POSTTEST

Select the best answer for each question. Please mark your answer on this exam to facilitate discussion and later review. If your instructor has provided a separate answer form, be sure you have identified yourself on the form, then begin your answers with question 1. Mark your answers both on the form and on this exam. Only one answer is correct.

The following information applies to questions 1 through 3.

Immediately following birth, cord blood was taken from a child whose mother was 0 Rh- and father was 0 Rh+. (There is no doubt about the father or mother's relationship to the child.) An agglutination assay on this blood gave the following results:

- Saline + child's RBCs
- Anti-A + child's RBCs
- Anti-B + child's RBCs
- Anti-D + child's RBCs
- Child's serum + A RBCs
- Child's serum + B RBCs
- Child's serum + D RBCs
- Anti-A + A RBCs
- Anti-B + B RBCs
- Anti-D + D RBCs

1. The child's blood type is
   (A) AB Rh+
   (B) AB Rh-
   (C) O Rh+
   (D) O Rh-
   (E) none of the above

2. The child's genotype for Rh is
   (A) Dd because his father is Rh+ and mother is Rh-. 
   (B) Dd because Rh+ is dominant. 
   (C) DD because Rh- is dominant. 
   (D) dd because Rh+ is dominant. 
   (E) Dd because Rh- is dominant. 

3. The father's genotype is 
   (A) homozygous at the ABO and Rh loci. 
   (B) heterozygous at the ABO and Rh loci. 
   (C) homozygous at the ABO locus and heterozygous at the Rh locus. 
   (D) heterozygous at the ABO locus and homozygous at the Rh locus. 
   (E) none of the above.
4. A healthy person whose blood type is A- cannot make antibody to
(A) B antigen of the ABO system.
(B) both diphtheria and tetanus toxoid.
(C) antigen of the Rh system
(D) both the M and N antigens
(E) both influenza virus and bovine serum albumin.

5. Which of the following represents a possible human genotype (followed in parentheses by its corresponding correct phenotype)?
(A) AA MNMN (AMN)
(B) 00 MNss (OOMNs)
(C) AB MsSs (ABMSs)
(D) BB NNss (ONs)
(E) AO MMSS (AMS)

6. If “natural” antibody to the A and B red blood cell antigens were IgG, then hemolytic disease of the newborn would occur in the children of:
(A) AB mothers and 0 fathers.
(B) O mothers and AB fathers.
(C) A mothers and A fathers.
(D) 0 mothers and 0 fathers.
(E) none of the above.

7. In an infant with erythroblastosis fetalis, the destruction of Rh positive erythrocytes is due to:
(A) extravascular hemolysis following C3b-mediated phagocytosis
(B) extravascular hemolysis following C3d-mediated phagocytosis
(C) extravascular hemolysis following Fcγ-mediated phagocytosis
(D) intravascular hemolysis caused by ADCC reaction against antibody-erythrocytes
(E) intravascular hemolysis following complement activation by red cell bound antibodies

Use the following diagrams for questions 8 through 10:

Remember that in an indirect Coombs test the patient's serum and normal RBC are mixed and then centrifuged to "wash" the RBCs before Coombs reagent is added.
Jaundiced Baby

8. A positive direct Coombs test is represented by which diagram?
   (A)
   (B)
   (C)
   (D)
   (E) None of these

9. A positive indirect Coombs test is represented by which diagram?
   (A)
   (B)
   (C)
   (D)
   (E) None of these

10. A negative indirect Coombs test is represented by which diagram?
    (A)
    (B)
    (C)
    (D)
    (E) None of these

When you have finished the posttest, discuss your answers with your colleagues and then compare them with the correct answers (see last pages in the workbook.)

POSTTEST ANSWERS ARE ON THE FOLLOWING PAGE.

DO NOT LOOK AT THEM OR REMOVE THEM UNTIL YOU HAVE COMPLETED THE POSTTEST
POSTTEST: CORRECT ANSWERS

Discuss the answers with each other to be sure none of you has any misconceptions!

1. D is correct. He lacks both A and B antigens on his RBCs, and since the blood type is determined by the RBC antigen, he is type 0. He has not had time to synthesize any anti-A or anti-B antibody. He also lacks the Rh antigen.

2. D is correct. Since Rh+ is dominant and the child is Rh-, he cannot have the Rh+ gene. Therefore, he must have two Rh- genes and be homozygous.

3. C is correct. The father is homozygous 0 (since A or B is dominant) and heterozygous Rh, i.e., Rh+/since the child is Rh- and had to get an Rh- gene from the father.

4. D is correct. All people are MM, NN, or MN. The MM person can only make anti-N, and the NN person can only make anti-M. The MN person can make neither anti-M nor anti-N, but no one can make both anti-M and anti-N, since everyone will always be carrying M, N, or both M and N.

5. E is correct.
   A has too many M and N alleles. A maximum of two is possible at each locus.
   B has too many Os in the phenotype.
   C has three S alleles, and no more than two are possible.
   D genotype BB does not match phenotype 0.

6. B is correct. The O mothers would make anti-A and anti-B which, if they were IgG, would cross the placenta and destroy the baby's RBCs that would have either A or B antigen on their surfaces.

7. C is correct. The destruction of Rh+ RBC in infants with erythroblastosis fetalis is due to the uptake by phagocytic cells, mediated by Fcγ receptors that recognize the RBC-associated IgG antibodies.

8. B is correct. The patient's RBCs have IgG on their surfaces and are agglutinated by the anti-IgG.

9. C is correct. The patient's IgG antibody reacts with the RBCs and the RBCs are washed to remove unbound human IgG. The Coombs reagent then will agglutinate the RBCs.

10. D is correct. None of the patient's IgG reacts with the RBCs; hence, it is washed away, and the test tube contains only RBCs and rabbit anti-human IgG.

When your group has finished reviewing the posttest, you have completed the activity. Have you achieved the objectives listed in the Introduction? Some of you may wish to discuss your reactions to this Patient-Oriented Problem-Solving session with your instructor.