

Lab 25:  
Human Blood  
Types

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# Human Blood Types

<i>Blood Type</i>	<i>Antigens</i>	<i>Antibodies in plasma</i>	<i>Can donate blood to type</i>	<i>Can receive blood from type</i>
<i>A</i>	1.	2.	3.	4.
<i>B</i>	5.	6.	7.	8.
<i>AB</i>	9.	10.	11.	12.
<i>O</i>	13.	14.	15.	16.

17. Universal recipient?

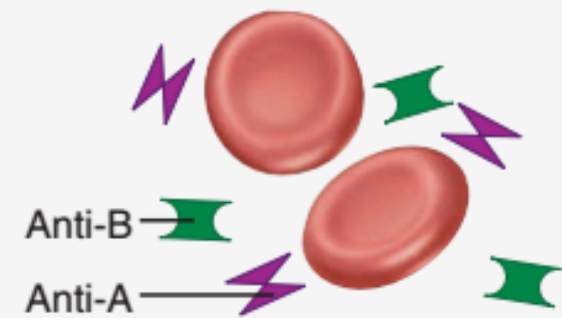
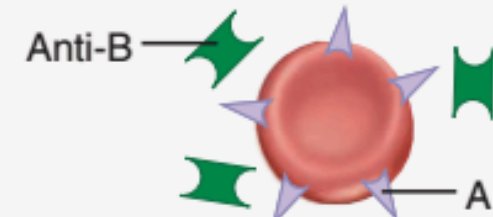
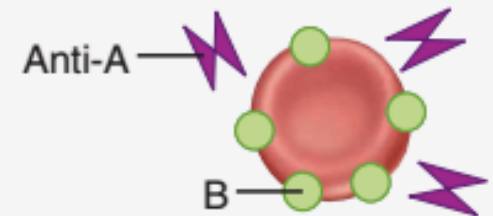
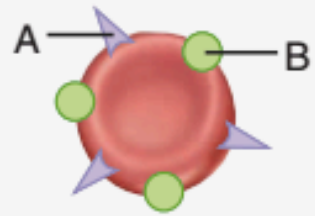
18. Universal donor?

19. Most common blood type in US?

20. Least common blood type in US?

**Table 17.4** ABO Blood Groups

BLOOD GROUP	RBC ANTIGENS (AGGLUTINOGENS)	PLASMA ANTIBODIES (AGGLUTININS)	BLOOD THAT CAN BE RECEIVED	FREQUENCY (% OF U.S. POPULATION)				
				WHITE	BLACK	ASIAN	HISPANIC	NATIVE AMERICAN
AB	A B	None	A, B, AB, O "Universal recipient"	4	4	7	2	<1
B	B	Anti-A (a)	B, O	11	19	25	10	4
A	A	Anti-B (b)	A, O	40	26	28	31	16
O	None	Anti-A (a) Anti-B (b)	O "Universal donor"	45	51	40	57	79



# Human Blood Types

Anti-A serum

Anti-B serum

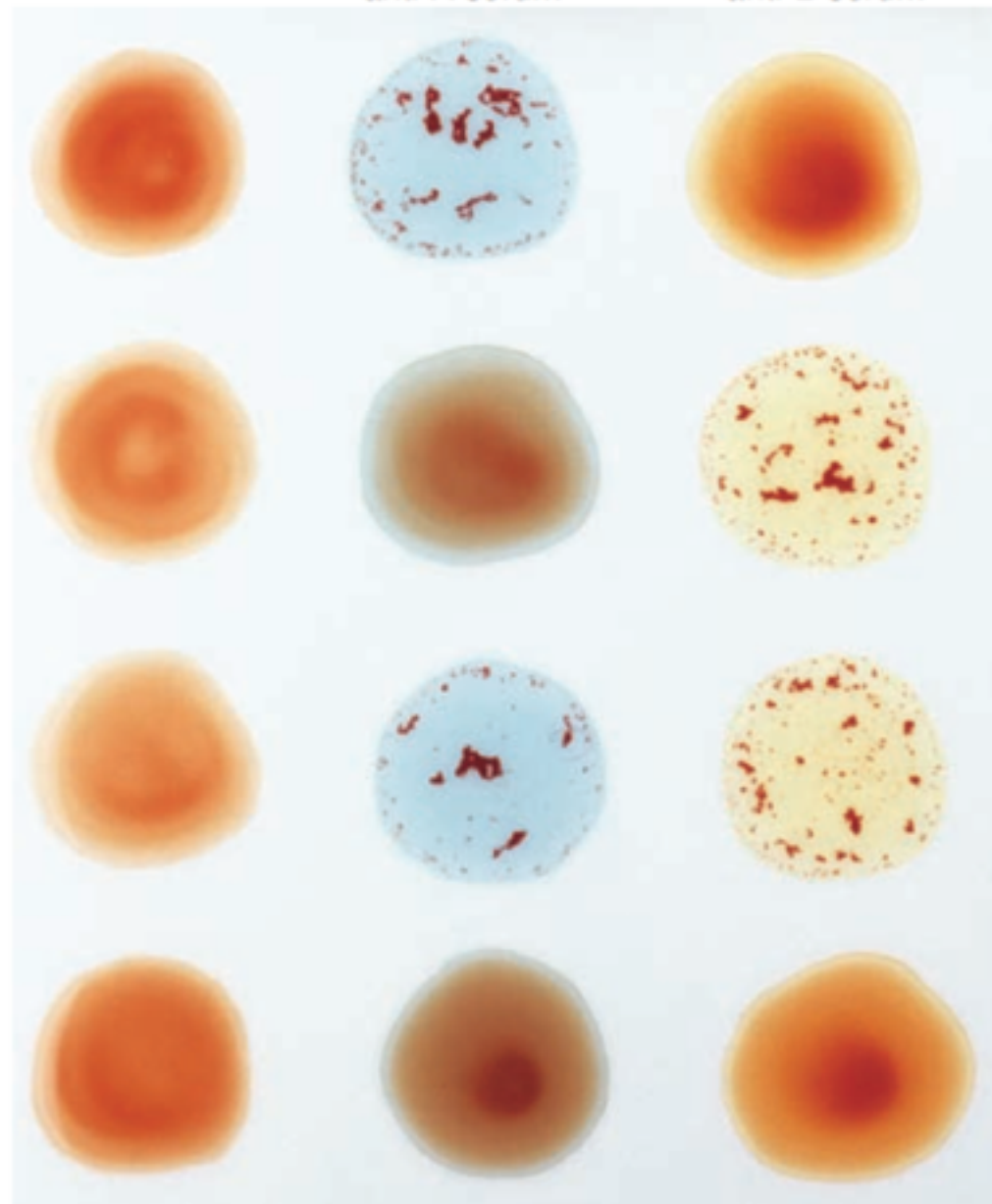


Untreated blood

Treated with anti-A serum

Treated with anti-B serum

Blood type



1.

2.

3.

4.

# Human Blood Types

**Question:** Can food coloring be used to demonstrate human blood type interactions?

**Procedure:** Develop a procedure given the following materials:

- Water
- Red food coloring
- Blue food coloring
- Yellow food coloring
- Green food coloring
- Spot Plate
- transfer pipettes

**Observations:** Make descriptive observations of your successful procedure.



# Application Question

Ms. Pratt is claiming that Mr. X is the father of her child. Ms. Pratt's blood type is O-. Her baby boy has type A+ blood. Mr. X's blood is typed and found to be B+. Could he be the father of her child? Build a pedigree, listing the probable genotypes for all individuals; include the potential grandparents on both sides. If Mr. X cannot be the father, list any possible phenotypes of potential fathers.

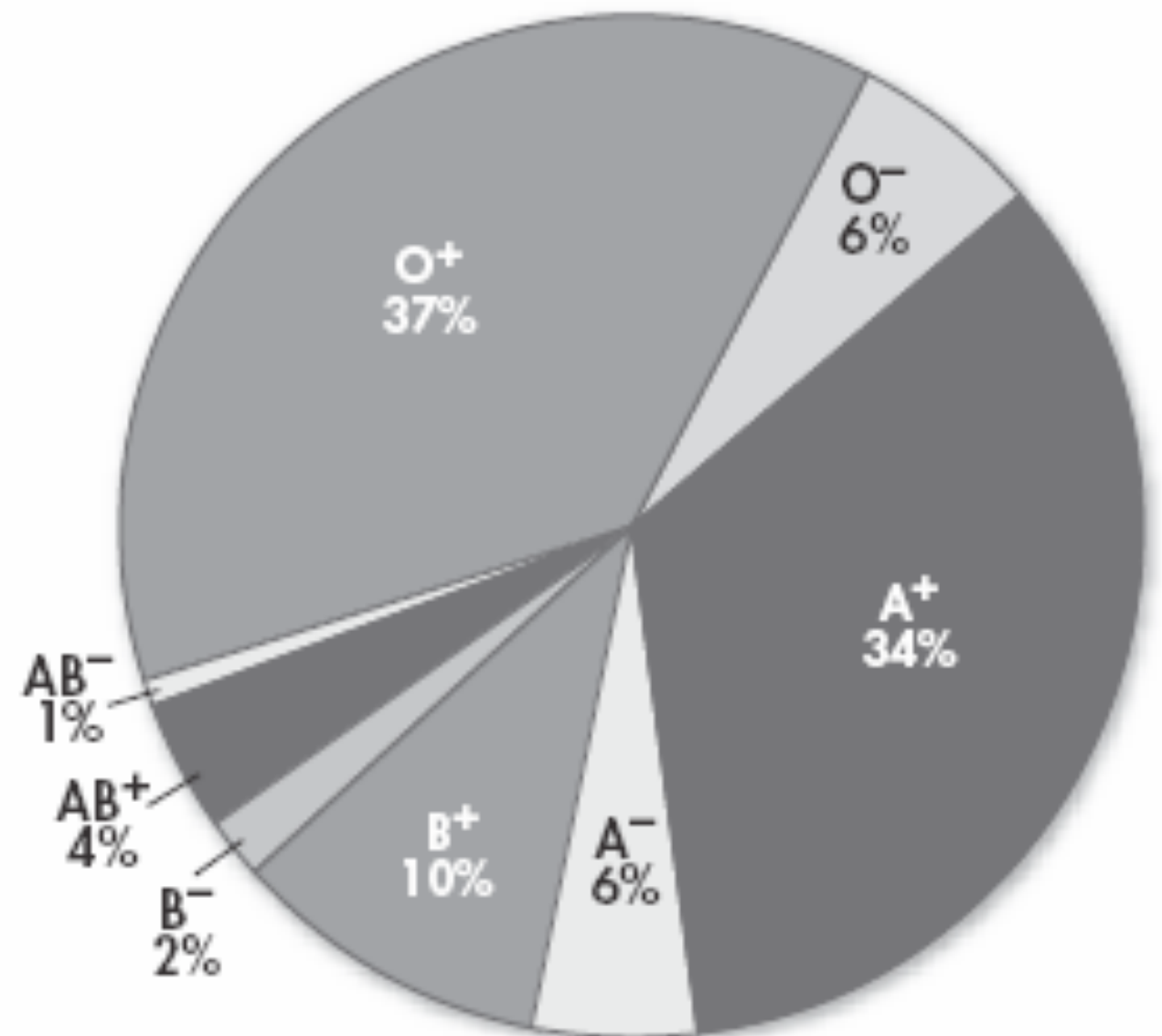
# Application Question

Explain why an Rh- person does not have a transfusion reaction on the first exposure to Rh+ blood. Why is there a transfusion reaction the second time he or she receives the Rh+ blood?



# Case Study

Blood Groups in the U.S. Population



1. People with blood type  $O^-$  are sometimes called universal donors. Why?
2. What blood type would a universal acceptor, a person who can receive any blood type, have?
3. Study the circle graph. Which blood type is most common in the U.S. population? What percentage of the population has that blood type?
4. What percentage of the U.S. population has a positive Rh factor?
5. What percentage of the U.S. population has a negative Rh factor?
6. Which blood type can be donated to the largest percentage of people? Which type can be donated to the smallest percentage of people?
7. Blood types A and B are codominant. O is recessive. Rh factor is determined by a different gene. The allele for a positive Rh factor is dominant over the allele for a negative Rh factor. Based on this information, could a person with  $O^+$  blood have parents, one with  $A^-$  blood and the other  $A^+$ ? What if both parents were  $A^-$ ?

# Case Study - Blood Typing EXTRA CREDIT

A patient was admitted to the ER and required a blood transfusion. A sample of blood was sent to the lab for blood typing as is the usual practice. The test resulted in an O- and hence O- blood was administered. The patient developed a transfusion reaction, and therefore transfusion had to be stopped. The patient's blood was retested and the O- test was confirmed. How is this possible?



## Human Blood Types

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