LESSON 3-8: WHAT TYPE ARE YOU?

A LESSON ON INHERITANCE OF BLOOD TYPES

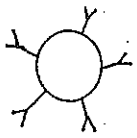
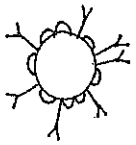
Blood and bloodstains can be important evidence in a criminal investigation. Blood evidence is often used to associate a suspect with a crime or crime scene. From a forensic point of view, blood has several important factors or types. Three of these factors are the ABO system, the MNS system, and the Rh factors.

The ABO Blood System

The ABO system may be most familiar to you because of its importance in blood transfusions. The letters A and B represent two different types of antigens, or molecules, that can be found on the surfaces of red blood cells. A person's red blood cells can be covered with one of the antigens, both of the antigens, or neither of the antigens. Blood types are a reflection of the antigens on the blood cells. There are four ABO blood types (see Table 1).

TABLE 1

ABO blood types are determined by the presence or absence of antigens on the cells.

Blood type	*Name of antigens on blood cells*	*Blood cells with antigens*
A	A	
B	B	
AB	AB	
O	NONE	

The blood of people whose blood cells have type A antigens contains antibodies to type B antigens (anti-B). Antibodies are substances produced by the immune system to help destroy foreign materials. Similarly, the blood of people whose blood cells have type B antigens contains antibodies to type A antigens (anti-A). Blood of type AB does not have any ABO antibodies. Type O blood contains both anti-A and anti-B.

Anti-B antibodies are shaped so that they fit type B antigens. Therefore, anti-B antibodies can cause cells with type B antigens to clump together. Likewise, anti-A antibodies are shaped to fit type A antigens, and can cause type A cells to clump.

Testing for ABO Blood Type

These properties of blood cells help in identifying blood types. If an investigator wants to know what ABO group a blood sample belongs to, he or she can test it with anti-A serum and anti-B serum to see which causes clumping (see Table 2).

TABLE 2

Type A blood clumps with anti-A serum; type B blood clumps with anti-B serum; AB clumps with anti-A or anti-B; and type O does not clump.

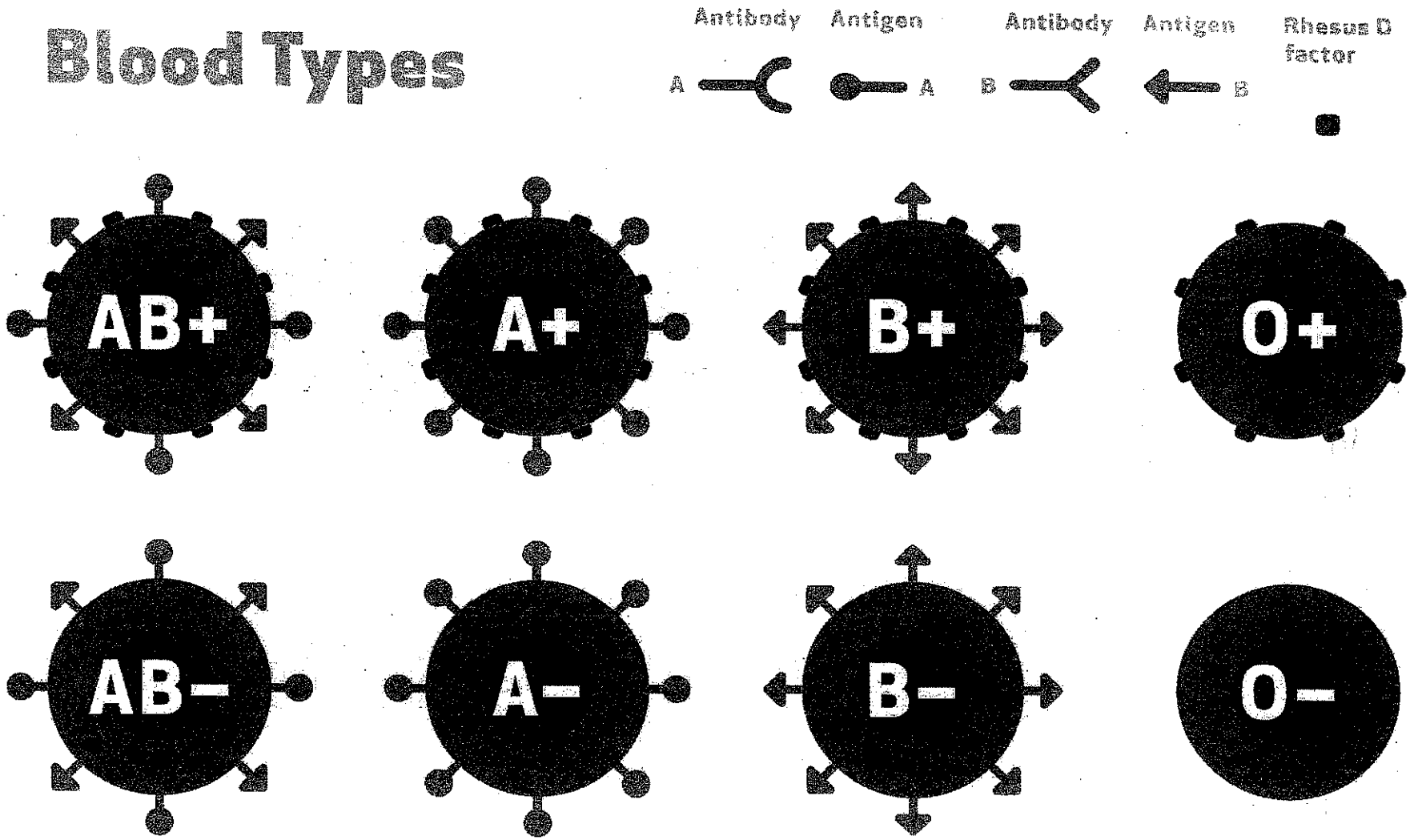
Blood Type	*Anti-serum*	*Results*
A	A	Clumps
B	B	Clumps
AB	A or B	Clumps
O	A or B	No clumps

You Inherited Your Blood Type

The presence of antigens on cells is genetically determined. Every person can inherit two ABO blood type antigens. If you inherit antigen A from both parents, you will have type A blood.

A Punnett square shows the probable genes of offspring when two individuals mate. The mother's genes, AA, are written across the top of the Punnett square. The father's genes, also AA in this case, are written down the left side of the square. Punnett square 1 shows there is a 100% chance that all of the offspring will have genes AA, and thus type A blood.

Erythrocytes (Red blood cells) – See, think, wonder



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