JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATIONS - 2022

M.Sc-II Semester (BT)

COURSE CODE (CREDITS): 18MS1BT211 (3) MAX. MARKS: 35

COURSE NAME: IMMUNOLOGY AND IMMUNOTECHNOLOGY

COURSE INSTRUCTORS: Dr. Rahul & Dr. Abhishek MAX. TIME: 2 Hours

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

Al Questions of a section must be answered at one place

Section A

Q1. How might an arthropod, such as a cockroach or beetle, protect itself from infection? In what ways might the innate immune responses of an arthropod be similar to those of a plant and how might they differ? **[3]**

Q2a. Explain the difference between antibody affinity and antibody avidity. Which of these properties of an antibody better reflects its ability to contribute to the humoral immune response to invading bacteria? **[2]**

Q2b. You are given two solutions, one containing protein X and the other containing antibody to protein X. When you add 1 ml of anti-X to 1 ml of protein X, a precipitate forms. But when you dilute the antibody solution 100-fold and then mix 1 ml of the diluted anti-X with 1 ml of protein X, no precipitate forms. **[4]**

a. Explain why no precipitate formed with the diluted antibody.
b. Which species (protein X or anti-X) would likely be present in the supernatant of the antibody-antigen mixture in each case?

Q3. In an immunology laboratory exercise, you are studying the response of mice injected intradermally with complete antibodies to the IgE Fc receptor (FcR1) or with Fab fragments of such antibodies. **[3]**

a. Predict the response expected with each type of antibody.
b. Would the responses observed depend on whether the mice were allergic? Explain.

Section B

Q4. Answer the following with respect to Immunoglobulins: **(Do Not Write Question)[0.5 X 6 = 3]**

a. Most preferred Ig for cancer therapy.
b. Ig type present in breast milk protecting newborn.
c. Cells which produce IgE.
d. Ig classes which are co-expressed on B cells due to differential RNA splicing.
e. Ig fragments produced by digestion with papain enzyme.
f. Ig classes which contain a J-chain in their multimeric form.

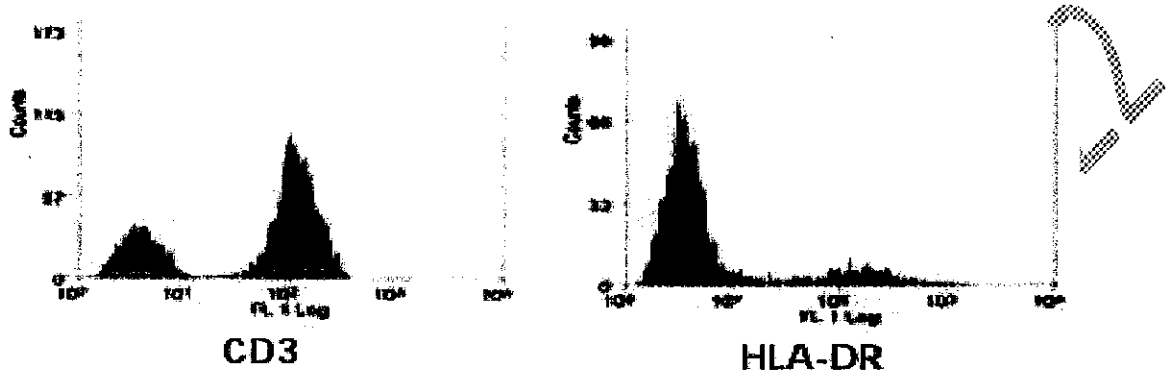
Q5. Indicate the type of immunity developed / provided in the body of the person if: **[2]**

A. A snake bite is followed by a Serum Immunoglobulin treatment.

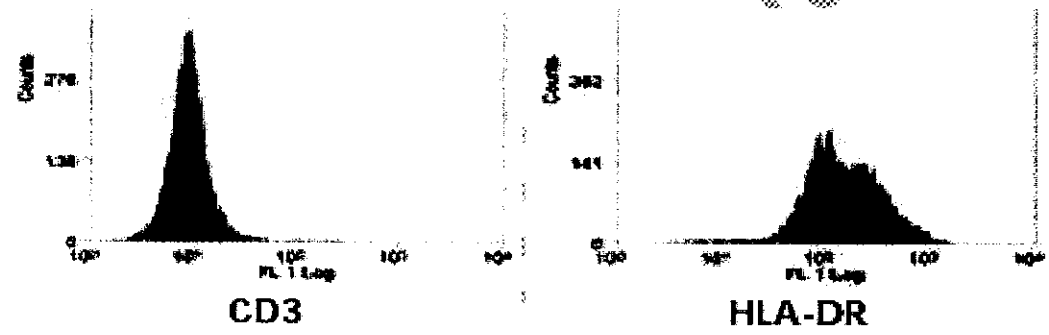
B. A snake bite is followed by No treatment, but the person survives.

Q6. Given below is a flow-cytometry data indicating fluorescence obtained using Anti-CD3 and Anti-HLA-DR antibodies from two individuals A and B. Explain the data obtained in both sets and predict the diseased condition which can be diagnosed using given data sets. **[4]**

A.



B.



Q7. Draw a histogram plot depicting different phases of human cell cycle obtained in a flow cytometry experiment. Draw peak for cells undergoing apoptosis in the histogram. How it can be used for diagnosis of clinical conditions. **[4]**

Q8. The complex mechanisms of immunity, which under normal circumstances work to identify foreign microbes and direct the immune system to destroy the pathogens, may work for rejection of cells, tissues, organs. Discuss the 'Cellular' and 'Antibody' mediated rejection process and its implications. **[4]**

Q9. Can carbohydrates be used as vaccine candidates? Provide suitable justification for your answer with example and possible immunological mechanism of such vaccines. **[4]**

Q10. Illustrate with a flow chart important steps required for processing a tissue or organ for the purpose of histopathological examination. **[3]**