
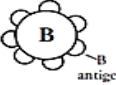
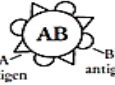














Human Blood Cell Typing

An organism monitors its internal environment to stay healthy and to carry out its life functions. Recognizing when foreign cells or other potentially harmful substances are in the body is one way to prevent damage and fight off infection by pathogens. Human red blood cells have a system for being recognized so that cells that belong in the body are kept safe while cells that do not belong can be destroyed.

Model 1 – Red Blood Cells and Antibodies

	Person with Blood Type A	Person with Blood Type B	Person with Blood Type AB	Person with Blood Type O
Cell with attached antigen	 A antigen	 B antigen	 A antigen B antigen	
Antibody produced	 Anti-B	 Anti-A	None	 Anti-B Anti-A
Cells in the presence of anti-A antibody				
Cells in the presence of anti-B antibody				

- Blood types in the human population are characterized by the presence or absence of antigens on the surface of the red blood cells.
 - According to Model 1, how many blood types are found in the human population?
 - What shape is used in Model 1 to represent an A antigen?
 - What distinguishes a type A red blood cell from a type B red blood cell?
 - What distinguishes a type A red blood cell from a type O red blood cell?
- Refer to the antibodies shown in Model 1.
 - How many different types of **antibodies** are shown?
 - Draw the antibody that is produced by a person with type A blood.
 - Which antigen would these antibodies fit?

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3. Refer to the second part of Model 1 that illustrates what happens when blood types are mixed. What happens to red blood cells when they are mixed with complementary antibodies?

4. The term **agglutination** is used to describe what happens to red blood cells when incompatible blood types are mixed.
 - a. Define agglutination according to Model 1.

 - b. What adverse effects might **agglutinated** red blood cells have on the body as they travel through veins, arteries, and capillaries?

An **antibody** is a protein made by the immune system of an organism in response to an **antigen** (foreign substance). The ability to produce antibodies protects animals from infections due to viruses, bacteria, and other microbes. In the case of blood, the body recognizes other blood types as foreign. For example, a person with type A blood produces anti-B antibodies. This process depends upon the body's ability to recognize **self-** and **nonself-antigens**.

5. Refer to Model 1.
 - a. What antigens are self-antigens for a person with type A blood?
 - b. What antigens are nonself-antigens for a person with type A blood?
 - c. What antigens are self-antigens for type AB blood?



6. A person with type A blood typically would not produce anti-A antibodies. Why is this a benefit to the person?

7. Suppose a person with type A blood needs a blood transfusion after an accident. Blood is received from a donor. Note that the antibodies in the donor blood are not significant. Only the antibodies in the recipient's blood will be considered. Use the diagrams in Model 1 to complete the following illustrations.
 - a. Draw the resulting mixture if the donor blood was also type A.

 - b. Draw the resulting mixture if the donor blood was type B.

 - c. Draw the resulting mixture if the donor blood was type O.