This question paper contains 4 printed pages.

6860 *Your Roll No*

M.Sc. – Ph.D. Bio-Medical Sciences / IV Sem. J

Paper— BIO–1006 IMMUNOBIOLOGY

(Admissions of 2008 and before)

Time : 3 hours *Maximum Marks* . 75

(Write your Roll No on the top immediately on receipt of this question paper)

Attempt all questions in Part A and Part B

PART A

1 Explain the role of lymphotoxin β in development of secondary lymphoid organs

Or

Discuss the different stages of development of Payer's patches 6

2. Explain how developing thymocytes are screened for self reactivity before they exit thymus 6

3. Explain the types of $CD4^+$T cells in circulation reported in literature till now based on the data shown by Sara Trifari et al and their importance in modulating the cell mediating immune responses 6

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4. Describe the importance of TCR signaling in T cell development in thymus specifically describing the role of T cell specific proteins (Themis). 6

5. Discuss the importance of TRADD in inflammatory responses. 6

6. How do the autoreactive CD4 T cells specific for insulin peptide escape thymic control and participate in diabetes according to James F Mohan et al NP6–2010? 5

7 Explain the factors involved in T_H I7 differentiation and pathogenesis of multiple sclerosis. 5

PART B

8. (*a*) What is cancer? Explain the tumor phenotype and explain how tumors achieve limitless replicative potential.

(*b*) Describe three E's of cancer immunoediting.

(*c*) How is the selection of immune cells against self antigens achieved? Depletion of T-reg. is supposed to be a good treatment for cancer, when such a treatment is given. What goes wrong when complete T-reg cell pool is depleted?

(*d*) A cancer patient with defective antigen presentation was given an adoptive transfer of primed dendritic cells, which improved his

immune status. Write appropriate set of experiments to show improved antitumor immunity when adop- tive transfer was administered.

(*e*) Describe the mechanism of immunosuppression by T regulatory cells in tumor. How do T-reg. survive in high ROS condition within tumors despite high oxidative stress? 10

9 (*a*) Describe Th17 responses and explain how differentiation into Th 17 can improve anticancer immunity

(*b*) What effect do ionizing radiations have on immune system? How does the effect differ, if cancer patient is subjected to low doses of ionizing radiations?

(*c*) A line of tumor cells prepared from one mouse is injected into an MHC-matched recipient The tumor was destroyed within 5 days. When tissues from the recipient were analysed, the animal had a negligible cytotoxic T lymphocyte response against the tumor Flow cytometry revealed that the tumor cells expressed very low level of MHC class I molecules. Write the best explanation for the destruction of the tumor cells in the recipient

Or

(*a*) Write the mechanism by which indole 2,3-dioxygenase enzyme induce immunosuppression in tumour cells

(*b*) Describe the presently available immunotherapies in clinics and write about some potential anticancer immunotherapies in development phase.

(*c*) Hurang et al in their article describe that $GR1^{+}115^{+}$ immature myeloid suppressor cells mediate the development of tolerance. Describe the possible mechanism of induction of tolerance by tolerogenic dendritic cells. 15

10. Write short notes (any *five*):

(*i*) Cancer vaccine

(*ii*) SOCS

(*iii*) Immunodominance and tumor escape

(*iv*) Negative costimulatory signal

(*v*) Sodium chromate assay

(*vi*) Immunosuppressive cytokines. 10