

Difference Between A and B Antigens

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Key Difference - A vs B Antigens

Blood is an essential transportation fluid in our body. It contains different cells such as [red blood cells](#) and [white blood cells](#). Red blood cells account for 45 % of the total volume while white blood cells account for just 1 %. The rest of the 55 % consists [blood plasma](#). The bone marrow of bones synthesize the red blood cells. White blood cells are responsible for our [immunity](#). Red blood cells are important in oxygen and nutrients transportation to respective [tissues](#). There are four main types of blood groups named as A, B, AB and O. They are named based on the presence or absence of specific [antigen](#) on the surface of red blood cells. And these antigens are known as antigen A and antigen B. Based on their presence (+) or absence (-), the blood types are further classified into A⁺, A⁻, B⁺, B⁻, AB⁺, AB⁻, O⁺, and O⁻. The **key difference** between A and B antigens is that **antigen A can be found only in people who have blood group A and blood group AB while antigen B can be found only in people who possess blood group B and blood group AB.**

What is A Antigen?

Blood group antigens are [glycoproteins](#) which present on the red blood cells surfaces. The antigen A is defined predominately as the blood antigen which is in the red blood cell surface of the people who possess blood groups A and AB. This antigen cannot be found in the people who have blood groups “B” and “O.”

Blood Group	Antigens	Antibodies	Can give blood (RBC) to	Can receive blood (RBC) from
AB	A and B	None	AB	AB, A, B, O
A	A	B	A and AB	A and O
B	B	A	B and AB	B and O
O	None	A and B	AB, A, B, O	O

Figure 01: Compatibility Testing

In transfusion science, antigen A is extremely important. According to the international society of blood transfusion (ISBT), ABO blood group system and RhD blood group system are more important when it comes to blood transfusion. So, a person who belongs to blood group A has the antigen “A” in the red blood cell surface and IgM antibody “B” in the blood [serum](#). Therefore, a person who has blood group A can receive blood from people who are having blood groups “A” or “O.” On the other hand, individuals with blood group A can donate blood to people who possess blood groups “A” or “AB.” Nevertheless, a Rh-negative patient who already sensitized may develop critical transfusion reaction when receiving Rh-positive blood for the second time. A well-known example of this type of situation is a hemolytic disease of the newborn (HDN).

What is B Antigen?

The antigen B is defined as the glycoprotein which is on the red blood cell surface of the people who possess blood group B and blood group AB. Individuals that have “A” and “O” blood types lack this antigen on their red blood cell surface. This antigen is also very important in the transfusion science.

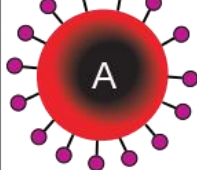
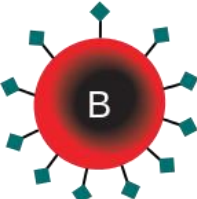
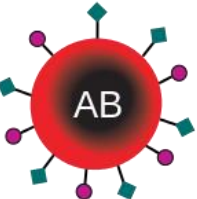
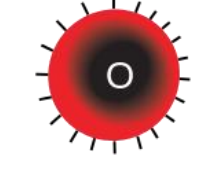


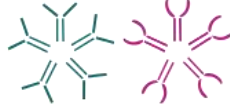



	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in Plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in Red Blood Cell	 A antigen	 B antigen	 A and B antigens	None

Figure 02: Blood Types and Antigens

An individual with the B blood group possesses “B” antigen on the red blood cell surface and IgM antibody “A” in the blood serum. So in the transfusion science, a person who has blood group B can receive blood from people who are having blood groups “B” or “O.” The individuals of blood group B can donate blood to the people who are having blood types “B” or “AB.”

What are the Similarities Between A and B Antigens?

- Both are glycoproteins.
- Both present in the red blood cell surface of human.
- Both can bind to their respective [antibodies](#) (“A” antibody and “B” antibody).
- Both are extremely important in transfusion science.
- Both are present in blood group “AB.”

What is the Difference Between A and B Antigens?

A Antigen vs B Antigen	
Antigen A is the blood antigen which is present on the red blood cell surfaces of people who has blood types A and AB.	Antigen B is the blood antigen which is present on the red blood cell surfaces of people who has blood types B and AB.
Respective IgM Antibodies in the Blood Serum.	
A person who has antigen “A” possesses “B” IgM antibody in the blood serum.	A person who has antigen “B” possesses “A” IgM antibody in the blood serum.
Incompatible Antibodies	
Antigen A is incompatible with “A” antibody.	Antigen B is incompatible with “B” antibody.
Compatible Blood Recieving	
A person who has antigen A can receive blood from people who are having blood groups “A” or “O.”	A person who has antigen B can receive blood from people who are having blood groups “B” or “O.”
Compatible Blood Donation	
A person who has antigen A can donate blood to people who are having blood types “A” or “AB.”	A person who has antigen B can donate blood to people who are having blood types “B” or “AB.”

Summary - A vs B Antigens

The most important blood group systems in the transfusion science are ABO system and RhD system. Multiple alleles control the ABO blood group system, and it is dependent on two antigens (antigen A and B) on red blood cell surfaces. A person who has antigen

A on red blood cell surface possesses “B” IgM antibody in the blood serum. They belong to A blood group type. A person who has antigen B in red blood cell surface possesses “A” IgM antibody in the blood serum. They belong to B blood group type. Individuals who have AB blood group type possess both antigens A and B in their red blood cell surfaces. But they have no antibodies in their blood serum. The blood group type O individuals do not have either A antigen or B antigen on their red blood cells surfaces. But their blood serum contains both IgM antibodies “A” and “B.” This is the difference between A and B antigens.

Reference:

- 1.“What Are Blood Group Antigens All About?” Dummies. [Available here](#)
- 2.“What is the difference between the various blood types.” Enotes.com, Enotes.com. [Available here](#)
- 3.“Blood type.” Wikipedia, Wikimedia Foundation, 22 Dec. 2017. [Available here](#)

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- 1.'Compatibility testing concerning RBCs 2014-02-01 00-42' By User:Luigi Albert Maria - Own work, ([CC BY-SA 3.0](#)) via [Commons Wikimedia](#)
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