

PostTest

Select the best answer for each question. Please mark your answers on this exam to facilitate discussion and later review. Only one answer is correct.

1. Positive skin tests such as for *Candida albicans* or tuberculosis are:
 - (A) a good indication that the humoral immune system is functional
 - (B) a good indication that the cell-mediated immune system is functional
 - (C) called delayed-type hypersensitivity (DTH) reactions, since they are antibody-mediated and require 24 to 72 hours to reach a maximum
 - (D) called immediate-type hypersensitivity reactions, since they are cell-mediated and require less than 15 minutes to reach a maximum
 - (E) called immediate-type hypersensitivity reactions, are mediated by IgE, and require less than 15 minutes to reach a maximum
2. A reaction to poison ivy can be best characterized as a:
 - (A) non-specific inflammatory reaction caused by a caustic irritant
 - (B) humoral immune response
 - (C) tissue inflammation caused both by antibodies and sensitized T lymphocytes
 - (D) special manifestation of a cell-mediated immune reaction
 - (E) secondary infection of skin microabrasions caused by poison ivy leaves
3. A major characteristic of the immune response induced by *Haemophilus influenzae* PRP is:
 - (A) IgG predominance
 - (B) Long persistence
 - (C) Lack of helper T cell involvement
 - (D) Predominant activation of cytotoxic T cells
 - (E) Vigorous secondary immune responses
4. In an enzymeimmunoassay for tetanus antibodies, tetanus toxoid is first adsorbed to a solid phase. Then, antibody-containing samples are allowed to react with the immobilized antigen. Next, an enzyme-labeled second antibody to human immunoglobulins is added, and last, a substrate is added which develops color in the presence of the enzyme conjugated to the second antibody. The intensity of color measured after adding the substrate is directly related to the concentration of:
 - (A) specific antibody in the patient's serum
 - (B) antigen adsorbed to the solid phase
 - (C) enzyme-labeled antibody added
 - (D) immunoglobulins in the patient's serum
 - (E) substrate added

Immunodeficiency Disease

PostTest (ctd.)

Questions 5 and 6 refer to the following information:

The following table shows the results of two separate complement fixation tests, which were run as follows: Serum was heated to 56°C for 30 minutes, cooled, mixed with its antigen (Ag) in the presence or absence of complement, and incubated to allow fixation of complement if antibody were present. To determine if complement remained in an active or "unfixed" state, indicator RBCs with antibody on them were added after the incubation. Any unfixed complement then lysed the RBCs. Serum A and serum B were assayed at different times using different reagents.

+ means reagent added; - means reagent not added

Tube	Serum	Antigen	Complement	Lysis of RBCs
	Serum A	Antigen 1		
1	+	+	+	no
2	-	+	+	no
3	+	-	+	no
4	+	+	-	no
	Serum B	Antigen 2		
5	+	+	+	no
6	-	+	+	yes
7	+	-	+	yes
8	+	+	-	no

(Choose the *one* answer that is consistent with all of the data.)

- Is there antibody to antigen 1 in serum A?
 - Yes, because the Ab-Ag reaction fixed complement and the controls are normal.
 - Can't tell, because complement may not have been active.
 - Can't tell, because Ag was anticomplementary.
 - Can't tell, because antiserum was anticomplementary.
 - No.
- Is there antibody to antigen 2 in serum B?
 - Yes, because the Ab-Ag reaction fixed the complement and the controls are normal.
 - Can't tell, because the complement may not have been active.
 - Can't tell, because Ag was anticomplementary.
 - Can't tell, because antiserum was anticomplementary.
 - No.

Immunodeficiency Disease

PostTest (ctd.)

Questions 7, 8, and 9 refer to the following information:

A virus-neutralizing test for antibody (described in the Introduction) was run on the serum from an obviously sick patient, with the following results:

Serum Dilution	1:2	1:10	1:50	1:250	1:1250	No Serum
Poliovirus						
Type 1	192*	224	200	140	236	216
Type 2	2	10	30	140	180	240
Type 3	202	200	196	218	220	212

*Plaques/culture dish.

7. A valid conclusion from these data would be:
- (A) The patient has Ab against only type 1 virus.
 - (B) The patient has Ab against only type 2 virus.
 - (C) The patient has Ab against only type 3 virus.
 - (D) The patient has Ab against both types 1 and 2 viruses.
 - (E) The patient has Ab against both types 1 and 3 viruses.
8. From the above data, we can also see that the 50% plaque reduction titer for type 2 virus is:
- (A) between 250 and 1,250.
 - (B) between 50 and 250.
 - (C) not determinable from these data.
 - (D) less than 10.
 - (E) more than 1,250.
9. From the above data, we can also see that the 50% plaque reduction titer for type 3 virus is:
- (A) between 250 and 1,250.
 - (B) between 50 and 250.
 - (C) less than 2.
 - (D) 2.
 - (E) more than 1,250.

Immunodeficiency Disease

Question 10 refers to the following information:

Red blood cell agglutination tests were run on the serum from a deceased patient to determine her blood type. RBCs of known blood type were mixed with appropriate amounts of the patient's serum.

Agglutination was scored as + = clumping or - = no clumping, and the following results were obtained:

Red Blood Cells	A	B	O	AB
Patient's Serum	+	+	-	+

10. These data indicate that:

- (A) the patient was type O.
- (B) the patient had a humoral immune deficiency.
- (C) the patient had a cellular immune deficiency.
- (D) the patient was type AB.
- (E) None of the above.

When you have finished the posttest, discuss your answers with your colleagues and then compare them with the correct answers.

THE CORRECT ANSWERS TO THE POSTTEST QUESTIONS ARE ON THE FOLLOWING PAGE. DO NOT LOOK AT THEM OR REMOVE THEM UNTIL YOU HAVE COMPLETED THE POSTTEST.

Posttest Correct Answers

1. B is correct. C is wrong because the DTH is cell-mediated.
2. D is correct. Poison ivy hypersensitivity is a cell-mediated immune reaction due to the sensitization of T lymphocytes to plant catechols which diffuse into the epidermis at the points of contact with the poison ivy leaves.
3. C is correct. Like most polysaccharides, *H. influenzae* PRP is a T-independent antigen which stimulates B cells without apparent involvement of helper T lymphocytes.
4. A is correct. An enzymeimmunoassay (ELISA) such as described in this question will measure specific anti-tetanus toxoid antibodies, rather than the levels of all serum immunoglobulins.
5. B is correct. It is the only *single* answer that could explain the data; however, if *both* C and D were true, they would also account for the data.
6. A is correct.
7. B is correct. The variations in the number of plaques seen with types 1 and 3 viruses are random and suggest the absence of antibody to those viruses.
8. B is correct. The control has 240 plaques. Therefore, a 50% reduction would show 120 plaques, and this falls between a 1:50 and a 1:250 dilution. The titer therefore must be between 50 and 250.
9. C is correct. Because the lowest dilution tested (1:2) was negative, one can state that the titer is lower than 2, but it cannot be stated the the titer is actually 0, because an undiluted sample was not tested.
10. A is correct. The patient has anti-A and anti-B antibodies and hence must be type O.

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.