

M. Sc. (BIOTECHNOLOGY) PART I EXAMINATION, 2017

IMMUNOLOGY

PAPER - 1/4

Time : Four hours

Full Marks : 100

GROUP – A

Answer Question 1 and four from rest

Q.1 Answer any twelve

(1 x 12)

- i. What will be the consequence of transgenic mouse having IgM gene knock out.
- ii. What is the most prevalent antibody circulating throughout the tissue fluids and blood?
- iii. Difference between TLR and TCR.
- iv. Idiotype of an antibody is determined by, —
- v. A B-cell is able to make cell-surface and secreted versions of antibody using which mechanism —
- vi. A child disturbs a wasp nest, is stung repeatedly, and goes into shock within minutes, manifesting respiratory failure and vascular collapse. This is usually called-----
- vii. Which is the first gene to be upregulated subsequent to T-cell activation:
- viii. Which cytokines characteristically produced by the Th2 CD4 cells which provide help for antibody production, but not by Th1 cells?
- ix. In Burkitt's lymphoma, a vaccine against a virus might prove useful, name the virus.
- x. Name the diagnostic marker for tumors of the colon
- xi. Name the mast cell products is not preformed and therefore has to be newly synthesized?:
- xii. Name the chemical mediators which are involved in giant cell granulomatous inflammation.
- xiii. Where in the body Central tolerance takes place ?
- xiv. During the induction of type I (immediate) hypersensitivity response, which cells secrete cytokines that stimulate IgE production by B cells, promotes mast cell growth, recruits and activates mast cells
- xv. Why in antigen antibody interaction avidity is important?

- Q.2. a. Are macrophages part of innate or adaptive immunity? Justify.
b. How does a macrophage destroy a pathogen? Discuss briefly.
c. How does a macrophage recognize a pathogen?
d. Define M1 and M2 macrophage.
e. Define significance of hapten. (3+5+2+2+4)

Q.3. a. How B-cells ensure the sequential recombination of V→D→J gene segments? Why most of the diversity occurs in the CDR3 region of heavy chain.

b. How same plasma cells can produce secretory as well as membrane bound antibody?

(6+4+6)

Q.4.a. Which region of MHC molecules are highly polymorphic and which is non-polymorphic? Why?

[Turn over

- b. What do you understand by self restriction? Is the function of cytotoxic T cells self restricted? Demonstrate.
- c. "non-classical MHC molecule HLA-DM has significant role in antigen processing—explain
(2+3+2+5+4)

Q5. a. What is thymic selection? Demonstrate an experiment to show the negative selection of T-cells in the thymus.

b. Discuss briefly the role of fyn and lck in T-cells activation. How NFAT stimulate T-cells.

c. What is the significance of clonal anergy? (2+5+5+4)

Q.6.a. How B-cells are mature—give schematic diagram only. Discuss briefly the tolerance of B-cells.

b. What is the role of CD40-CD40L interaction in B-cell activation?

c. How the inhibitory and activating signal of NK cells function together to destroy infected cells only? (4+4+5+3)

Q.7

a. Mention the different phases of delayed type hypersensitivity?

b. Give signaling event associated with the production of leukotriene and Prostaglandin D₂ in Mast cells induced by IgE.

c. Why the patient receive organ transplant are prone to develop cancer? How dendritic cells can be used as an immunotherapeutic agent. (4+6+2+4)

8. Answer any eight (8) [8 x 2 = 16]

- What is the function of cilia or pili present in the lining of digestive tract and respiratory tract?
- What is vasodilatation in inflammatory response?
- What is an antigen?
- Tears contain which enzyme to kill bacteria?
- Write the full form of NETS.
- What are the secondary immune organs present in human?
- Describe the oxygen independent mechanism of phagocytosis.
- What is PALS?
- What are the surface markers present in T lymphocyte?
- Mention the life span of memory B cells and plasma cell.

GROUP – B

9. a) What is the role central tolerance in case of autoimmunity? Please explain with an example.

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Or,

- b) What is Hashimoto Thyroiditis? What is proposed mechanism of this disease?

4

10. What is allograft, please explain with appropriate examples. Explain “white graft rejection”? Describe an experiment to demonstrate the role of antibodies, T-helper cells and T-cytotoxic cells in transplantation. **(5+5+10) = 20**

Or,

11. What are the different pathways for the complement and what are the initial components needed to initiate that specific complement pathway? What is the role of follicular dendritic cells in complement function? Describe in details the lytic pathway of complement and its significance. **(5+5+10) = 20**