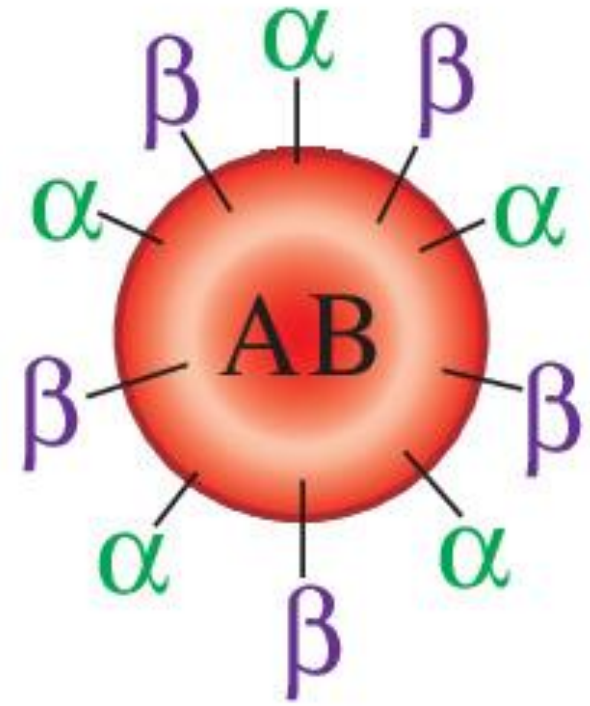




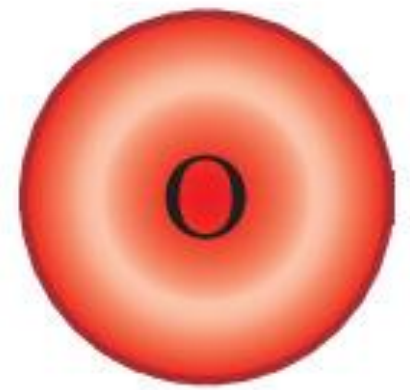
Blood type A
Only A antigen
on RBCs



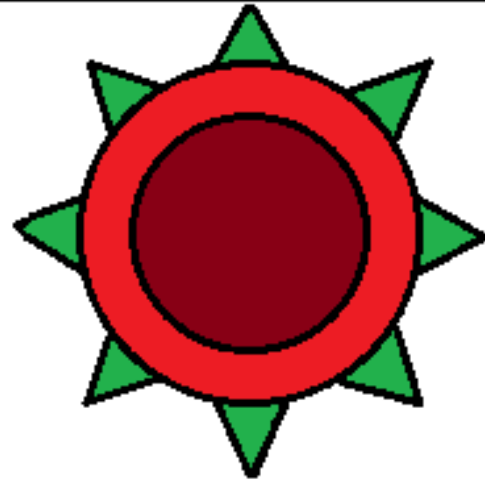
Blood type B
Only B antigen
on RBCs



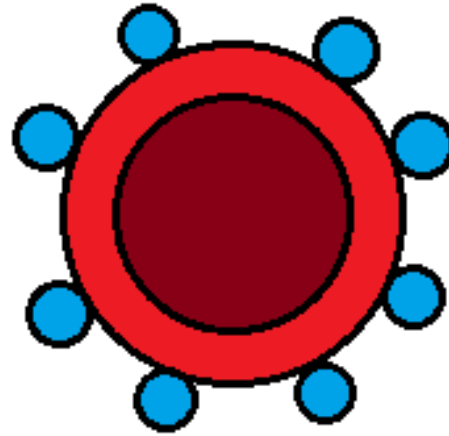
Blood type AB
Both A and B
antigens on RBCs



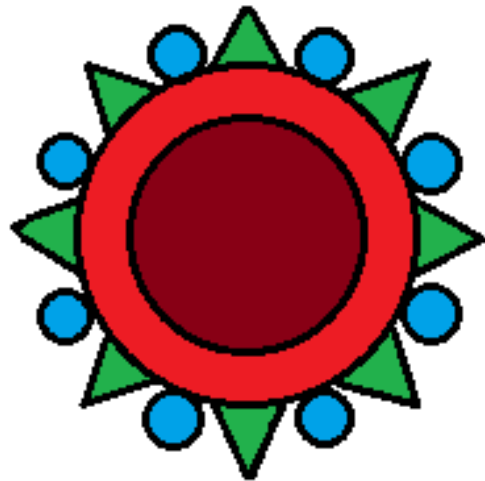
Blood type O
No antigens
on RBCs



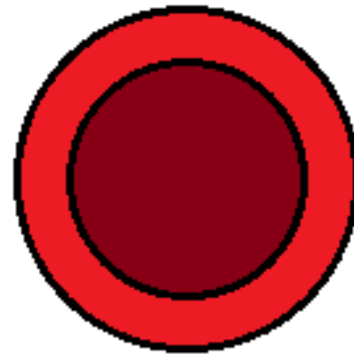
Type A



Type B



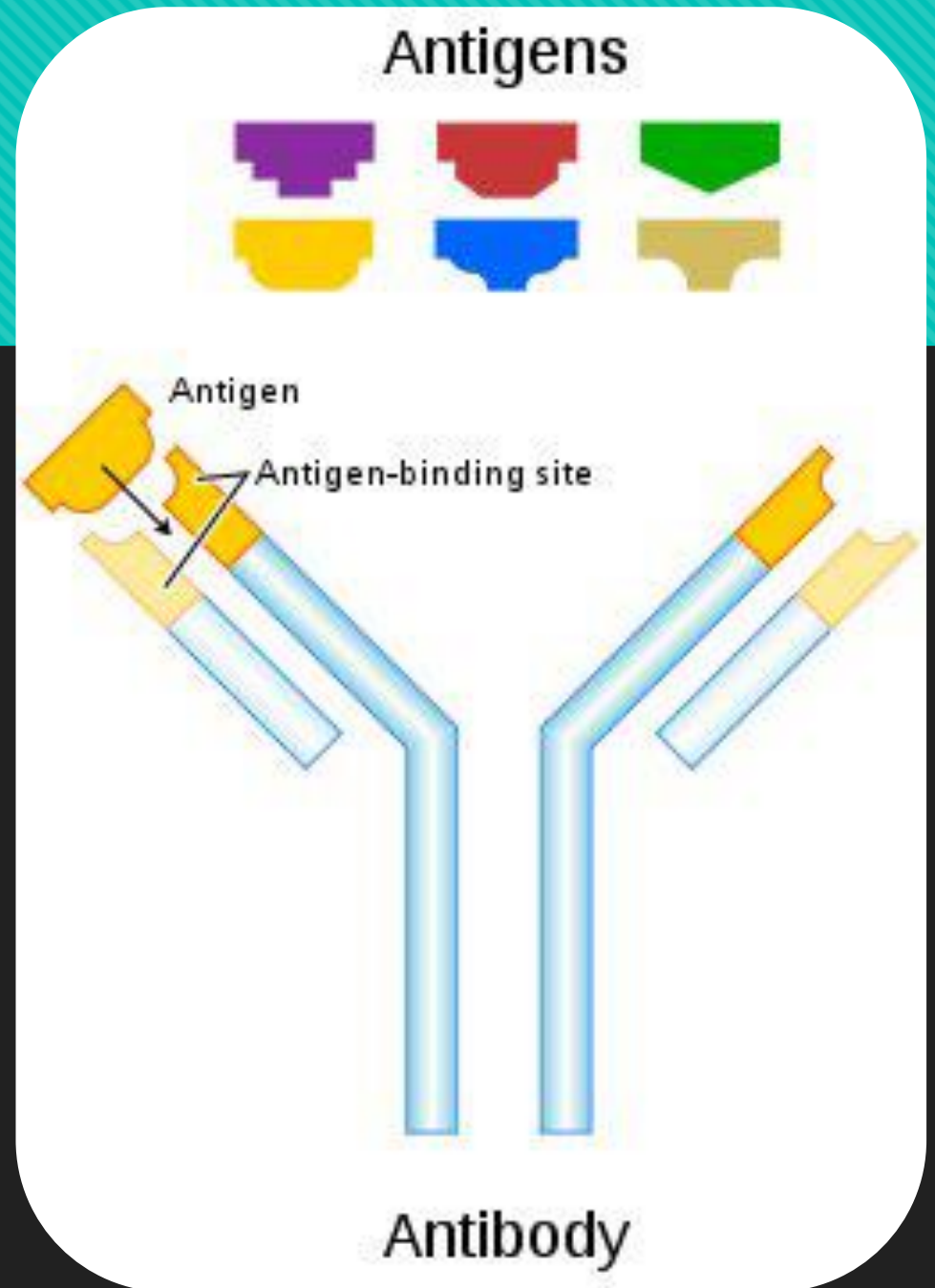
Type AB

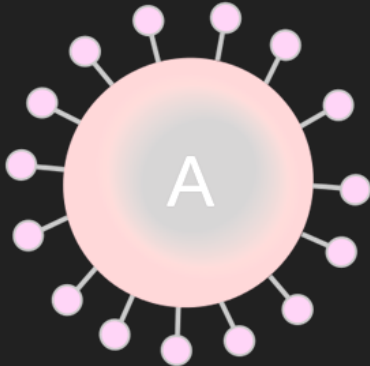
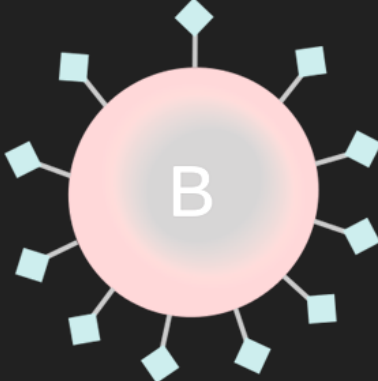
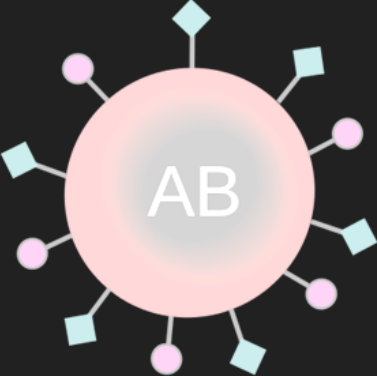
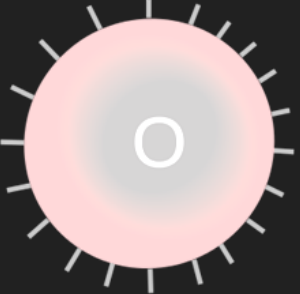
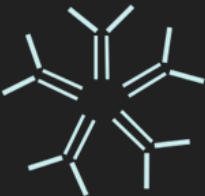

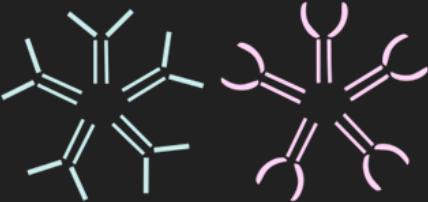





Type O

antibodies

- Blood markers are also in plasma.
- These plasma blood markers are called **antibodies**.
- They are the body's response to antigens.
- **Antibodies** are proteins made by the immune system.



	Group A	Group B	Group AB	Group O
Red blood cell type	 <p>A</p>	 <p>B</p>	 <p>AB</p>	 <p>O</p>
Antibodies in Plasma	 <p>Anti-B</p>	 <p>Anti-A</p>	<p>None</p>	 <p>Anti-A and Anti-B</p>
Antigens in Red Blood Cell	 <p>A antigen</p>	 <p>B antigen</p>	 <p>A and B antigens</p>	<p>None</p>

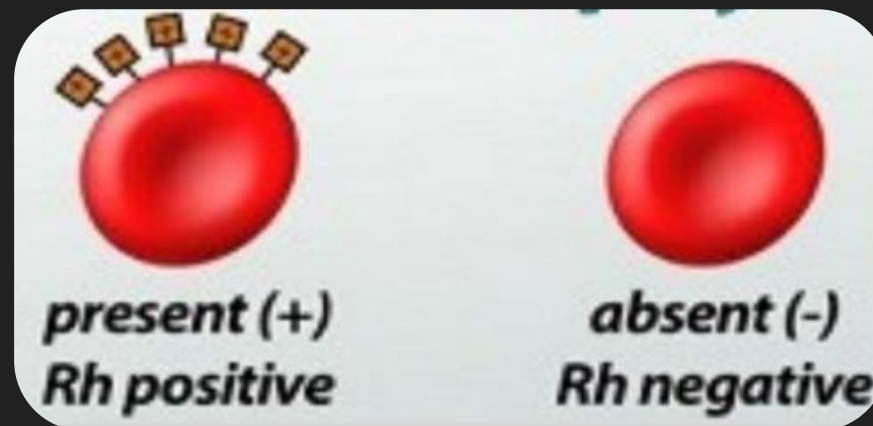
BLOOD TYPE	ANTIGENS (ON RBC)	ANTIBODIES (IN PLASMA)
A	A	B
B	B	A
AB	A and B	NONE
O	NONE	A and B

Rh FACTOR

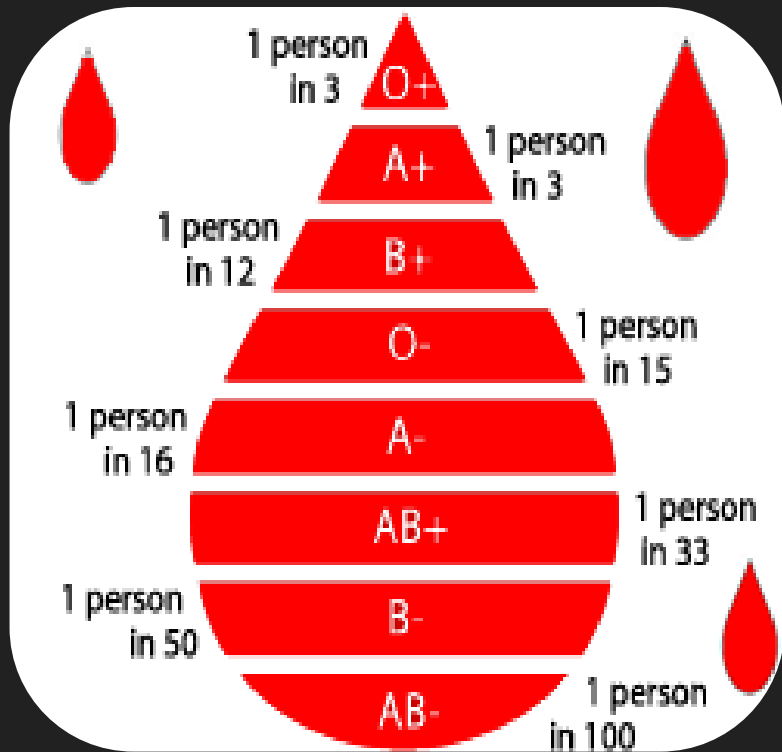
Some people have an additional marker, called **Rh factor**, in their blood.

Rh is a **protein on the red blood cell**.

Because each of the four main blood groups (A, B, AB, and O) may or may not have Rh factor, scientists further classify blood as either "**positive**" (meaning it has Rh factor) or "**negative**" (without Rh factor).



O -	NEITHER	NO Rh FACTOR
O +	NEITHER	Rh
A -	A	NO Rh FACTOR
A +	A	Rh
B -	B	NO Rh FACTOR
B +	B	Rh
AB -	A and B	NO Rh FACTOR
AB +	A and B	Rh

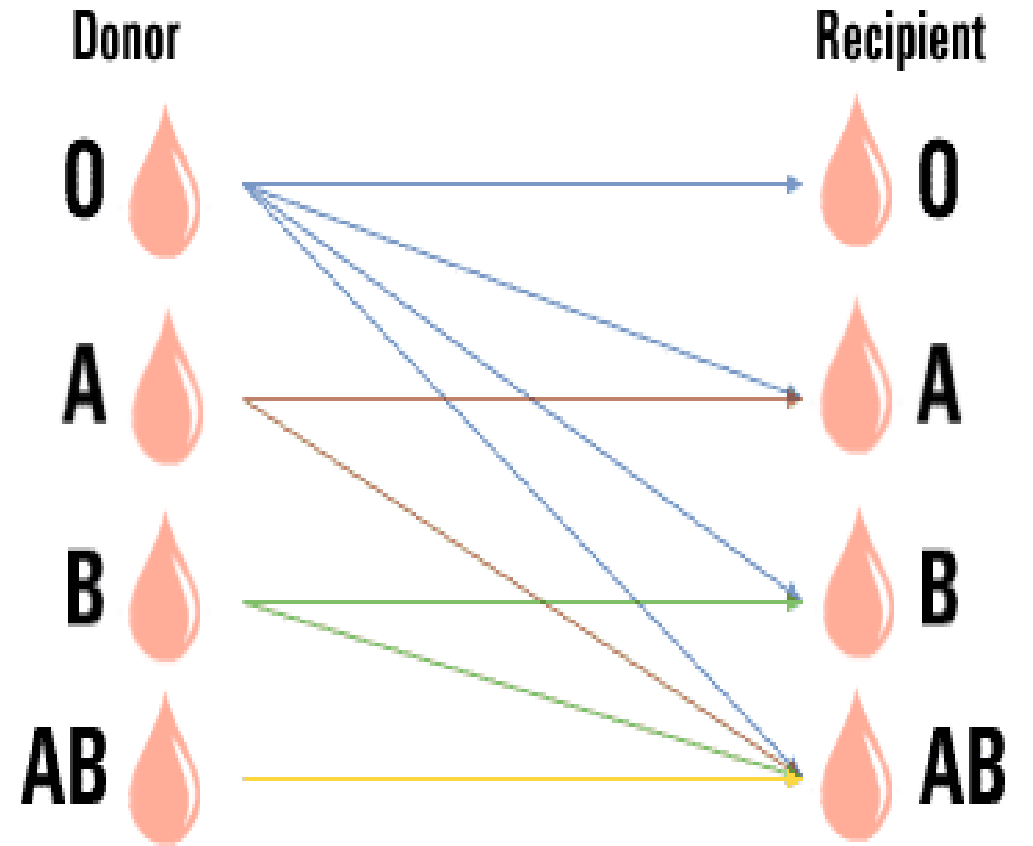


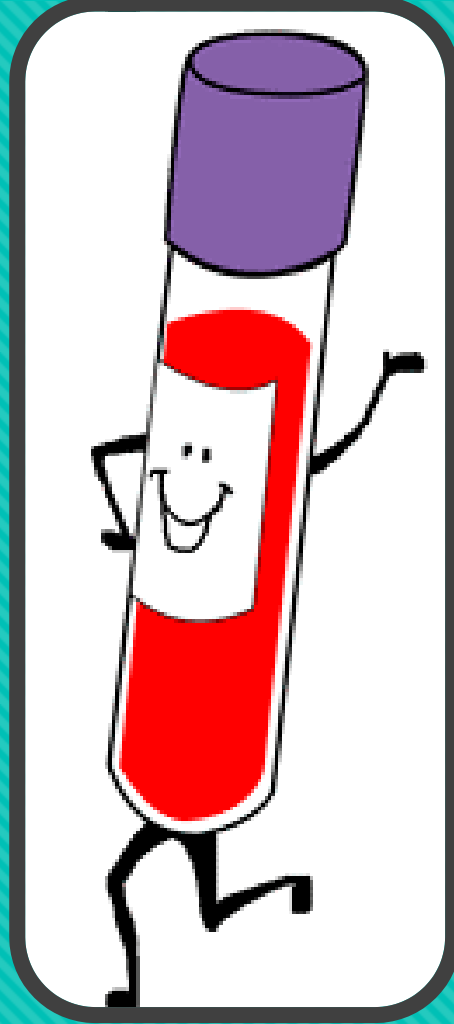
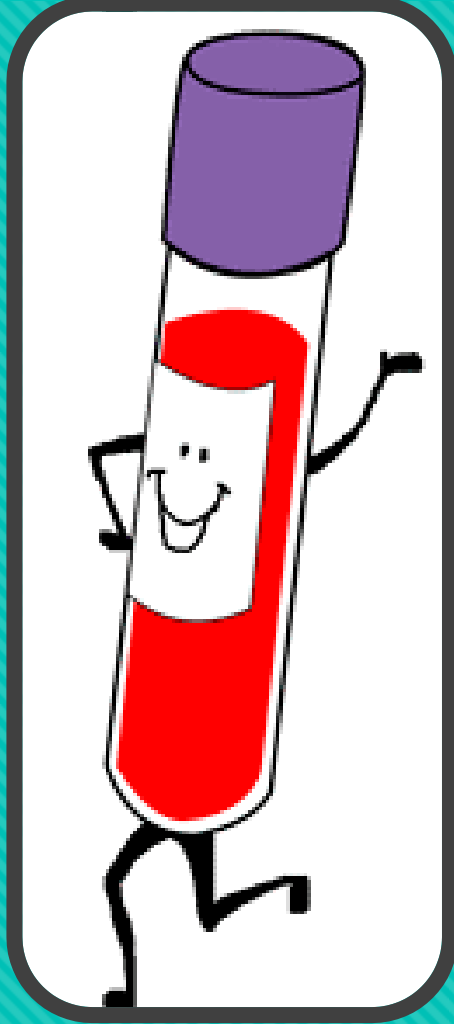
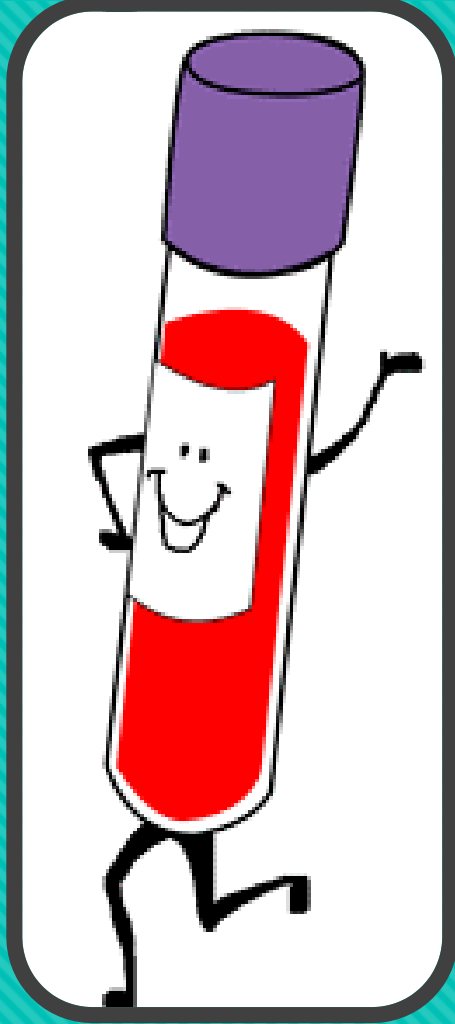
Group O can donate red blood cells to anybody. It's the universal donor.

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.





BLOOD TESTING

What are blood tests?

- * A sample of blood is taken usually from a vein in your arm using a needle
- * A way of helping doctors check for certain diseases and conditions
- * Labs draw the blood and analyze it



Tourniquet is applied and area is disinfected



Needle is introduced into vein, blood is drawn into vial and analyzed



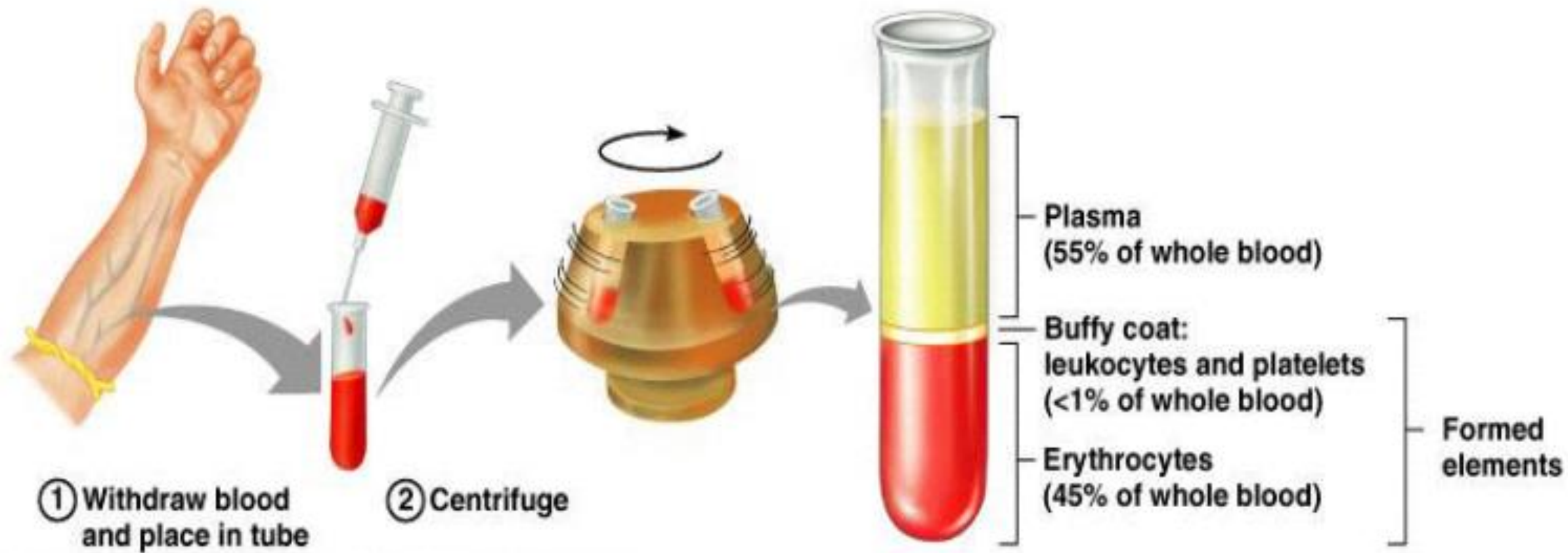
Why are blood tests done?

- * Evaluate organ function
- * Diagnose diseases
- * Find out if you have risk factors for heart disease
- * Check if medicines are working
- * Assess if your blood is clotting



What information can blood tests give you?

- **Whole blood** to count blood cells
- **Separate blood cells** from the fluid that contains them (plasma)
- **Plasma** is used to measure substances in the blood



HEMATOCRIT

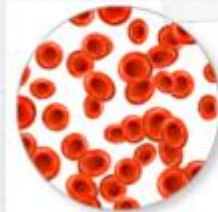
- * A measure of how much space red blood cells take up
- * High: May be dehydrated
- * Low: May have anemia
- * Abnormal: May a sign of a blood or bone marrow disorder



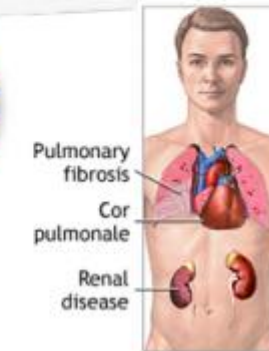
Low numbers of RBCs may indicate conditions such as:



ADAM



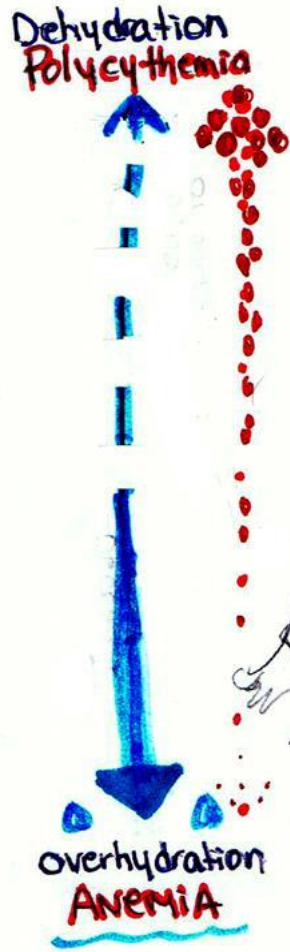
High numbers of RBCs may indicate conditions such as:



HEMATOCRIT



35 - 47%

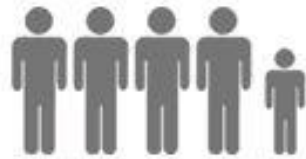


42 - 52%

Vol. % of Red Blood Cells



Blood Facts And Statistics



⇒ **4.5** million Americans need blood transfusion each year.

Someone needs blood every **2** seconds.



43,000 pints: amount of donated blood used each day in the U.S. and Canada



About **1** in **7** people entering a hospital needs blood.



One pint of blood can save up to **3** lives.

Most of the donated red blood cells can be stored up to **42** days.

Shortages of all blood types happen during the summer and winter holidays.



Most donated platelets can be stored up to **5** days.