

CHUKA



UNIVERSITY

**UNIVERSITY EXAMINATIONS**

**SECOND YEAR EXAMINATION FOR BACHELOR OF SCIENCE IN NURSING**

**NURS 226: IMMUNOLOGY**

**STREAMS: Y2S2**

**TIME: 3 HOURS**

**DAY/DATE : .....**

**INSTRUCTIONS:**

1. Do not write anything on the question paper.
2. Mobile phones and any other reference materials are NOT allowed in the examination room.
3. The paper has three sections. Answer ALL questions in Sections I and II and ONE question in section III.
4. All your answers for Section I (MCQs) should be on one page.
5. Number ALL your answers and indicate the order of appearance in the space provided in the cover page of the examination answer booklet.
6. Write your answers legibly and use your time wisely

**Section A: Multiple Choice Questions (20 Marks)**

1. All of the following are involved in the external defense system of innate immunity except:
  - a) Lysozyme
  - b) IgA.
  - c) Interleukin-38
  - d) Defensins
  
2. One of following cells is not involved in innate immunity
  - a) Neutrophils (PMN)
  - b) Macrophages
  - c) Natural killer (NK)
  - d) T helper cell

3. Cytotoxic T cells generally recognize antigen fragments in association with?
  - a) Class II MHC determinants.
  - b) Class I MHC determinants.
  - c) Class III MHC determinants.
  - d) HLA-DR determinants
  
4. The majority of the cell types involved in the immune system are produced from a common hemopoietic stem cell (HSC) and develop through the process of differentiation into functionally mature blood cells of different lineages. Which one of following cells does not share the same progenitor cell?
  - a) Natural killer (NK)
  - b) Neutrophils (PMN)
  - c) Macrophages
  - d) Erythrocyte
  
5. B lymphocytes (B cells) and T lymphocytes (T cells) are important components of adaptive immune response. Helper T cells are distinguished from cytotoxic T cells by the presence of:
  - a) CD8 and Class II MHC receptor
  - b) CD4 and Class II MHC receptor.
  - c) CD8 and Class I MHC receptor
  - d) CD4 and Class I MHC receptor
  
6. Which of the following cells is not an antigen presenting cell
  - a) Dendritic
  - b) Macrophage
  - c) B cells
  - d) Natural killer
  
7. In order to detect pathogens such as bacteria and viruses the immune system is equipped with receptors called pattern recognition receptors (PRRs). Which of the following PRR is involved in recognizing the LPS component of gram negative bacteria
  - a) Scavenger receptors
  - b) Toll-like receptors
  - c) CD14 receptors
  - d) Mannose receptor
  
8. Which of the following is the major immunoglobulin class found in colostrum
  - a) IgG.
  - b) IgA.
  - c) IgM.
  - d) IgE.
  
9. Complement components facilitate immunity to extracellular pathogens by all of the following mechanisms except.

- a) Opsonizing the pathogen.
  - b) Mediating the chemotaxis of inflammatory cells to the site of infection.
  - c) Increasing vascular permeability to increase access to the site of infection.
  - d) Binding to T cells inducing their activation
10. The following are required for or are sequelae of clonal selection EXCEPT
- a) Recognition of antigen by specific antigen receptors on lymphocytes.
  - b) Proliferation of cells triggered by specific antigens.
  - c) Activation of T lymphocytes by super antigens.
  - d) Generation of T cell dependent B cell memory responses.
11. Host antibody against a tumor would most likely be directed against
- a) MHC class II antigens.
  - b) Viral antigens.
  - c) Differentiation antigens.
  - d) MHC class I antigens.
12. Tumor immune surveillance is mainly mediated by
- a) Mast cells.
  - b) Neutrophils cells.
  - c) Natural killers cells
  - d) Langerhans cell
13. Which of the following cell types (or their products) is least effective against extracellular bacterial pathogens?
- a) Cytotoxic T cells.
  - b) B cells.
  - c) helper T cells.
  - d) Neutrophils.
14. Tumor necrosis factor is an important cytokine that:
- a) Decreases macrophage effector functions.
  - b) Increases expression of adhesion molecules on endothelial cells.
  - c) Decreases vascular permeability.
  - d) Decreases blood flow
15. Antibody dependent cell mediated cytotoxicity (ADCC)
- a) Is carried out by B cells.
  - b) Is the main mechanism for killing intracellular microbes.
  - c) Involves Fc receptors on the effector cells.
  - d) Is primarily mediated by IgE antibody.
16. The structure of Immunoglobins is classified into several portions. The Fab portion immunoglobulin
- a) Binds to an Fc receptor.

- b) Contains the J chain.
  - c) Contains the idiotype of the immunoglobulin
  - d) Mediates biological effector functions of Ab molecules (e.g. complement fixation).
17. Phagocytosis is a crucial cellular defense mechanism. Which of the following is correct?
- a) Is important in bacterial infections.
  - b) Is carried by cells of the adaptive immune system.
  - c) Is restricted to macrophages and Natural killers.
  - d) Is a process that does not involve energy.
18. Both mast cells and basophils are specialized cells of myeloid progenitor lineage. Which of the following statements is correct?
- a) Both release histamine.
  - b) They circulate in the blood stream.
  - c) They are found primarily in lymph nodes.
  - d) Have receptors for IgM antibodies
19. Treatments for immunodeficiency would not include?
- a) Antibiotics.
  - b) Bone marrow transplantation.
  - c) Interleukins.
  - d) anti-CD4 antibody.
20. An anti-idiotypic antibody was infused into a patient with autoimmune hemolytic anemia. This treatment improved the anemia for 2 days, followed by recurrence of the anemia. The improvement was most likely related to binding of anti-idiotypic antibody to.
- a) The B-cells making the autoantibody.
  - b) Plasma cells making the autoantibody.
  - c) Autoantibody specific T helper cells.
  - d) Circulating serum autoantibody alone.

**Section B: Short Answer Questions (30 Marks)**

1. Describe the alternative and classical complement pathways of the innate immune response (10 marks)
2. Explain the physical barriers as an external defense mechanism of the innate immunity ( 4 marks)
3. Explain the process of microbe killing by phagocytic cells via phagocytosis cell (4 marks)
4. Describe mechanisms of distinguishing infected cells or tumor cells from normal self-cells by Natural killers cells (4 marks)
5. Different antibody classes with different biological activities have evolved to deal with antigens (e.g. microbes) with different properties and which enter the body at different sites. Briefly explain the various classes of antibodies (8 marks).

**Section C: Long Answer Questions (20 Marks)**

1. Discuss giving appropriate illustrations the following

- a) The production of monoclonal antibodies (10 marks)
- b) The replacement therapy (using thyroid autoimmunity and diabetes) as examples and suppression of the autoimmune process in treatment of autoimmune diseases (5 marks)
- c) Explain giving an illustration the indirect ELISA as an immuno assay (5 marks)

2. Discuss the deficiencies in the immune system under the following subheadings:

- a) Primary/congenital (inherited) immunodeficiency (6 marks)
  - b) Secondary (acquired) immunodeficiency in respect to HIV/AIDS, Immune senescence and Trauma (7 marks)
  - c) The diagnosis and treatment strategies of immunodeficiencies under the subheadings (Family history, evaluation of specific immune components, antibiotics and antibodies, bone marrow transplants and gene therapy (7marks)
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