



KENYATTA UNIVERSITY
EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE (MEDICAL
LABORATORY SCIENCE)

HML 306: CLINICAL IMMUNOLOGY

2ND SEMESTER, 2022/2023

TIME: 2 Hours

INSTRUCTION:

SECTION A: ANSWER ALL QUESTIONS (4 MARKS EACH)

- 1 a) List FOUR organ specific autoimmune disorders that are mediated by direct cellular damage. (2 marks)
- b) Define molecular mimicry. (2 marks)
2. a) Distinguish between primary and secondary immunodeficiencies. (2 marks)
- b) Distinguish between isograft and allograft. (2 marks)
3. List FOUR therapies for autoimmune diseases. (4 marks)
- 4 List FOUR functions of the human complement system. (4 marks)
5. Describe HLA class II antigen presentation. (4 marks)

SECTION B: ANSWER ANY ONE QUESTION (20 MARKS EACH)

- 6 a) Describe the following autoimmune disease.
 - i) Systemic Lupus Erythematosus. (5 marks)
 - ii) Multiple Sclerosis. (5 marks)
- b) Describe Hyper acute graft rejection. (10 marks)
7. a) Describe Type I Hypersensitivity reactions (10 marks)
- b) Discuss FOUR mechanism by which tumors evade the immune system. (10 marks)

SECTION C: ANSWER ALL QUESTION BY INDICATING THE RIGHT CHOICE IN THE ANSWER BOOKLET. EACH QUESTION IS 1/2 MARK.

1. Which of the following cell surface molecules is classified as an MHC class II antigen?
 - A. HLA-A
 - B. HLA-B
 - C. HLA-C
 - D. HLA-DR
2. Which of the following are products of HLA class III genes?
 - A. T-cell immune receptors
 - B. HLA-D antigens on immune cells
 - C. Complement proteins C2, C4, and Factor B
 - D. Immunoglobulin VL regions
3. What molecule on the surface of most T cells recognizes antigen?
 - A. IgT, a four-chain molecule that includes the tau heavy chain
 - B. MHC protein, a two-chain molecule encoded by the HLA region
 - C. CD3, consisting of six different chains
 - D. TcR, consisting of two chains, alpha and beta
4. The T-cell antigen receptor is similar to immunoglobulin molecules in that it:
 - A. Remains bound to the cell surface and is never secreted
 - B. Contains V and C regions on each of its chains
 - C. Binds complement
 - D. Can cross the placenta and provide protection to a fetus
5. A super antigen, such as toxic shock syndrome toxin-1 (TSST-1), bypasses the normal antigen processing stage by binding to and cross linking:
 - A. A portion of an immunoglobulin molecule and complement component C1
 - B. Toll-like receptors and an MHC class I molecule
 - C. A portion of an immunoglobulin and a portion of a T-cell receptor
 - D. A portion of a T-cell receptor and an MHC class II molecule
6. What is a general definition for autoimmunity?
 - A. Increase of tolerance to self-antigens
 - B. Loss of tolerance to self-antigens
 - C. Increase in clonal deletion of mutant cells
 - D. Manifestation of immunosuppression
7. What type of antibodies is represented by the solid or homogeneous pattern in the immunofluorescence test for antinuclear antibodies?
 - A. Antihistone antibodies
 - B. Anticentromere antibodies
 - C. Anti-ENA (anti-Sm and anti-RNP) antibodies
 - D. Anti-RNA antibodies
8. What disease is indicated by a high titer of anti-Sm (anti-Smith) antibody?
 - A. Mixed connective tissue disease (MCTD)
 - B. RA

- C. SLE
- D. Scleroderma

9. Which disease might be indicated by antibodies to smooth muscle?

- A. Atrophic gastritis
- B. Autoimmune hepatitis
- C. Myasthenia gravis
- D. Sjögren's syndrome

10. What is the main use of laboratory tests to detect antibodies to islet cells and insulin in cases of insulin-dependent diabetes mellitus (IDDM)?

- A. To regulate levels of injected insulin
- B. To diagnose IDDM
- C. To rule out the presence of other autoimmune diseases
- D. To screen susceptible individuals prior to destruction of β cells

11. Which of the following is a description of a type I hypersensitivity reaction?

- A. Ragweed antigen cross links with IgE on the surface of mast cells, causing release of preformed mediators and resulting in symptoms of an allergic reaction
- B. Anti-Fy_a from a pregnant woman crosses the placenta and attaches to the Fy_a antigen-positive red cells of the fetus, destroying the red cells
- C. Immune complex deposition occurs on the glomerular basement membrane of the kidney, leading to renal failure
- D. Exposure to poison ivy causes sensitized T cells to release lymphokines that cause a localized inflammatory reaction

12. A patient deficient in the C3 complement component would be expected to mount a normal:

- A. Type I and IV hypersensitivity response
- B. Type II and IV hypersensitivity response
- C. Type I and III hypersensitivity response
- D. Type II and III hypersensitivity response

13. Which of the following symptoms in a young child may indicate an immunodeficiency syndrome?

- A. Anaphylactic reactions
- B. Severe rashes and myalgia
- C. Recurrent bacterial, fungal, and viral infections
- D. Weight loss, rapid heartbeat, breathlessness

14. What screening test should be performed first in a young patient suspected of having an immune dysfunction disorder?

- A. Complete blood count (CBC) and white cell differential
- B. Chemotaxis assay
- C. Complement levels
- D. Bone marrow biopsy

15. A patient had surgery for colorectal cancer, after which he received chemotherapy for 6 months. The test for carcinoembryonic antigen (CEA) was normal at this time. One year later, the bimonthly CEA was elevated (above 10 ng/mL). An examination and biopsy revealed the recurrence of a small tumor. What was the value of the results provided by the CEA test in this clinical situation?

- A. Diagnostic information
- B. Information for further treatment

- C. Information on the immunologic response of the patient
- D. No useful clinical information in this case

16. A carbohydrate antigen 125 assay (CA-125) was performed on a woman with ovarian cancer. After treatment, the levels fell significantly. An examination performed later revealed the recurrence of the tumor, but the CA 125 levels remained low. How can this finding be explained?

- A. Test error
- B. CA-125 was the wrong laboratory test; α -fetoprotein (AFP) is a better test to monitor ovarian cancer
- C. CA-125 may not be sensitive enough when used alone to monitor tumor development
- D. CA-125 is not specific enough to detect only one type of tumor

17. How is HLA typing used in the investigation of genetic diseases?

- A. For prediction of the severity of the disease
- B. For genetic linkage studies
- C. For direct diagnosis of disease
- D. Is not useful in this situation

18. Select the best donor for a man, blood type AB, in need of a kidney transplant.

- A. His brother, type AB, HLA matched for class II antigens
- B. His mother, type B, HLA matched for class I antigens
- C. His cousin, type O, HLA matched for major class II antigens
- D. Cadaver donor, type O, HLA matched for some class I and II antigens

19. What method may be used for tissue typing instead of serological HLA typing?

- A. PCR
- B. Southern blotting
- C. RFLP
- D. All of these options

20. A transplant patient began to show signs of rejection 8 days after receipt of the transplanted organ, and the organ was removed. What immune elements might be found in the rejected organ?

- A. Antibody and complement
- B. Primarily antibody
- C. Macrophages
- D. T cells