University of Al-Ameed
College of Pharmacy

Physiology

Asist lec doaa aljeml

Blood grouping is the classification of blood based on the presence or absence of two inherited antigenic substances on the surface of red blood cells (RBCs).

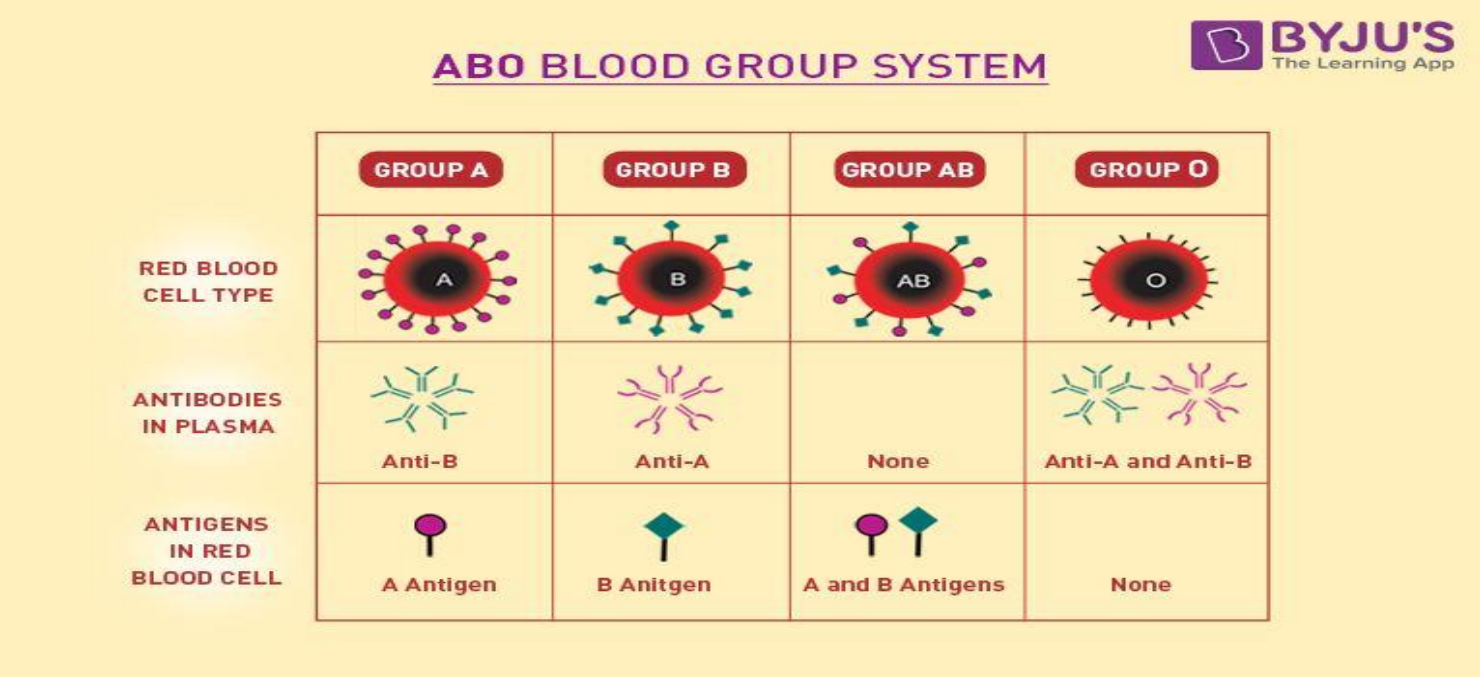
The ABO blood group is characterized by two glycolipid antigens, called A and B – depending on whether the RBCs have none, only one or both antigens, blood groups are distinguished as type O, type A, type B, or type AB.

Type A blood has the A surface antigen on its RBCs' membrane.

Type B blood has the B surface antigen.

Type AB blood has both A and B surface antigens.

Type O blood has neither.



Blood also contains specialized antibody molecules (immunoglobulins) called *agglutinins*. The antibodies and antigens in an individual's blood do not interact with one another.

Type A blood contains anti-B antibodies, which attack RBCs carrying B antigens.

Type B blood contains anti-A antibodies to defend against RBCs carrying A antigens.

Type AB blood contains no antibodies.

Type O contains both anti-A and anti-B antibodies.

Purpose of blood grouping

- In blood transfering

- Blood can only be given after blood grouping which is an essential requirement before blood is given to any individual.

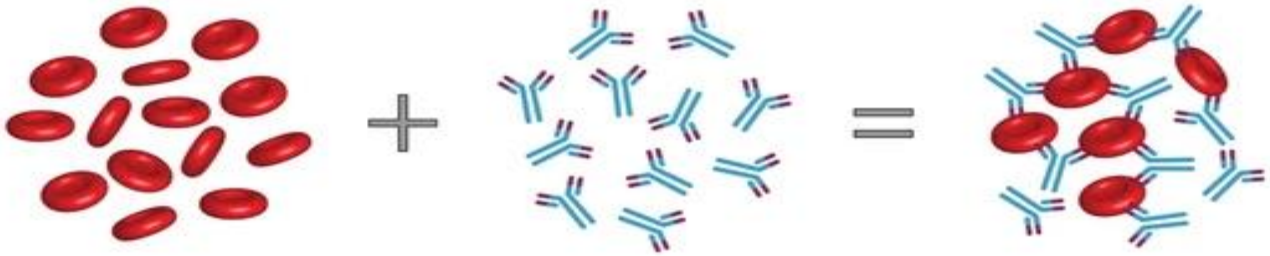
Agglutination

If someone receives blood of the wrong type, the worst problem is the reaction of the recipient's antibodies on the donor's RBCs.

When the body encounters a foreign antigen, agglutination occurs.

Agglutination: is the clumping of RBCs due to binding of antibodies (part of the immune system) to antigen, and causes blockage of blood vessels and eventually death.

Hemagglutination



Rh Blood Groups

(Rh) is the second most important blood group system in humans. The **Rh blood group** is named after the presence of the **Rh factor** or **D antigen** on the surface of RBCs:

- People having the D antigen are called **Rh^+** (**Rh positive**)
- People lacking Rh antigens are regarded as **Rh^-** (or **Rh negative**).

Normally, blood plasma does not contain anti-D antibody, however, in case an Rh^- person receives Rh^+ blood, ***immunization*** occurs and anti-D antibodies are produced.

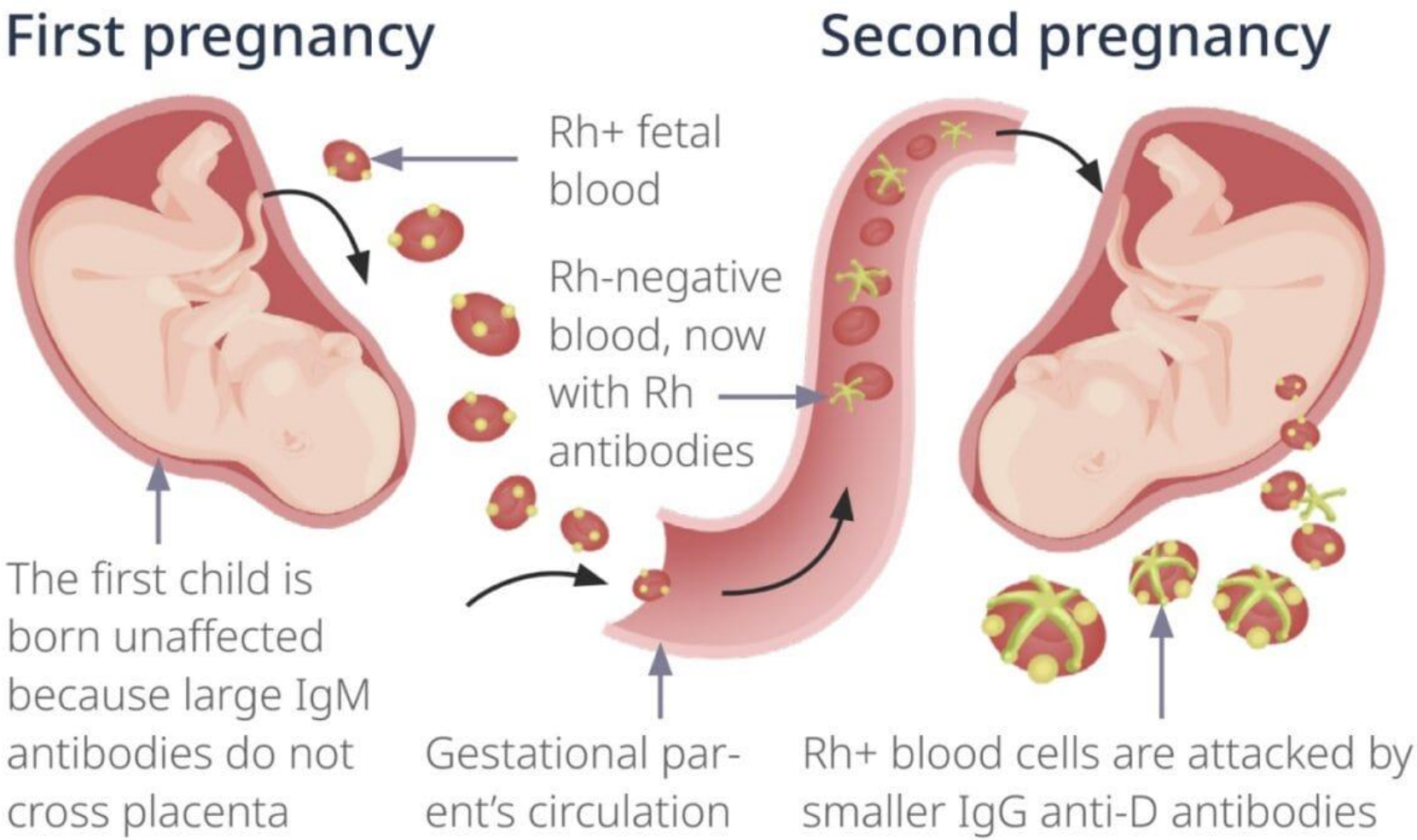
The Rh blood grouping is especially critical in case of Rh incompatibility between Rh^- mothers and their Rh^+ fetuses causing the **hemolytic disease of the newborn** (HDN, also called erythroblastosis fetalis). During the first pregnancy, fetal RBCs are normally isolated from the mother's circulation. During birth,

This normally does not cause any harm to the first Rh^+ fetus (1^{st} pregnancy)

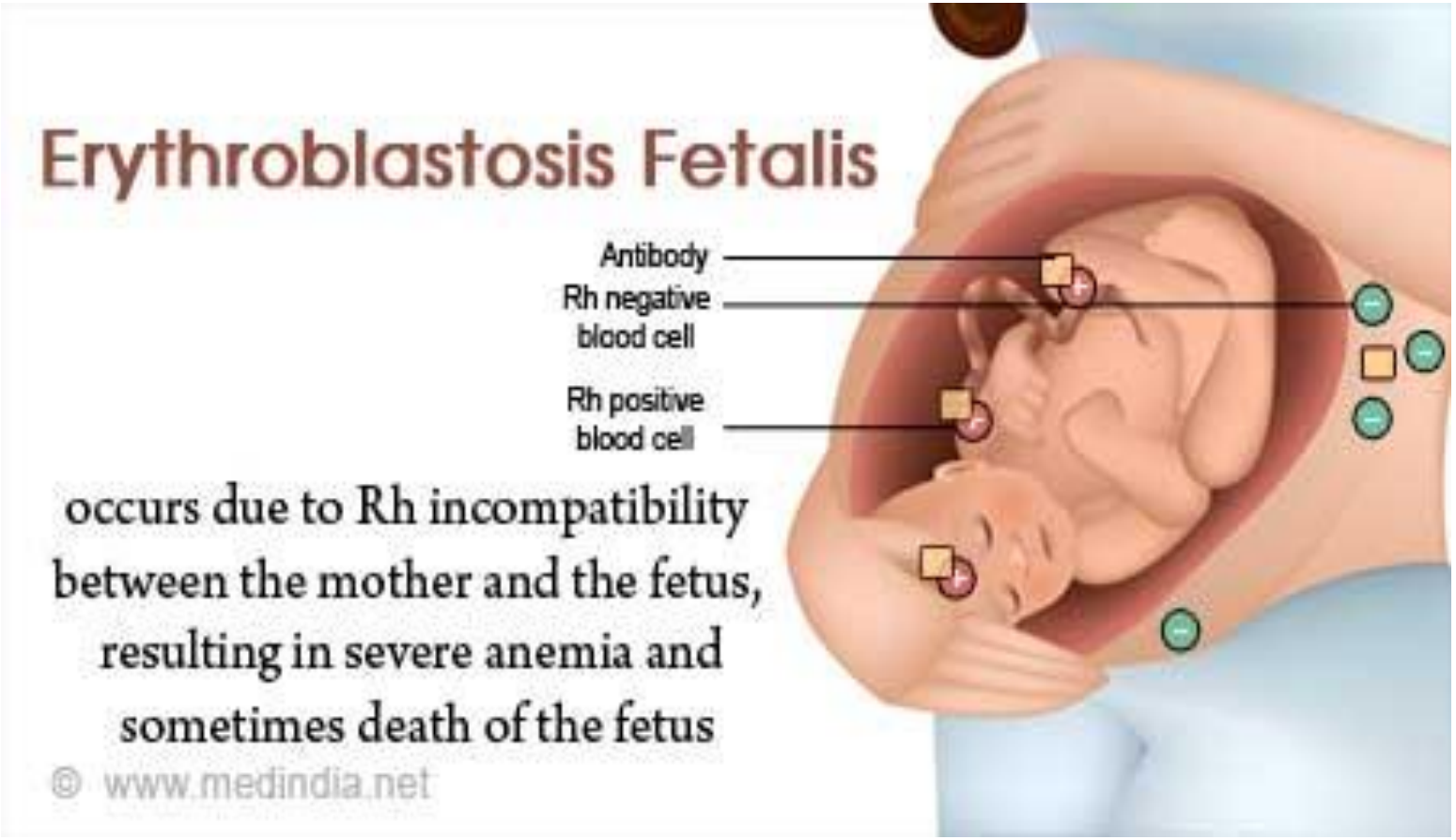
but can lead to severe problems in case of the following Rh^+ fetuses (2^{nd} pregnancy).

As anti-D antibodies can cross the placenta, they lead to the agglutination and hemolysis of the Rh^+ fetal RBCs, resulting in severe anemia, jaundice, developmental problems, and even death

RH


First pregnancy
Second pregnancy
Rh+ fetal blood
Rh-negative blood, now with Rh antibodies
The first child is born unaffected because large IgM antibodies do not cross placenta
Gestational parent's circulation
Rh+ blood cells are attacked by smaller IgG anti-D antibodies

RH


Erythroblastosis Fetalis
Antibody
Rh negative blood cell
Rh positive blood cell
occurs due to Rh incompatibility between the mother and the fetus, resulting in severe anemia and sometimes death of the fetus
© www.medindia.net

this condition can be prevented by the **passive immunization** of Rh^- mothers. During this process, Rh^- mothers receive pre- made anti-D Rh_o immunoglobulin [Rh_o(D) immunoglobulin, RhIG] , which bind to the fetal RBCs.

The binding prevents the mother's immune system to recognize the antigen, and to form antibodies against it.


अँटीडी
AntiD®
150 mcg / mL
Composition:
Each Pre-filled syringe contains:
Trinbelimab (Purified liquid bulk) 150 mcg
Excipients:
Glycine IP, Sodium Chloride IP, Water for Injection IP.
Dosage:
For dosage and administration, refer pack insert.
Storage:
Store between +2°C to +8°C. DO NOT FREEZE.
WARNING:
To be sold by retail on the prescription of a Registered Medical Practitioner only.

What is cross matching?

refers to the test that is performed prior to a blood transfusion in order to determine if the donor's blood is compatible with the blood of an intended recipient.

Cross-matching is also used to determine compatibility between a donor and recipient, in organ transplantation .

What means by the terms of universal donor and universal recipient?

- Type O persons are called **universal donors,** because they do not have either A or B antigens on their red blood cells, and their blood can be given to all 4 blood types.
- Type AB persons are called universal recipients ” because they do not have circulating antibodies in their plasma and can receive blood from any blood type.

WHICH BLOOD TYPES AM I COMPATIBLE WITH?

BLOOD TYPE	CAN GIVE TO	CAN RECEIVE 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-

GOOD HOUSEKEEPING

Procedure:

1- Clean your finger with alcohol and let dry.

2- Prick finger with lancet, near the tip but not too close to the nail. You will need three fairly large drops of blood. Prick so that blood flows freely

3- Use one slide for ABO typing and Rh factor. Place three drops of blood on the slide, add the appropriate typing serum, and determine your blood type. Be sure the serum dropper does not touch the drop of blood.

Results should be readable in about a minute.

If agglutination is observed when blood is mixed with Anti A reagent, then the individual is said to have blood group “A”.

_ If agglutination is observed when blood is mixed with Anti B reagent, then the individual is said to have blood group “B”.

_ If agglutination is observed when blood is mixed with Anti A and Anti B reagent, then the individual is said to have blood group “AB”.

_ If no agglutination is observed when blood is mixed with Anti A and Anti B reagent, then the individual is said to have blood group “O”.

If agglutination is observed when blood is mixed with Anti RhD reagent, then the individual is said to have “+ve” Rh factor.

_ If no agglutination is observed when blood is mixed with Anti RhD reagent, then the individual is said to have “-ve” Rh factor.

Write the blood group

Thank You