

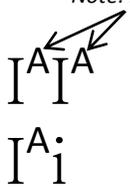
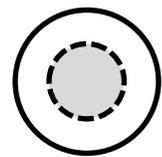
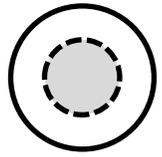
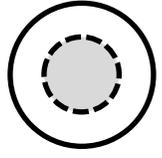
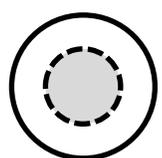
BLOOD TYPE GENETICS

THEORY

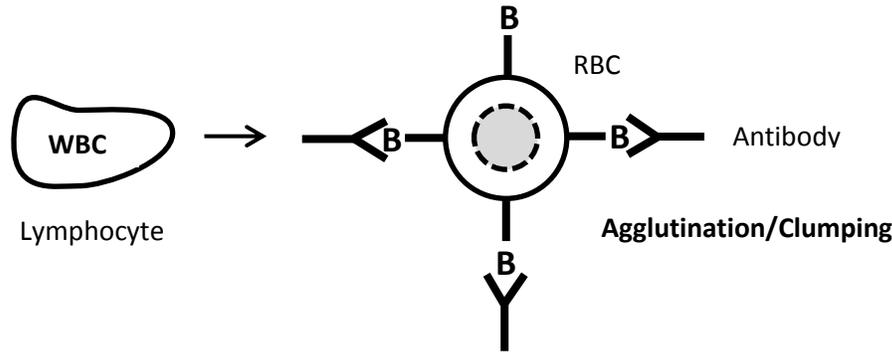
Human blood type is caused by the presence of _____ (sugar proteins) embedded in the cell _____ of _____ blood cells (RBC's). Two genes, located on _____ chromosomes, determine the blood type. For the most part, blood type is inherited as simple dominant or recessive genes. For example, the gene that causes type ____ blood is dominant over the gene that causes type ____ blood. But the gene that causes type ____ blood is equally dominant to that causing type _____. These genes, with equal dominance, are said to be _____.

Knowing what blood type a patient has is important for blood _____. The blood received can be rejected and attacked by the patient's _____ system. This is because, the glycoproteins on the RBC's act as _____ which stimulate an immune response which can lead to destruction of the RBC's which causes reduction of _____-carrying ability and clumping of the blood (_____) which can block blood vessels. Knowing which antigens (glycoproteins) are being introduced into a patient from a _____ is critical.

There are four major blood types: _____, _____, _____ and _____.

PHENOTYPE	GENOTYPE	ANTIBODIES MADE	DIAGRAM
TYPE A (dominant)	<p style="text-align: center;"><i>Note: 2 genes</i></p> 	<p style="text-align: center;">Anti-B </p> <p style="text-align: center;"><i>Normally you do not make antibodies against your OWN glycoproteins</i></p>	<p style="text-align: center;">Red Blood Cell (RBC)</p> 
TYPE B (dominant)			
TYPE AB (codominant)			
TYPE O (recessive)			

When RBC's from a donor are NOT the same type as those of the recipient (receiver), the _____ immune system recognizes them as foreign and attacks them. The _____ blood cells (WBC's, specifically called _____) produce Y-shaped proteins called _____ which are like tiny missiles that attack the _____ (antigens) on the RBC cell membrane.



Only certain blood types can be donated to certain recipients.

DONOR				
RECIPIENT	A	B	AB	O
A				
B				
AB				
O				

Type _____ is the "universal donor" (can be given to any blood type). Type _____ is the "universal recipient" (can receive from any blood type).

PROBLEMS (Answer in your notes)

- John has blood type AB and Jenny has type O. Draw the cross and Punnett square and list the possible blood types of their offspring.
- Mary has blood type A ($I^A I^A$) and Marvin has blood type AB. Is it possible for them to produce baby Melvin with blood type A? Draw the cross and Punnett square and explain.
- Samantha has blood type B and Simon has blood type O. Use the dash technique to draw the cross and Punnett square and explain if they can produce a type O child.
- Paul has blood type A and Peter has blood type AB. Penny has blood type B and baby Peewee has blood type O. Both Paul and Peter believe they are the father. Using crosses and Punnett squares and explanations, determine if one of them is more likely to be the father. Is this individual DEFINITELY the father? How could you tell for sure?
- If Penny needed a blood transfusion, could either Paul or Peter donate blood to her? Explain using relevant terminology.

(Try "Drag-and-Drop Genetics" on zeroBio)