Ex/MSBT/1/4/53/2018

M. Sc. Bio-Technology Part I Examination, 2018

Immunology

Paper - MSBT 1/4

Time : Four hours | Full Marks : 100

GROUP - A

Answer ***Q1*** and ***four*** from the rest :

1. Answer ***any nine*** questions : 1×9=9

   a) What is Positive selection of T cell ?

   b) Presence of only mother's or only father's genes for V chains is enabled by _____.

   c) Name the state of unresponsivness of T lymphocytes that exists after production of immunological synapsis.

   d) Name the process by which the mitogen lipopolysaccharide (LPS) can stimulate an effective antibody response in "nude" (nu/nu) mice.

   e) Which specific cytokine is characteristically produced by the Th2 CD4 cells which provide help for antibody production, but not by Th1 cells ?

   f) Name the T-cell surface molecule by which Dendritic cells can be driven from a resting state to an activated state.

g) By which mechanisms high affinity B-cell clones in mammals are usually generated ?

h) Activated memory T-cell can be distinguished from naive T-cells on the basis of expression of what surface molecule?

i) What will be the outcome when a thymectomized animal which is irradiated and reconstituted with bone marrow cells ?

j) A person with an extremely high count of neutrophils is likely suffering from _____.

k) Cancer cells often have reduced amounts of cell surface proteins, including class l MHC antigens. Which cells of the immune system can exploit this property to kill cancer cells ?

l) Which antibody binds to an Fc receptor on mast cells and basophils.

m) What is the principal difference between cytotoxic (type II) and immune complex (type III) hypersensitivity ?

n) If you measure the ability of cytotoxic T cells from an HLA-B27 person to kill virus X-infected target cells, then which cell will be killed ?

2. a) How are antivenoms produced ? Why are antivenoms an example of passive immunixation ?

OR

What are the different pathways for the complement and what is the initial component needed to initiate that specific complement pathway ? What is the role of follicular dendritic cells in complement function ? Describe in details the classical pathway of complement. (5+5+10)

GROUP -B

9. One mark each ***(any two)*** :

   a) What is the autocrine function of cytokine ? give one example.

   b) Which is one of the diseases is caused by hypo-thyroidism : Grave's Disease or Hosimoto Diseases.

   c) What is opsonization ? Give one example.

   d) What is White Graft Rejection ?

10. 5 mark each ***(any one)*** :

   a) What is passenger leukocytes ? What is the importance of passenger leukocytes in case of transplantation ?

   b) What is hygiene hypothesis ? Please explain with examples.

   c) What is frustrated phagocytosis ? Please explain with example.

11. What are the advantages of use of mouse skin as a model to study the transplantation ? Which kind of immune response is crucial for the transplant rejection ? Explain with the experimental design to demonstrate that which cell types are important for the rejection of transplant. (5+5+10)

   b) Give Example of physical barriers that protect you from infectious diseases.

   c) What are the characteristics for antigenicity ? What is an adjuvant ? Name 2 and describe their possible mode of action. (2+2)+4+(2+2+4)

3. a) What are the properties of B and T cell epitopes ?

   b) Differentiate between polyclonal and monoclonal antibodies. How are they produced ?

   c) Mention the steps for immunoglobulin heavy chain gene rearrangement . What is N-nucleotide addition ? 4+(3+2)+4+3

4. a) Describe the mechanisms for antigen processing and presentation via MHC class I and class II molecules to T T lymphocytes. How do these different pathways lead to appropriate defenses against different types of microorganisms ? How are the MHC molecules encoded in the genome ? How are they inherited ? (8+4+2+2)

5. a) The most common T-cells express the alpha/beta TCR and can be divided into two major groups, cytotoxic T cells and T helper cells. What are the characteristics for these two types of T-cells ?

b) With suitable diagram describe the development of T cel in the thymus.

c) How to T cells help B cell ? Give at least three different molecules in the process and at least two different consequences for the B cell response. [3+8+(2+3)]

6. a) Why CD45 is an important molecule for T cell activation? Describe the role of ZAP70 in T cell activation. How after removal of infection, T cell activation is terminated ?

b) Which cell produce stem cell factors for the production of B cells ? How mature B cell is produce from Pro-B cells indicating the arrangement of antibody gene in each steps? What is receptor editing ? (2+6)+(1+5+2)

7. a) Compare and contrast killing mechanisms by natural killer cells and phagocytes of the innate immune system.

b) Which is the major effectors cell in Type IV hypersensitive reaction ? Why it is called delayed type hypersensitivity ?

c) Give an account of delayed Type I hypersensitivity reaction. Define leukotriene and prostaglandin D2 in Type I reaction. (6)+2+2+(2+4)

8. a) How does immune system differ from other systems of Human Body ?

b) Describe the circulation of Lymph in human body.

c) Where the Peyer's patches are seen ?

d) Where the MALT are located in human ?

e) Why the colour of Lymph is creamy ?

[2+6+2+4+2]