

Jaypee University Of Information Technology, Waknaghat  
Test -2 Examinations-2023

B.Tech- V Semester (Biotechnology)

Course Code (Credits): 18B11BT513 (4)

Course Name: Immunology

Max. Marks: 25

Course Instructors: Dr. Abhishek

Max. Time: 1 Hour And 30 Minutes

*Note: All questions are compulsory. Marks are indicated against each question in square brackets.*

1. For heavy-chain sequencing studies, myeloma proteins were reduced with mercaptoethanol and alkylated, and the heavy chains were separated by gel filtration in a denaturing solvent. When the amino acid sequences of several myeloma protein heavy chains were compared, a pattern similar to that of the light chains emerged. The remaining part of the protein revealed five basic sequence patterns, corresponding to five different heavy-chain constant (C) regions. Each of these five different heavy chains is called an isotype. Detail out all the immunoglobulin isotype with neat and clean diagram. [5]
2. You prepare an immunotoxin by conjugating diphtheria toxin with a monoclonal antibody specific for a tumor antigen. [5]
  - a. If this immunotoxin is injected into an animal, will any normal cells be killed? Explain.
  - b. If the antibody part of the immunotoxin is degraded so that the toxin is released, will normal cells be killed? Explain.
3. For each of the following statements, indicate whether it is true only of B-cell epitopes (B), only of T-cell epitopes (T), or both types of epitopes (BT) within a large antigen and explain why? [5]
  - a. Immunodominant epitopes are determined in part by the MHC molecules expressed by an individual.
  - b. They generally are located on the surface of a protein antigen.
  - c. They lose their immunogenicity when a protein antigen is denatured by heat.
  - d. Their immunogenicity may depend on the three-dimensional structure of the antigen.
  - e. Their immunogenicity may depend on the three-dimensional structure of the antigen
4. Macrophages and neutrophils are specialized for the phagocytosis and degradation of antigens. Phagocytosis is facilitated by opsonins such as antibody, which increase the attachment of antigen to the membrane of the phagocyte. Detail out the mechanism of opsonisation and antigen processing by Macrophage cell, also explain ADCC [5]

PTO

5. Adaptive immunity has evolved in vertebrates but they have also retained innate immunity. What would be the disadvantages of having only an adaptive immune system? Comment on how possession of both types of immunity enhances protection against infection [5]

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