

Sample Questions

American Board of Medical Laboratory Immunology

The American Board of Medical Laboratory Immunology
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SAMPLE QUESTIONS

The sample questions included in this examination guide are actual questions from previous examinations. They have been removed from the question pool. Do not judge the content as indicative of content in current questions, but use these sample questions as templates for the format.

Sample Case Study and Related Questions

The following case study is related to the next four questions in bold:

An obstetrician evaluated a 32-year-old female for problems with repeated miscarriages. All miscarriages have occurred in the second or third trimester. In each miscarriage there was no evidence of anatomic, genetic, or hormonal causes. A notable pathological finding in the last miscarriage was placental thrombosis. Of interest was the report that the patient had a false-positive serological test for syphilis. The physician considered an autoimmune disorder in the patient's differential diagnosis. The physician ordered tests and the laboratory results are shown in Table 1.

Table 1.

<u>Test</u>	<u>Result</u>	<u>Reference range</u>
Antinuclear antibodies	Negative	Negative
Anti-ds-DNA antibodies	Negative	Negative
Platelet counts	60 K/ μ l	150 – 400 K/ μ l
Urine protein	3+	Negative
Activated partial thromboplastin time	>40 seconds	24-35 seconds

1. What is the most probable clinical diagnosis?

- a. Idiopathic thrombocytopenic purpura
- b. Systemic lupus erythematosus (SLE)
- c. Thromboangiitis obliterans
- d. Antiphospholipid antibody syndrome

2. Cross-reactivity with which antigen would cause a false-positive syphilis test result for this patient?

- a. Cardiolipin
- b. Protein C and S
- c. Annexins
- d. Myeloperoxidase

3. What subsequent test(s) would you suggest that the physician order?

- a. Anti-SSA antibody
- b. Anti-phospholipid antibodies and anti- β 2-glycoprotein
- c. Anti-platelet antibody
- d. C-ANCA

4. You are considering bringing an assay for anti-phospholipid measurement into your laboratory. This test is currently sent to another laboratory. As part of the validation study, you have found a considerable degree of interlaboratory variation. What technical area(s) should be evaluated for these variations?

- a. Sample volume
- b. Sample storage
- c. Calibration curve used and units of measurement
- d. Operator pipetting technique

Sample Questions for Remainder of Exam

5. Which of the following cell surface markers are normally associated with both T and B cells?
- CD19 antigens
 - Receptors for tumor necrosis factor (TNF)
 - CD3 antigens
 - MHC class I (MHC-I) gene products
 - CD2 antigens
6. The skin biopsy of a patient having a delayed hypersensitivity reaction is characterized by:
- the deposition of Ig and complement in the arterial wall.
 - neutrophil infiltrates around arteries.
 - necrosis of the epidermis.
 - mononuclear cell infiltrates surrounding small vessels.
 - edema.
7. Serum samples from patients on heparin therapy, particularly those receiving renal dialysis, may contain fragments of fibrin. In solid-phase RIA for HBsAg with polystyrene beads, these fragments:
- produce false-negative results by trapping radiolabeled antibody.
 - trap radiolabeled antibody on the bead with resulting false positives.
 - interfere with binding of the radiolabeled antibody on the bead.
 - do not affect the specificity of the test result.
8. In a patient with a positive antinuclear antibody (ANA) and a history compatible with systemic lupus erythematosus (SLE), the MOST specific test is:
- anti-single-stranded DNA (anti-ssDNA).
 - anti-double-stranded DNA (anti-dsDNA).
 - anti-Ro.
 - positive immunofluorescence of uninvolved skin with an intracellular pattern.
 - anti-RNP.
9. Interleukin-3 (IL-3) stimulates:
- hematopoiesis of lymphoid and myeloid stems.
 - development of lymphokine-activated killer (LAK) cells.
 - generation of NK cells.
 - proliferation of helper T cells.
 - differentiation of NK cells.
10. A cell with phenotype $CD2^-$, terminal deoxynucleotidyltransferase negative (TdT⁻), HLA-DR⁺, slg⁻, clg⁺ is MOST likely to be a:
- monoblast.
 - pre-B cell.
 - mature B cell.
 - plasma cell.
 - myeloblast.
11. Optimal efficiency of PCR is obtained when primers:
- are random hexamers.
 - are complementary to sequences which are over 5,000 bp apart.
 - are complementary to positive DNA strands.
 - are complementary to negative DNA strands.
 - complement both positive and negative DNA strands.
12. Antibodies to polysaccharides in humans are MOST likely to be of which one of the following isotypes?
- IgG1
 - IgG2
 - IgG3
 - IgG4
 - IgA2

13. Which of the following best correlates with active SLE?
- Deposition of Ig and complement along the glomerular basement membrane
 - High-titer ANAs and anti-centromere antibodies
 - Circulating cryoglobulin complexes formed by IgM-IgG aggregates
 - Antibodies to dsDNA and depressed levels of serum complement
14. The marginal zone of a secondary follicle contains high numbers of:
- activated T cells.

Test	Result (mg/dl)	Reference range (mg/dl)
IgG	1,158	723–1,685
IgA	221	69–312
IgM	144	56–353
C3	127	83–177
C4	29	12–43
C1 esterase inhibitor	17.3	11.5–19.5

- nonactivated B cells.
 - dendritic macrophages.
 - large cleaved lymphocytes.
 - equal mixtures of T and B cells.
15. Laboratory diagnosis of Goodpasture's syndrome is largely dependent on the demonstration of:
- anti-glomerular basement membrane antibodies in serum by complement fixation.
 - lumpy staining of glomerular basement membrane by electron microscopy.
 - linear staining of tubular basement membrane by indirect immunofluorescence.
 - linear staining of glomerular basement membrane by indirect immunofluorescence.
 - antibody in kidneys cross-reactive with cardiac sarcolemma.

16. A 62-year-old female with progressive rheumatoid arthritis and a tubular-type proteinuria by urine electrophoresis has a positive heat test for Bence Jones proteins in concentrated urine. The MOST probable cause is:
- marked increase of polyclonal light chains.
 - gamma heavy-chain disease.
 - light-chain disease.
 - plasma cell myeloma.
 - non-Hodgkin's lymphoma.

17. The following results are obtained by nephelometry from a patient suspected of having hereditary angioedema.

The physician calls and explains that the patient appears to have a classic case of hereditary angioedema, but the laboratory results do not confirm this. What additional tests would you recommend?

- C3b inactivator, functional
 - C3 activator
 - CH50
 - C1 esterase inhibitor, functional
 - Total C1
18. A 35-year-old man presents with a history of episodic subcutaneous swelling and incapacitating, colicky, abdominal pain lasting 1 to 3 days that is sometimes associated with nausea and vomiting. The abdominal pain occurs independently of the swelling. He has also had episodes of swelling in the throat. He has a positive family history: his mother had similar episodes when she was younger; one son has similar attacks; another son is completely normal. Several distant cousins have the same symptoms.

Physical examination shows a male in no acute distress. Height, 5' 11"; weight, 177 lb; blood pressure, 125/80 mm/Hg, pulse, 82 beats/min. The rest of the examination is unremarkable.

The laboratory data include the following results:

Hemoglobin	14 g/dl
Hematocrit	48%
White blood cells (WBC)	8,000/mm ³
Differential	26% lymphocytes 68% segmented neutrophils 3% monocytes 2% eosinophils 1% basophils

Electrocardiogram, SMA-12, chest X-ray, and urinalysis results were within normal limits. Which of the following tests is more likely to be abnormal in this patient?

- a. CH50
- b. C3
- c. C4
- d. C5
- e. IgE

19. Which of the following characteristics is shared by radioimmunoprecipitation (RIPA) and Western blot assays for specific antibodies recognizing viral antigens?
- a. An electrophoretic step is required to separate the viral antigens on the basis of molecular weight.
 - b. The antigen-antibody reaction takes place before the electrophoretic step.
 - c. The viral antigens are radiolabeled.
 - d. An enzyme-conjugated goat anti-mouse Ig reagent is used.
20. Which of the following approaches would be best to deal with the problem of an increasing number of celebrations (birthdays, etc.) by laboratory personnel during normal working hours?
- a. Prohibit all celebrations except on break time and lunch periods.
 - b. Predesignate a reasonable time for all celebrations each month, chosen to least interfere with laboratory performance.

- c. Allow each section supervisor to deal with the problem.
- d. Act only if you have gathered data showing that celebrations are interfering with laboratory performance and productivity.

21. Isoelectric focusing is a technique that can be used to analyze proteins. Which of the following is true of isoelectric focusing?
- a. It is commonly used to quantitate IgA.
 - b. It separates proteins in an aqueous environment where one is able to maintain a net charge of +1 on the proteins.
 - c. It is restricted to the analysis only in an acidic environment (pH < 6).
 - d. It is restricted to the analysis only in an alkaline environment (pH > 6).
 - e. It separates proteins based on the pH at which the net charge on a protein is zero.
22. The skin biopsy of a patient having a Jones-Mote reaction is characterized by:
- a. a deposit of Igs and complement in the arterial wall.
 - b. neutrophils around the arteries.
 - c. basophil-rich infiltrates in the dermis.
 - d. mononuclear cell infiltrates surrounding small vessels.
 - e. subcutaneous edema.
23. The finding by nephelometry of low IgG, IgA, and IgM levels in a patient with a monoclonal protein of gamma mobility (8 g/dl) and no Bence Jones protein should first be followed by:
- a. repeating the assay of IgG, IgA, and IgM with higher dilutions of serum.
 - b. immunofixation using anti-IgD and anti-IgE.
 - c. repeating the assay with different antisera.
 - d. reevaluating the quality control in your laboratory.
 - e. reassignment of the technician in charge of the nephelometer.

24. In the direct antiglobulin test (DAT), it is essential that the antiglobulin reagent contain anti-IgG antibodies and:

- a. anti-IgM antibodies.
- b. anti-C1r antibodies.
- c. anti-C3d antibodies.
- d. anti-P antibodies.
- e. anti-MN antibodies.

25. Prekallikrein can be activated by:

- a. components of the extrinsic pathway of coagulation.
- b. tissue thromboplastin and coagulation factor IX.
- c. plasmin and coagulation factor Xa.
- d. thrombin and kininogen.
- e. activated factor XII.

26. Chronic inflammation in response to foreign bodies is characterized by the accumulation of:

- a. polymorphonuclear leukocytes.
- b. sensitized T lymphocytes.
- c. platelets.
- d. macrophages.
- e. basophils.

27. Which of the following factors attracts neutrophils?

- a. C-reactive protein
- b. Soluble antibody-antigen complexes
- c. C5a
- d. IL-2
- e. Amyloid A protein

28. Which of the following cell types are positive for TdT analysis by immunofluorescence?

- a. Germinal center cells
- b. Resting cells in diffuse cortex
- c. Plasma cells
- d. Peripheral T cells
- e. Mantle cells

29. The finding of a positive result with the serum control in a complement fixation test is MOST likely explained by the presence of:

- a. anti-Forsman antibodies.
- b. anti-human red blood cell antibodies.
- c. free antigen in circulation.
- d. high levels of heat-labile IgE.
- e. soluble immune complexes.

30. An activated CD4-positive lymphocyte will:

- a. recognize antigens associated with MHC-I.
- b. release large amounts of IL-2.
- c. interact with CD2+ lymphocytes.
- d. interact with antigen-presenting cells through the MHC-I molecule.
- e. express MHC-I molecules but NOT MHC-II molecules on its membrane.

31. The radioallergosorbent test (RAST) is used instead of a skin test under which of the following circumstances?

- a. The suspected allergen is not present.
- b. The patient is very young.
- c. C1q binds to an IgE-allergen complex in patient serum.
- d. IgG antibody to suspected allergen interferes with the skin test.
- e. The patient has hypogammaglobulinemia.

32. The lectin pathway leads to activation of the classical complement pathway through:

- a. antibody binding.
- b. production of C1 complex.
- c. mannose-binding lectin (MBL) and activation of MBL-associated serum proteases (MASP).
- d. C5 convertase.
- e. decay-accelerating factor (DAF).

33. Which one of the following statements demonstrates the linkage disequilibrium of HLA-A1 and HLA-B8 alleles in the Caucasian population?
- The observed A1-B8 haplotype frequency is usually higher than the expected frequency.
 - The observed A1-B8 haplotype frequency is usually lower than the expected frequency.
 - The observed A1-B8 haplotype frequency is the same as the expected frequency.
 - The observed A1-B8 haplotype frequency is the sum of the A1 and B8 gene frequencies.
 - The observed A1-B8 haplotype frequency is the product of the A1 and B8 gene frequencies.
34. The function of MHC-I molecules is to present:
- endogenous antigen peptides to T helper cells.
 - exogenous antigen peptides to T cells.
 - processed antigen peptides to CD4+ T cells.
 - processed antigen peptides to CD8+ T cells.
 - processed antigen peptides to B cells.
35. The function of MHC- II molecules is to present:
- exogenous antigen peptides to T killer cells.
 - endogenous antigen peptides to T cells.
 - processed antigen peptides to CD4+ T cells.
 - processed antigen peptides to CD8+ T cells.
 - intact antigen molecules to B cells.

ANSWERS

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|-------|-------|-------|-------|
| 1. d | 11. e | 21. e | 31. b |
| 2. a | 12. b | 22. c | 32. c |
| 3. b | 13. d | 23. a | 33. a |
| 4. c | 14. b | 24. c | 34. d |
| 5. d | 15. d | 25. e | 35. c |
| 6. d | 16. a | 26. d | |
| 7. b | 17. d | 27. c | |
| 8. b | 18. c | 28. a | |
| 9. a | 19. b | 29. e | |
| 10. b | 20. b | 30. b | |