KUMARAGURU
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Register Number:……..…

M.TECH DEGREE EXAMINATIONS: JUNE 2016

(Regulation 2015)

Second Semester

BIOTECHNOLOGY

P15BTE203: Immunotechnology

COURSE OUTCOMES

CO1: Acquire the basics of Immunology and immunobiology

CO2: Develop an understanding of various concepts of immunotechniques

CO3: Apply these concepts and techniques in immunobiology

CO4: Acquire knowledge in cellular and immunoassays

Time: Three Hours **Maximum Marks: 100**

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. Predict the correct sequence in hybridoma technology: CO2 [K_4]

   1. Fusion of myeloma cells with immune spleen cells
   2. Screening of mice for antibody production
   3. Cloning of hybridoma cells by limiting dilution
   4. Preparation of myeloma cells

   a) 2-3-1-4 b) 2-4-1-3

   c) 2-4-3-1 d) 3-1-2-4

2. Which of the following is an example of artificial passive immunization CO4 [K_2]

   a) Injection of DNA from bacteria b) Injection of pooled gamme globulin

   c) Transplacental paasage of Ab d) Injection of adjuvant

3. Which of the following is a quantitative precipitation technique? CO2 [K_1]

   a) Countercurrent electrophoresis b) Gel diffusion

   c) Immunoelectrophoresis d) Radial immuodiffusion

4. Match the following immune cells with their respective functions: CO1 [K_1]

List I	List II
A. Natural killer cells	i. Allergic response
B. Macrophages	ii. Antiparasitic activity

C. Basophils	iii. Antiviral and anticancer activity
D.Eosinophils	iv. Phagocytic activity

a) A-iii, B-iv, C-i, D-ii
b) A-i, B-iii, C-iv, D-ii
c) A-iv,B-i C-ii, D-i
d) A- ii, B-iv, C-ii, D-i

5. Catalytic antibodies, also called _____, are generated against an antigen that is_____. CO3 [K_2]

a) abzymes; an analog of the transition-state intermediate in the reaction
b) abzymes; the substrate of the reaction
c) zymogens; an analog of the product of the reaction
d) holoenzyme; an analog of the transition-state intermediate in the reaction

6. HT-2 and CTLL-2 cell lines are commonly used in the bioassays of CO3 [K_1]

a) Interleukin 2
b) Interleukin-4
c) Interferon -ϒ
d) Tumor Necrosis factor-α

7. **Assertion (A):** Mixed lymphocyte Reaction (MLR) is performed when transplants are to be made into an immunosuppressed individual. CO4 [K_3]

Reason (R): In such situations, transplantations must be performed between well-matched individuals in order to avoid reaction in inadvertently transplanted immunocompetant cells.

a) Both A and R are individually true and R is the correct explanation of A
b) Both A and R are individually true, but R is not the correct explanation of A
c) A is true but R is false
d) A is false but R is true

8. Where would be a B cell **NOT** be likely to meet its antigen CO1 [K_1]

a) Bone marrow
b) Spleen
c) Lymph node
d) Payer patches

9. Which of the following statements about chimeric antibody is incorrect? CO4 [K_2]

1. Able to deliver powerful toxin to particular antigen targets.
2. Bestowes capacity to respond to immunization by producing antibody encoded by donors Ig transplantable genes.
3. Prevents hazards of mouse monoclonal antibodies in human applications.
4. Genes for the antibody production are encoded from the same species.

a) 1 & 3
b) 1 & 2
c) 2 & 4
d) 3 & 4

10. The heavy-light chain constructs for isolation of antibody from combinatorial gene libraries are usually inserted into — CO4 [K_2]

a) Bacteriophage λ
b) Bacteriophage φX174
c) Phagemids
d) Mu phage

PART B (10 x 2 = 20 Marks)

11. Define an adjuvant with an example. CO1 [K_1]
12. What is the role of growth factors in hematopoiesis? CO1 [K_2]
13. Differentiate between precipitation and agglutination reactions. CO2 [K_4]
14. Write the principle behind Laurell Rocket technique. CO2 [K_2]
15. How do you separate peripheral blood mononuclear cells from blood? CO4 [K_2]
16. What is Cr^{51}? Give the significance of Cr^{51} assay. CO4 [K_2]
17. Compare and contrast between active and passive immunization. CO3 [K_4]
18. What is reverse vaccinology? Write its significance. CO3 [K_2]
19. What is the purpose of engineering antibody gene? CO4 [K_2]
20. How is the proliferation of lymphocytes monitored? CO2 [K_2]

PART C (6 x 5 = 30 Marks)

21. Explain the different types of immune cells and their role in immune response. CO1 [K_2]

22. Explain competitive and sandwich ELISA and their applications in diagnosis. CO2 [K_2]

23. How do you enrich the hematopoietic stem cells using FACS? CO4 [K_2]

24. What are plant-based vaccines? How is it superior over conventional vaccines? CO3 [K_4]

25. Describe how monoclonal antibodies can be constructed from immunoglobulin gene libraries? CO4 [K_2]

26. What are abzymes? Describe its applications. CO3 [K_2]

Answer any FOUR Questions
PART D (4 x 10 = 40 Marks)

27. Describe classical and alternate pathways of complement activation and its regulation. CO1 [K_2]

28. Outline the approaches used for production of humanized monoclonal antibodies. Mention any two diagnostic and therapeutic applications of monoclonal antibodies. CO2 [K_2]

29. Describe the bioassay procedure for following cytokines: IL2, IFN-ϒ, TNF-α CO4 [K_3]

30. Write a note on the following emphasizing their working principle and advantages CO3 [$_{K2]}$

    (i) Recombinant vector vaccines

    (ii) DNA vaccines

    (iii)Multisubunit vaccines

31. Explain antibody engineering. Outline any two methods commonly used for functional screening of combinatorial library of peptides. CO4 [K_2]

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