FACULTY	HEALTH SCIENCES AND VETERINARY MEDICINE		
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UNIVERSITY OF NAMIBIA

Second Opportunity Examination

Examiner: Prof C. Ntahonshikira, Prof S. Khaiseb

Internal Examiner: Dr M.Y. Hemberger

External Moderator: Prof B. Penzhorn

This Exam Paper contains **SIX (6)** pages including this front page.

Instructions

Answer all questions

SECTION A. MULTIPLE CHOICE QUESTIONS. **[20 Marks@1 Mark each]**

1. Which of the following best describes the difference between innate and adaptive immunity?
    a. Innate immunity describes the immune system's defence against intracellular microorganisms, whereas adaptive immunity describes defence against extracelluar microorganisms.
    b. Innate immunity is a nonspecific, stereotyped immune response that can destroy a variety of microorganisms, whereas adaptive immunity is an immune response that improves over time against specific microorganisms.
    c. Innate immunity relies on the production and action of antibodies, whereas adaptive immunity relies primarily on inflammation.
    d. Innate immunity utilizes neutrophils to eliminate viruses, whereas adaptive immunity utilizes natural killer cells to eliminate bacteria.

2. Phagocytosis involves several steps that occur sequentially, leading to destruction of a microorganism. Which of the following is NOT a step of phagocytosis?
    a. Activation of enzymes
    b. Adherence to the microorganism
    c. Chemotaxis toward the microorganism
    d. Production of immunoglobulin

3. Phagocytes migrate to sites of inflammation via what process?
    a. Chemotaxis
    b. Bownian movement
    c. Facilitated diffusion
    d. Vasotaxis

4. Lysozyme:
    a. Is a cytoplasmic organelle
    b. Activates complement
    c. Is a proteolytic enzyme
    d. Splits peptidoglycan

5. A plasma cell secretes:
    a. Antibody of a single specificity related to that on the surface of the parent B-cell
    b. Antibody of two antigen specificities
    c. The antigen it recognizes
    d. Many different types of antibodies

6. Immunological unresponsiveness to self antigens is called:
    a. Tolerance
    b. Tolerogen
    c. Memory
    d. Acquired immunity

7. Protective antibodies against infectious agents are often:
    a. Autoantibodies
    b. Neutralizing

c. Toxoids
d. Natural antibodies

8. An immune response against grass pollen often involves:
   a. Pathogen-associated molecular patterns
   b. Breakdown of self tolerance
   c. A hypersensitivity reaction
   d. Reaction against MHC

9. Secondary antibody responses are better because:
   a. The antibody can be made by both T and B cells
   b. Complement-fixing antibodies are made
   c. They do not require T-cell help
   d. They are stronger and faster

10. Clonal selection occurs when a B-lymphocyte encounters:
   a. Cytokines
   b. Antigens
   c. T-lymphocytes
   d. The complement

11. MHC class II molecules are found on:
   a. Virtually all cells in the body.
   b. B cells, dendritic cells, and macrophages.
   c. Virtually all nucleated cells in the body.
   d. Only on virus-infected cells.

12. Antibody titre refers to the:
   a. Absolute amount of specific antibody
   b. Avidity of specific antibody
   c. Concentration of specific antibody
   d. Highest dilution of antibody still able to give a positive result in a test system

13. A T-cell hybridoma
   a. Is obtained by continuous culture of T-cells with antigen
   b. Is obtained by cloning antigen-specific splenic T-cells
   c. Is obtained by fusing T-cells with a T-cell tumour cell line and cloning
   d. Results from producing a mouse which is transgenic for the rearranged alpha- and beta-receptor from a T-cell clone

14. Which of the following is the earliest site of haematopoiesis in the embryo?
   a. Bone marrow
   b. Liver
   c. Spleen
   d. Yolk sac

15. In a thymectomized animal which is irradiated and reconstituted with bone marrow cells:
   a. The T-lymphocyte population is not restored.

b. The B-lymphocyte population is not restored.
c. All lymphocyte populations are restored.
d. None of the lymphocyte populations are restored.

16. Secretory IgA protects external mucosal surfaces by:
    a. Triggering mast cells.
    b. Recruiting phagocytic cells.
    c. Preventing microbial adherence to the mucosa.
    d. Binding to epithelial cells

17. The term variolation refers to:
    a. The generation of antibody variable regions.
    b. Inoculation of scab material into small skin wounds
    c. The removal of scab material from an individual with smallpox
    d. A type of gene therapy

18. Primary immunodeficiency producing susceptibility to infection by viruses and moulds is due to:
    a. B-cell deficiency
    b. T-cell deficiency
    c. Phagocyte deficiency
    d. Complement deficiency

19. Hyperacute graft rejection is caused by:
    a. Preformed antibody.
    b. T cytotoxic
    c. Natural killer cells
    d. Circulating immune complexes.

20. The normal immunological control of tumours is referred to as:
    a. Immunological tolerance
    b. Immune surveillance
    c. Immunological silence
    d. Superantigen recognition

SECTION B: TRUE/FALSE AND FILL IN THE BLANKS QUESTIONS [20 Marks]

a. True/False questions [10 marks@1 mark each]

i. Chemokines are specific in receptor usage.
ii. Innate immune receptors are clonally distributed.
iii. The innate immune reaction is more specific than the adaptive immune reaction.
iv. Macrophages and neutrophils play a role in the innate immune reaction.
v. Birds possess lymph nodes.
vi. Acquired immune mechanisms are found only in phylogenetically advanced vertebrates.
vii. Invertebrates do not possess phagocytic activity.

viii. Autografts and isografts are usually accepted owing to the genetic identity between donor and recipient.
ix. Canine lupus affects males more than females.
x. Antibodies are simply soluble B cell receptors.

b. Fill in the blanks questions **[10 marks@ 1 mark each]**

i. Xenographs are often rejected in a .....manner.
ii. The small antigens that cannot stimulate the production of antibodies are called ...
iii. The communication molecules of immune system are .....
iv. The classical complement pathway starts with the activation of .....
v. NK cells and cytotoxic T lymphocytes have a major protective role in immunity against .....
vi. Monocytes move from the systemic circulatory system into general connective tissues, where they differentiate into .....
vii. Humoral immunity is a type of adaptive immunity that results in the circulation of ... throughout the blood.
viii. The .... portion/region of an antibody provides antigen-binding sites.
ix. It is not advisable to vaccinate animals that are younger than the age suggested in the vaccination calendars and schemes because ..... may interfere with the vaccine
x. Inflammation is one of the first signs of damage or infection. Which cells do you expect to be the most numerous in a new inflammation? .....

SECTION C: SHORT ANSWER QUESTIONS. [30 Marks]

Question 1. Give the definitions of the following terminologies: [5 marks]

a. "Vaccination Withdrawal Time of a vaccine". [2]
b. "Monoclonal Antibodies" [3]

Question 2. Answer to the following short questions below. [18 marks]

a. Give the other name of the lectin complement activation pathway [2]
b. Name three (3) components of the 2nd line of defence [3]
c. What are the 2 arms of the specific/adaptive immune response? [2]
d. Describe action of the membrane attack complex (in complement activation) and give the end result of this process [2]
e. What do you understand by "cascade activation" of the complement? [2]
f. Name the 3 basic white blood cells involved in humoral adaptive immunity [3]
g. Quality control is a very important step in the vaccine production process. What is the purpose of the following tests? [4]

i. Sterility
ii. Safety
iii. Residual toxicity
iv. Efficacy

Question 4. Name the two systems used to grow bacteria and the two systems used to grow viruses in the process of vaccine production [4 marks]

Question 5. Name three (3) components of the gut-associated lymphoid tissue. [3 marks]

SECTION D. STRUCTURED QUESTIONS **[50 MARKS]**

Question 1. **[10 marks]**

a. Explain how vaccines work [7]
b. Name the main vaccine delivery routes in livestock [3]

Question 2. **[10 marks]**

Give the advantages and disadvantages of using live attenuated vaccines.

Question 3. **[10 marks]**

a. In Kabe North constituency of the Zambezi region, there are 15556 adult cattle registered on Namlits system. 14350 of them have been vaccinated against foot and mouth disease. Calculate the vaccination coverage in this case and show the formula you used. Is it a good or bad coverage? Explain your answer. [5]

b. Discuss the passive transfer of immunity from mother to offspring in different animal species, as well as humans. [5]

QUESTION 4. **[10 marks]**

a. There are multiple factors that protect against gastrointestinal pathogens. Name five (5) of them. [5]

b. The immunoregulation in response to antigens depend on different factors. Name five of them.

QUESTION 5. **[10 marks]**

a. Define "adjuvant" and outline the mechanisms of action of adjuvants. [5]

b. Define "Immunopathology" and give its three (3) main components. [5]

END OF EXAM PAPER