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“Investing in Africa’s future”

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL
SCIENCES
DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES
BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS

END OF SEMESTER EXAMINATIONS

NSLS208: IMMUNOLOGY

NOVEMBER 2025

LECTURER: Mr Z Chiwodza

DURATION: 3 HOURS

INSTRUCTIONS

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1. Write your candidate number in the space provided on top of each page
 2. Answer **all** questions in section A on the question paper.
 3. Answer **all** questions in section B on separate answer sheets provided.
 4. Answer any 3 questions in section C on separate answer sheets provided
 5. The mark allocation for each question is indicated at the end of the question
 6. Credit will be given for logical, systematic and neat presentations in sections B and C
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SECTION A: MULTIPLE CHOICE [40 MARKS]

- Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions
- Each correct response is allocated half a mark

1. Secondary Lymphoid organs include

- T F a) Spleen
- T F b) Tonsils
- T F c) Bone Marrow
- T F d) Thymus

2. Regarding the mucosal surfaces

- T F a) They consist of cells lining the lungs, skin, and hair
- T F b) They have an increased number of lymphoblasts
- T F c) They can contain commensals that live symbiotically with the rest of the body
- T F d) pH imbalances in the mucosal surfaces can affect the microbiome associated with the mucosa and this can lead to disease.

3. Cells of the cell mediated immunity include

- T F a) Macrophages
- T F b) NK cells
- T F c) T_h cells
- T F d) Neutrophils

4. Are the following cells correctly matched with their use in the immune system?

- T F a) Phagocytes – engulf invading parasites
- T F b) B cells – produce Immunoglobulins
- T F c) Natural killer cells – kill viruses by directly releasing autoantibodies
- T F d) T helper cells – help Cytotoxic T cells via cytokines

5. Palesa ate improperly cooked seafood and developed symptoms of food poisoning. Which immunological events may occur in response?

- T F a) The gastrointestinal tract may activate its mucosal immune defenses, including secretory IgE.
- T F b) Pattern Recognition Receptors (PRRs) in the gut can detect bacterial toxins and initiate an immune response.
- T F c) Inflammation in the intestinal lining can cause diarrhea as a way to expel the pathogen.

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- T F d) The liver plays a role in clearing toxins from the bloodstream in such cases.
6. **Functions of Macrophages in Immunity include**
- T F a) Phagocytosis of pathogens and cellular debris.
- T F b) Presentation of antigens to B cells to initiate adaptive immunity.
- T F c) Direct production of antibodies to neutralize pathogens.
- T F d) Secretion of cytokines to regulate immune responses.
7. **Features of inflammation include**
- T F a) Increased blood flow leads to redness and warmth at the site of injury.
- T F b) Swelling results from increased vascular permeability and fluid accumulation.
- T F c) Inflammation always indicates an infection is present.
- T F d) Chemical mediators such as histamine and cytokines play key roles in inflammation.
8. **The role of dendritic cells in immunity are**
- T F a) Dendritic cells are the main antigen-presenting cells for T-cell activation.
- T F b) They capture antigens in tissues and migrate to lymph nodes to initiate adaptive immunity.
- T F c) Dendritic cells only function in innate immunity and have no role in adaptive immunity.
- T F d) They express both MHC class II and III molecules to present antigens to CD4+ and CD8+ T cells
9. **Bruce has a bacterial infection and is given antibiotics. How does the immune system still contribute to recovery?**
- T F a) Neutrophils and macrophages help eliminate the bacteria.
- T F b) Complement activation can enhance bacterial clearance.
- T F c) B cells can produce antibodies that aid in bacterial neutralization.
- T F d) Antibiotics completely replace the immune system's role in fighting infections.
10. **Regarding immune evasion by pathogens**
- T F a) Some viruses downregulate MHC molecules to evade cytotoxic T cells.
- T F b) Bacterial capsules can inhibit phagocytosis by immune cells.

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- T F c) Antigenic variation allows some pathogens to escape immune recognition.
- T F d) Pathogens are unable to interfere with cytokine signaling during infection.
11. **Regarding vaccination**
- T F a) Live attenuated vaccines generally provide longer-lasting immunity than inactivated vaccines.
- T F b) Subunit vaccines contain whole killed pathogens to stimulate the immune system.
- T F c) Herd immunity protects individuals who are not vaccinated.
- T F d) mRNA vaccines work by encoding viral proteins that are expressed in host cells.
12. **Regarding Cancer Immunology**
- T F a) Tumor cells can evade the immune system by downregulating tumor antigens.
- T F b) Checkpoint inhibitors block immune checkpoints to enhance T-cell activation.
- T F c) CAR-T cell therapy involves genetically modifying a patient's T cells to target cancer cells.
- T F d) Natural Killer (NK) cells play no role in anti-tumor immunity.
13. **Regarding the Rapid Plasma Reagin (RPR) test for Syphilis**
- T F a) It measures IgD antibodies found in the sick patient
- T F b) It tests for Cardiolipin found in the sick patient
- T F c) It is a useful Lateral flow assay with high accuracy
- T F d) If antibodies are not present, the charcoal reacts with the commercial antigen to form small clumps.
14. **Factors to consider when performing gel electrophoresis include**
- T F a) ionic strength of buffer
- T F b) gel pore size
- T F c) general Molecular weight of the analytes and their charge
- T F d) strength of electrical current
15. **Regarding the complement**
- T F a) C5b is an important opsonizing molecule
- T F b) C3b has chemotactic function
- T F c) C4b may cause mast cell degranulation

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- T F d) cytolysis of bacteria can occur in the absence of immune complexes
16. **Polio is a vaccine preventable disease. What immunological principles does the vaccination process rest upon**
- T F a) Adaptive immunity has memory
- T F b) Adaptive immunity develops more strength with each encounter with a pathogen
- T F c) A weak version of the virus is enough to boost the immune system
- T F d) Once the body makes antibodies against polio, the virus will never attack again.
17. **Patrick receives a kidney transplant. What immunological challenges may arise?**
- T F a) The recipient's immune system may recognize the donor kidney as foreign and attempt to reject it.
- T F b) Immunosuppressive drugs may be required to prevent organ rejection.
- T F c) T-cell-mediated immunity plays a role in transplant rejection.
- T F d) The immune system ignores all transplanted organs, making rejection unlikely.
18. **Amina has been exposed to *Mycobacterium tuberculosis* (TB). What immune mechanisms may be involved?**
- T F a) Tumor necrosis factor.
- T F b) Hydrogen Peroxide H_2O_2
- T F c) $ONOO^-$ (peroxynitrite)- a reactive nitrogen species
- T F d) B-cell activating factor
19. **Sibusiso has an allergic reaction after eating peanuts. What immune events may explain this?**
- T F a) Mast cells degranulate and release histamine, causing symptoms like swelling and itching.
- T F b) The reaction is mediated by IgA antibodies.
- T F c) The response involves a Type I hypersensitivity reaction.
- T F d) Epinephrine can be used to counteract severe allergic symptoms.
20. **Diseases that can be caused by cytokine abnormalities include**
- T F a) Cytokine Release Syndrome
- T F b) Overproduction of IL-6 and TNF-beta causes septic shock in bacterial bloodstream infections.

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- T F c) Under expression of IL-6 in Chaga's disease
T F d) IL12 overproduced by cancer cells and further increases proliferation of the cancer cells

SECTION B [20 MARKS]

Answer all questions on separate answer sheets provided

1. State 2 advantages and 2 limitations of using monoclonal antibodies in diagnostic immunology [4 marks]
2. Give 5 examples of an auto immune disease. [5 marks]
3. State the function of the following molecules as they are used in immunology
 - a) IgG [1mark]
 - b) MHC II [1mark]
 - c) Tumor Necrosis Factor Alpha [1mark]
 - d) Interleukin 1 [1mark]
 - e) Histamine [1mark]
 - f) Properdin [1mark]
4. Which diseases are associated with an increase in the following molecules
 - a) Antinuclear Antibodies [1mark]
 - b) C-reactive Protein [1mark]
 - c) IgE [1mark]
 - d) Eosinophils [1mark]
 - e) T_{helper 2} [1mark]

SECTION C [75 marks]

Answer any 3 questions from this section on separate answer sheets provided

1. Explain in detail, the mechanisms of phagocytosis. [25 marks]
2. Describe in detail, MTB from an immunological perspective. [25 marks]
3. Discuss Cryptococcal IRIS. [25 marks]
4. Discuss a tried and tested method of curing HIV from an immunological perspective. In your discussion highlight the challenges associated with the procedures and ways to overcome them. [25 marks]
5. Discuss the immunological principles behind vaccine development, using two different vaccine types as examples. [25 marks]

END