AMREF INTERNATIONAL UNIVERSITY

SCHOOL OF MEDICAL SCIENCES

DEPARTMENT OF REHABILIATIVE MEDICINE

BACHELOR OF SCIENCE IN PHYSIOTHERAPY

END OF TRIMESTER EXAMINATIONS JANUARY TO APRIL 2024

UNIT CODE: PHT 122
UNIT NAME: IMMUNOLOGY

DATE: 15th APRIL 2024 **TIME: 11.15AM-1.15PM**

INSTRUCTIONS

1. **All students will have two (2) hours to complete the examination**
2. **Attempt all questions as per the instruction**
3. **It is the student's responsibility to report any page and number missing in this paper.**
4. **DO NOTWRITE ON THE QUESTION PAPER**

Section I: MCQs (30 Marks)

Attempt ALL questions.

1. Antibodies can cross the placenta and provide passive immunity to the developing fetus. This process is mediated by _____
    a) IgM antibodies
    b) IgA antibodies
    c) IgE antibodies
    d) IgG antibodies.
2. The term "cold chain" refers to:
    a) The transportation of vaccines at sub-zero temperatures.
    b) The storage of vaccines at freezing temperatures.
    c) The process of keeping vaccines within a recommended temperature range during storage and transportation.
    d) The rapid delivery of vaccines to remote areas.
3. Which pattern recognition receptor (PRR) recognizes and binds to pathogen-associated molecular patterns (PAMPs) on the surface of pathogens?
    a) Toll-like receptors (TLRs)
    b) Major histocompatibility complex (MHC) molecules
    c) T-cell receptors (TCRs)
    d) B-cell receptors (BCRs)
4. The World Health Organization (WHO) established an immunization program known as:
    a) VACCINE (Vaccination for All Children in Need).
    b) EPI (Expanded Program on Immunization).
    c) IVI (International Vaccine Institute).
    d) GAVI (Global Alliance for Vaccines and Immunization).
5. Antibodies can mediate antibody-dependent cell-mediated cytotoxicity (ADCC) by:
    a) Killing infected cells directly
    b) Activating T cells to produce cytokines.
    c) Binding to mast cells and releasing histamine.
    d) Coating target cells and facilitating their destruction by natural killer cells.

6. The recommended immunization schedule for infants and young children includes vaccines for:
    a) Polio, tetanus, and measles
    b) Influenza, hepatitis B, and pneumonia
    c) Mumps, rubella, and varicella
    d) Diphtheria, pertussis, and meningitis
7. The major histocompatibility complex (MHC) molecules are crucial for:
    a) Activation of B cells
    b) Antibody production
    c) Antigen presentation to T cells
    d) Phagocytosis of pathogens
8. The differentiation of B cells into plasma cells leads to:
    a) Production of antibodies
    b) Activation of T cells
    c) Phagocytosis of pathogens
    d) Inflammation
9. How do antimicrobial peptides contribute to innate barriers?
    a) They directly kill pathogens by disrupting their membranes.
    b) They produce antibodies against pathogens.
    c) They activate T cells.
    d) They neutralize toxins released by pathogens.
10. Which of the following is a key cytokine involved in the recruitment of immune cells to the site of infection or inflammation?
    a) Interleukin-2 (IL-2).
    b) Interferon-gamma (IFN-gamma).
    c) Tumor necrosis factor-alpha (TNF-alpha).
    d) Transforming growth factor-beta (TGF-beta).
11. Which of the following is NOT a characteristic of innate immune responses?
    a) Rapid response
    b) Specificity for antigens
    c) Non-specific recognition
    d) First line of defense against pathogens

12. In 1796, Edward Jenner used material from cowpox lesions to vaccinate a young boy. This experiment led to the discovery that:
    a) Bacteria cause infectious diseases.
    b) Vaccination can prevent the spread of viruses.
    c) Antibiotics can treat viral infections.
    d) Immunity can be induced against related diseases.
13. Which type of immune cell releases histamine and other chemical mediators in response to allergens or pathogens?
    a) Eosinophils.
    b) Basophils.
    c) Neutrophils.
    d) Dendritic cells.
14. Vaccine adjuvants are substances added to vaccines to:
    a) Increase vaccine efficacy.
    b) Decrease vaccine side effects.
    c) Increase vaccine stability.
    d) All the above.
15. Which of the following diseases was declared eradicated globally through vaccination efforts?
    a) Measles.
    b) Mumps.
    c) Tuberculosis.
    d) Smallpox.
16. What is the role of lysozyme in innate immunity?
    a) It promotes inflammation.
    b) It neutralizes bacterial toxins.
    c) It destroys bacterial cell walls.
    d) It enhances phagocytosis.
17. The term "booster dose" refers to:
    a) An additional dose of a vaccine given to adults.
    b) A repeat dose of a vaccine given to maintain immunity.
    c) A vaccine dose that is given orally.
    d) A vaccine dose that is given via injection.

18. How does the acidic pH of the stomach contribute to innate defense?
    a) It triggers the production of antibodies.
    b) It directly kills pathogens.
    c) It enhances the activity of natural killer cells.
    d) It activates the complement system.
19. The human papillomavirus (HPV) vaccine is an example of which type of vaccine?
    a) Inactivated vaccine.
    b) Subunit vaccine.
    c) Live attenuated vaccine.
    d) Toxoid vaccine
20. The resolution phase of inflammation is characterized by:
    a) Prolonged tissue damage and scarring
    b) Clearance of inflammatory cells and tissue repair
    c) Activation of mast cells
    d) Release of pro-inflammatory cytokines
21. Vaccines work by stimulating the immune system to produce:
    a) Antibodies.
    b) Viruses.
    c) Bacteria.
    d) Antiviral drugs
22. Which of the following is NOT a class of immunoglobulins (antibodies) produced by B cells?
    a) IgA
    b) IgB
    c) IgM
    d) IgG
23. The recommended immunization schedule for adults includes vaccines for:
    a) Hepatitis A and B, influenza, and shingles.
    b) Diphtheria, tetanus, and polio.
    c) Measles, mumps, and rubella.
    d) Varicella and pertussis

24. Inflammation is a protective response triggered by the immune system in response to:
    a) Allergic reactions
    b) Infection or injury
    c) Autoimmune diseases
    d) Chronic illnesses
25. Which type of vaccine is made by using a harmless virus or bacterium as a carrier for specific antigens of the pathogen?
    a) Inactivated vaccine.
    b) Subunit vaccine.
    c) Vector vaccine.
    d) Toxoid vaccine.
26. The hallmark signs of acute inflammation include:
    a) Fever and chills
    b) Fatigue and malaise
    c) Redness, swelling, heat, and pain.
    d) Cough and shortness of breath.
27. Which of the following is NOT a cellular component involved in the inflammatory response?
    a) Neutrophils
    b) Macrophages
    c) T cells
    d) Mast cells
28. How does normal flora contribute to innate barriers?
    a) They produce antibodies.
    b) They directly kill pathogens.
    c) They compete with pathogens for resources and colonization sites.
    d) They induce inflammation.
29. What is the role of cilia in the respiratory tract as an innate barrier?
    a) They produce mucus to trap pathogens.
    b) They enhance phagocytosis.
    c) They directly kill pathogens.
    d) They move mucus and trapped pathogens out of the respiratory tract.

30. Which of the following routes of administration is commonly used for live attenuated vaccines?
    a) Intramuscular injection
    b) Subcutaneous injection
    c) Oral administration
    d) Intradermal injection

Section II: Short Answer questions (20 Marks)

Attempt ALL questions.

31. **[4 Marks]** Describe the concept of pathogen-associated molecular patterns (PAMPs) in innate immune recognition.
32. **[4 Marks]** Explain the role of major histocompatibility complex (MHC) molecules in adaptive immunity.
33. **[2 Marks]** Differentiate between active immunization and passive immunization.
34. **[3 Marks]** State the roles of the skin and mucosal surfaces as physical barriers in innate immunity.
35. **[4 Marks]** Describe the different types of vaccines used in immunization programs.
36. **[3 Marks]** Outline the roles of helper T cells in coordinating adaptive immune responses.

Section III: (20 Marks)

Attempt any TWO (2) questions.

37. **[10 Marks]** Discuss the importance of vaccine safety and monitoring of adverse events.
38. **[10 Marks]** Discuss the mechanisms by which the immune system maintains self-tolerance and prevents autoimmunity.
39. **[10 Marks]** Describe of the cellular and molecular events involved in the initiation and regulation of inflammation.