

KATHMANDU UNIVERSITY
End Semester Examination [C]
November/December, 2023

Marks Scored:

Level : B.Tech.

Year : II

Exam Roll No.:

Time: 30 mins.

Course : BIOT 207

Semester : II

F. M. : 20

Registration No.:

Date 28 NOV 2023

SECTION "A"

[20Q × 1 = 20 marks]

Choose and mark [X] in the correct answer.

- _____ does not develop from the common myeloid progenitor.
 Megakaryocyte Basophil Mast cell Natural killer cell
- Clonal deletion of an immature B cell is typically caused by _____.
 A failure of the B cell to recognize antigen
 Somatic hypermutation
 Recognition of a cell surface self-antigen
 Receptor editing
- _____ is NOT a type of Pattern Recognition Receptor (PRR).
 Mannose-binding lectin receptor
 Scavenger receptor
 Macrophage-mannose binding lectin receptor
 T cell receptor
- _____ is responsible for antibody-dependent cell-mediated cytotoxicity.
 Erythrocyte Natural killer cell
 Basophil Cytotoxic T lymphocyte
- Which of the following statements regarding immunoglobulin subtypes is TRUE?
 IgA activates complement IgG1 crosses the placenta
 IgM forms quadramers in serum IgM reacts with staphylococcal protein A
- _____ is NOT a factor for generation of T cell diversity
 VJ and VDJ recombination (combinational diversity)
 Heavy and light chain combinations.
 Variation in repair of joins (junctional diversity)
 N-region nucleotide addition
- B-1 cells _____
 secrete mainly IgM antibodies
 always express IgD and IgM on their surface
 reside primarily in the marginal zone of the spleen
 migrate to the bone marrow after their differentiation into plasma cells
- The _____ T cell-APC interaction is MHC _____-restricted, and the _____ T cell-target cell interaction is MHC _____-restricted.
 CD4; class I; CD8; class II CD4; class II; CD8; class I
 CD8; class I; CD4; class II CD8; class II; CD4; class I

10. B cells internalize antigen by _____
[] Pinocytosis [] Phagocytosis
[] Receptor-mediated endocytosis [] All the above

Fill in the blanks

11. In the processing pathway for extracellular antigens, synthesis of MHC class II and invariant chain (Ii) occurs in the _____.
12. Immunoglobulin _____ is most abundant in human serum.
13. CD4 T cells are restricted by _____.
14. MHC is known as _____ in humans.
15. Monoclonal antibodies are produced using _____ technology.

Define the following.

16. Lymphocytes:
17. Thymectomy:
18. Isotype:
19. Double positive thymocytes:
20. Superantigens:

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Semester : II
F. M. : 55

SECTION "B"
[7Q. × 5 = 35 marks]

Attempt *ALL* questions.

1. Discuss the key features of antigen recognition patterns by innate and adaptive immune system.
2. Briefly discuss the outcomes of complement system activation.
3. Discuss the significance of positive and negative selection of thymocytes.
4. Outline the sequence of events in antigen presentation by MHC I pathway.
5. Draw a well labelled structure of immunoglobulin. Discuss the characteristic features and functions of different types of immunoglobulin.
6. Compare and contrast the thymus-dependent and thymus-independent antigens.
7. Write short note on Fc receptors.

SECTION "C"

8. Give TWO differences between *ANY FIVE* [5Q. × 2 = 10 marks]
 - a. Opsonization and Neutralization
 - b. Granulocytes and Agranulocytes
 - c. Innate and Adaptive immunity
 - d. Plasma B cells and Memory B cells
 - e. Classical pathway and Alternative pathway of complement activation
 - f. B cell receptor and T cell receptor
9. Explain *WHY/HOW* for *ANY FIVE*. [5Q. × 2 = 10 marks]
 - a. When a mouse with MHC "a" genotype is irradiated and reconstituted with bone marrow cells from a mouse of MHC "(a x b)" genotype then it shows mature T cells expressing MHC molecules of genotype "a" and "b" that are restricted to MHC molecules of genotype "a" but not "b" and tolerant to MHC molecules of genotype "a" and "b".
 - b. Receptor editing can rescue B cells reactive to multivalent self-antigens from deletion.
 - c. CTLA-4 deficient mice die of a massive lymphoproliferative disorder.
 - d. Activation of naïve T lymphocytes is best achieved by dendritic cells.
 - e. Cells deficient in invariant chain retain MHC II in the endoplasmic reticulum.
 - f. Linked recognition has helped in vaccine development.

