

JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- MAY-2023

Course Code (Credits): 20MS1BT212 (3)

Max. Marks: 25

Course Name: Immunology

Course Instructors: Dr.Abhishek

Max. Time: 1.5 Hour

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

1. Adjuvants are often used to boost the immune response when an antigen has low immunogenicity or when only small amounts of an antigen are available. Mechanistically adjuvants appear to exert one or more of the following effects (a) Prolongs antigen persistence (b) Enhances co-stimulatory signal (c) Induces granuloma formation (d) Stimulates lymphocytes nonspecifically. Write down the possible mode of actions adopted (one or more) by the following adjuvant and why? [5]
 - a. Freund's incomplete adjuvant
 - b. Freund's complete adjuvant
 - c. Aluminum potassium sulfate (alum)
 - d. *Mycobacterium tuberculosis*
 - e. Synthetic polynucleotides (poly IC/poly AU)

2. Antibodies participate in a broad range of biological activities when considering the role of antibody in defending against disease. In order to be effective against pathogens, antibodies must not only recognize antigen, but also invoke effector functions that will result in removal of the antigen and death of the pathogen. Opsonization and ADCC are such kind of antibody activity which involve in removal of the antigen and death of the pathogen. Explain in detail about both the activity and also define plasmacytomas and its significance. [6]

3. For each pair of immunogen listed below, indicate which is likely to be more immunogenic and why? Explain your answer. [5]
 - a) A Homopeptide of Tryptophan (Trp)
A Heteropolymer of Lysine, Serine and Glycine
 - b) A peptide of 56 amino acid long
A peptide of 168 amino acid long.
 - c) A hapten such as dinitrophenol (DNP)
A hapten such as dinitrophenol (DNP) conjugated with bovine serum albumin (BSA)
 - d) Compound lipid such as Phosphatidylcholine and Phosphatidylethanolamine
Compound such as glycoproteins or lipoproteins
 - e) A polymer of nucleotides or polynucleotides
An octamer of Histone

4. Since antibodies are glycoproteins, they can themselves function as potent immunogens to induce an antibody response. Such anti-Ig antibodies are powerful tools for the study of B-cell development and humoral immune responses. The antigenic determinants, or epitopes, on immunoglobulin molecules fall into three major categories: isotypic, allotypic, and idiotypic determinants. For each of the following immunization scenarios, indicate whether anti-immunoglobulin antibodies would be formed to isotypic (IS), allotypic (AL), or idiotypic (ID) determinants: [4]
- a) Anti-XYZ antibodies produced in a Wistar rat are injected into a Sprague-Dawley rat.
 - b) Anti-XYZ monoclonal antibodies from a Wistar rat are injected into another Wistar rat
 - c) Anti-XYZ antibodies produced in a Wistar rat are injected into a rabbit.
 - d) Anti-XYZ antibodies produced in a Wistar rat are injected into the same rat.
5. Direct biochemical purification of a monoclonal antibody from a polyclonal antibody preparation is not feasible. In 1975, Georges Köhler and Cesar Milstein devised a method for preparing monoclonal antibody known as hybridoma technology. Illustrate hybridoma technology with neat diagram and its significance in clinical immunology with suitable example. Also explain transcytosis in brief. [5]