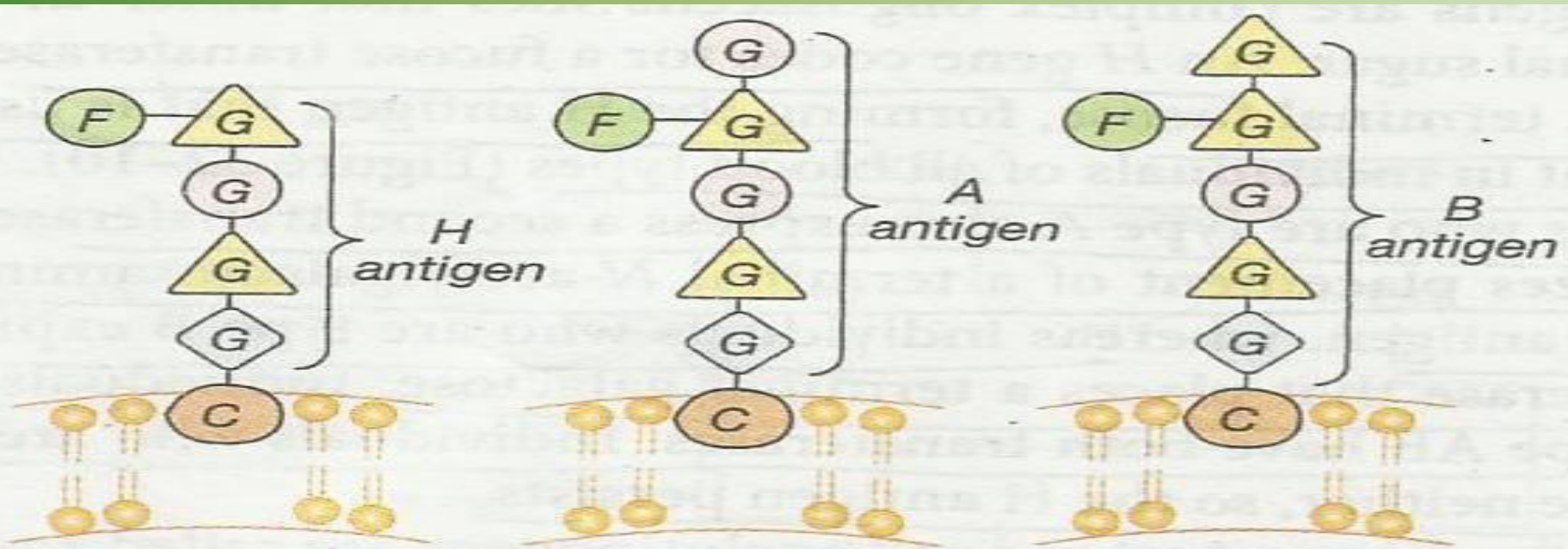
Blood Types

Blood types depends on surface antigens (Agglutinogen) on erythrocytes

- O-A-B blood types
- Rh blood type
- Others: Rh, MNSs ,Kidd, Lutheran ,Kell etc

Antigens of ABO system



F = fucose

G = N-acetylgalactosamine

G = glucose

G = galactose

C = ceramide

= lipid bilayer

O-A-B blood type

Depending on presence or absence of antigen (Agglutinogen),four different blood groups

A--if only agglutinogen A is present

B--if only agglutinogen B is present

AB--if both agglutinogen A and B are present

O--if neither agglutinogen A nor agglutinogen B are present

Relative frequencies of blood types

O	47%
A	41%
B	9%
AB	3%

Landsteiner's Law

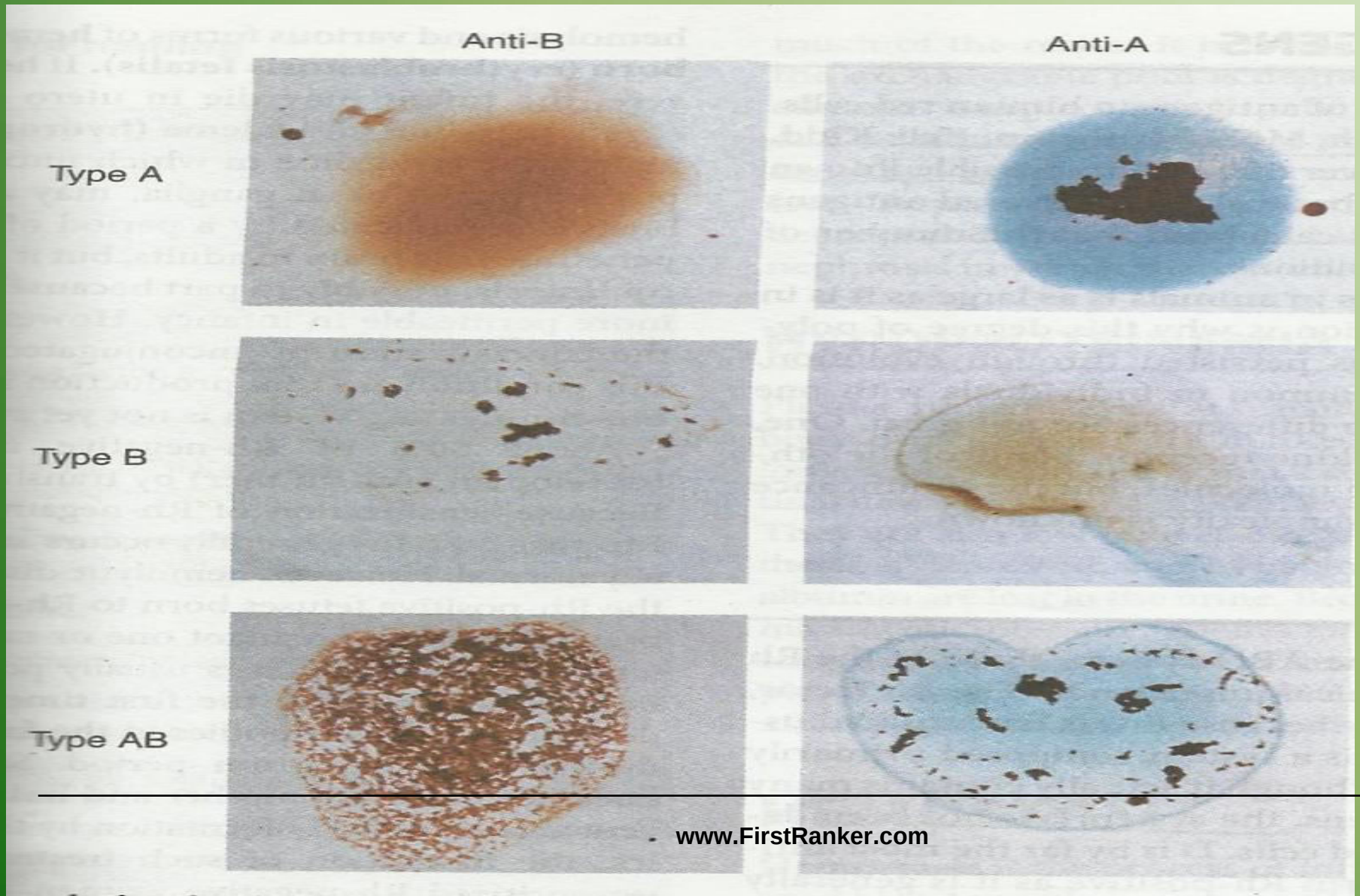
- If a particular agglutinogen is present on RBC, corresponding agglutinin must be absent in serum
- If a particular agglutinogen is absent on RBC, corresponding agglutinin must be present in serum

This law does not apply to Rh system

Blood Types with Their Genotypes and Their Constituent Agglutinogens and Agglutinins

Genotypes	Blood Types	Agglutinogens	Agglutinins
OO	O	—	Anti-A and Anti-B
OA or AA	A	A	Anti-B
OB or BB	B	B	Anti-A
AB	AB	A and B	—

Red cell agglutination in incompatible plasma



Blood Typing, Showing Agglutination of Cells of the Different Blood Types with Anti-A or Anti-B Agglutinins in the Sera

Red Blood Cell Types	Sera	
	Anti-A	*Anti-B*
O	−	−
A	+	−
B	−	+
AB	+	+

Titer of Agglutinins at different Ages

- Immediately after birth– zero
- Two - eight months of age – begins to produce
- Eight- ten years of age – maximum titer
- Then gradually declines throughout life

Origin of Agglutinins in Plasma

- Food
- Bacteria

- Inheritance
- Universal donors
- Universal Recipients
- Autologous transfusion
- Secretors and non- secretors