CANDIDATE NUMBER.....

"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 SECOND SEMESTER EXAMINATIONS

NSLS208: IMMUNOLOGY

APRIL 2024

LECTURER: Mr Z Chiwodza

DURATION: 3 HOURS

INSTRUCTIONS

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 gut, lungs, and nasal tract

T F b) They have an increased number of lymphocytes

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 humoral 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 bacteria

T F b) B cells – produce antibodies

T F c) Natural killer cells – kill viruses by directly releasing autoantibodies

T F d) T helper cells – help Cytotoxic T cells via cytokines

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5. Functions of pathogen recognition receptors include

T F a) Opsonisation

T F b) Complement activation

T F c) Antibody production

T ` F d) Triggering cytokine release

6. Regarding PAMPS

T F a) They can be molecules found on microbes including lipoteichoic acids.

T F b) They are constant in a pathogen since they are essential for the survival of the organism

T F c) They can be components of the organisms including the cell wall, flagella, or DNA

T F d) They are recognized in the body by PRRs

7. Once induced, TLR influence the production of

T F a) Cytokines

T F b) Chemokines

T F c) TCRs

T F d) Interferons

8. During inflammation, leukocytes leave the vascular system in the following sequence

T F a) Margination → rolling → adhesion → transmigration

T F b) Margination → adhesion → rolling → transmigration

T F c) Transmigration → rolling → adhesion → margination

T F d) Transmigration → adhesion → rolling → margination

9. Matshidiso just had a small cut, which immunological events can occur if bacteria is introduced into the cut

T F a) Leukocytes can be recruited to the site of injury via chemotaxis

T F b) The wound can eventually heal with the possibility of a scar

T F c) The site can become red, and swollen, due to vascular leakage and vascular dilation

T F d) Pus may form which is a combination of lymphoid cells, mast cells, dendritic cells, pluripotent cells, and the bacteria that the cells are trying to fight

10. Some features of innate immunity include

T F a) biochemical barriers like cerumen

T F b) cellular barriers like phagocytes

T F c) mechanical barriers like ciliary rejection

T F d) natural antibiotics like lysozyme

11. With regards to HIV detection using immunochromatography

T F a) The test will not detect HIV in children under the age of 18

T F b) The test should be repeated every 3 months

T F c) Current assays detect the CCR5 receptors present on the HIV envelope making it a highly accurate test

T F d) The test cassette uses the principle of ouchtelony

12. Pregnancy test kits

T F a) mainly test for Gonadotrypsin present in urine or blood or stool from the moment of conception

T F b) uses the principle of enzyme-linked immunosorbent assay

T F c) can detect miscarriages

T F d) uses Horse Radish Peroxidase as an enzyme that catalyzes the reaction that causes a colour change on the test strip

13. Regarding the Rapid Plasma Reagin (RPR) test for Syphillis

T F a) It measures IgA 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) C5a is an important opsonizing molecule

T F b) C3b has chemotactic function

T F c) C3a may cause mast cell degranulation

T F d) cytolysis of bacteria cannot occur in the absence of immune complexes

16. Measles is a vaccine preventable disease. What immunological principles does the 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 measles, the virus will never attack again.

17. Match the antibody to its major functional properties

T F a) IgA – antigen receptor on Naïve B cells

T F b) IgG – Regulation of antibody production

T F c) IgM – recruitment of eosinophils

T F d) IgE – fixing the compliment

18. Which molecules are involved in the immune system:

T F a) Interferon Gamma.

T F b) Hydrogen Peroxide H_20_2

T F c) $ONOO^-$ (peroxynitrite)- a reactive nitrogen species

T F d) B-cell activating factor

19. The following are autoimmune disorders

T F a) Multiple sclerosis

T F b) SLE

T F c) Rheumatoid arthritis

T F d) SCID

20. Diseases that can be caused by cytokine abnormalities include

T F a) Cytokine Release Syndrome

T F b) Overproduction of IL-1and TNF-alpha causes septic shock in bacterial bloodstream infections.

T F c) Under expression of IL2 in Chaga's disease

T F d) IL6 overproduced by cancer cells and further increases proliferation of the cancer cells

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SECTION B [20 MARKS]

Answer all questions on separate answer sheets provided

1. State any five cells involved in cellular-mediated immunity and their uses. [5]
2. What are the differences between acute inflammation and chronic inflammation? [4]
3. State any five tests done in the medical laboratory that use immunology principles. Give an example of a disease tested by each of the tests. [5]
4. Describe the following terms as they are used in immunology
   a) HLA complex [2]
   b) Sero-conversion [2]
   c) Phagolysosome [2]

SECTION C [75 marks]

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

1. Describe the process of inflammation. **[25 marks]**
2. Patient X is HIV positive and has been having night sweats and persistent coughs. A chest x-ray detects pulmonary lesions and enlarged pulmonary (hilar) lymph nodes. Discuss the immunological events that led to these radiological findings. **[25 marks]**
3. Patient Z has been diagnosed with AIDS. Discuss the immunological events that led to this state. **[25 marks]**
4. Describe the disease progression of rheumatoid arthritis. **[25 marks]**
5. Discuss the immunological principles used in diagnosis of disease. Base your answer on 2 examples of diseases.**[25 marks]**