

[This question paper contains 6 printed pages.]

Sr.No. of Question Paper : 1047 E Your Roll No.....

Unique Paper Code : 249605

Name of the Course : B.Sc. (Hons) / Biochemistry

Name of the Paper : BCHT-613/Immunology-II

Semester : VI

Duration : 3 Hours

Maximum Marks : 75

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt five questions in all.
3. Question No. 1 is compulsory.
4. Use of scientific calculator/log tables may be allowed.

1. (a) State whether the following statements are true or false, justify.

- (i) If HAART is successful, viral load decreases.
- (ii) The blood of children with Bruton's disease (X-linked agammaglobulinemia) usually lacks mature B Cells.
- (iii) In humans, skin grafts from mother to her son are usually accepted.
- (iv) Contact Sensitivity is a skin reaction that can be transferred passively with reaginic (IgE) antibody.
- (v) Patients who lack the enzyme adenosine deaminase have a selective deficit in development of plasma cells.
- (vi) Most tumors appear to have one or more tumor associated antigens.
- (vii) Identical twins do not reject blood transfusions as they share all genetically encoded blood group antigens.

P.T.O.

(viii) A pepsin digest of anti-SRBC antibodies can agglutinate SRBC.

(ix) Humoral type of immunity is responsible for clearance of mycobacterial infections. (9)

(b) Choose the one BEST answer-

(i) One reason why vaccines fail to work in very young infants is the presence of

(a) maternal antibodies

(b) glycoproteins

(c) adjuvant

(d) serum

(e) endotoxin

(ii) A child stung by a bee experiences respiratory distress within minutes and lapses into unconsciousness. This reaction is probably mediated by

(a) IgE antibody

(b) IgG antibody

(c) Sensitized T cells

(d) Complement

(e) IgM antibody

(iii) The cytokine responsible for activation of macrophages is —

(a) IL-4

(b) IL-2

(c) IFN- $\gamma$

(d) Lymphotoxin

(e) TNF- $\alpha$

(iv) Which strain of mice fails to develop a thymus?

(a) New Zealand mice

(b) *lpr*

(c) beige

(d) nude

(e) motheaten

(v) Immune complex precipitates are formed in

(a) Antigen excess

(b) Antibody excess

(c) Zone of equivalence

(d) Presence of adjuvant

(5)

(c) Explain briefly:

(i) The cross reactivity of antibodies presents problems for the science of serology.

(ii) IL-3, IL-5 and GM-CSF exhibit considerable redundancy in their effects.

(iii) Nude mice can tolerate both allografts and xenografts.

(iv) Pernicious anemia can be treated with injections of vitamin B12

(v) In Hashimoto's disease, high levels of antibodies against thyroglobulin are found. Yet these antibodies do not seem to cause the disease. (5)

2. (a) What are monoclonal antibodies? Why is the technology for the production of monoclonal antibodies called hybridoma technology? Schematically depict the steps for the production of monoclonal antibodies?

- (b) Indicate four properties of cytokines with suitable examples.
- (c) What do you understand by "The immune system is the greatest obstacle to most transplants" ? (7,4,3)
3. (a) What are the advantages of Sabin vaccine as compared with Salk vaccine for polio?
- (b) Cancers camouflage themselves to evade antitumor defenses. Describe any two possible forms of camouflage that you think are most important.
- (c) For each of the following immunodeficiency disorders indicate the primary cause and the associated symptoms -.
- (i) Di George's syndrome
- (ii) Chronic Granulomatous Disease ( CGD) (4,4,6)
4. (a) For each antigen and antibody listed below , indicate an appropriate assay method keeping in mind the sensitivity of the assay and the expected concentration of each protein.
- (i) Insulin in serum
- (ii) IgE in serum
- (iii) Complement component C3 on glomerular basement membrane
- (iv) IgG in serum
- (b) Describe possible mechanisms that lead to autoimmunity.
- (c) What are the advantages and disadvantages of using live and killed attenuated organisms as vaccines? (4,4,6)
5. (a) Write short notes (any 4)
- (i) Herd immunity
- (ii) SLE or SCID

- (iii) Complement Fixation Test
  - (iv) Immunosuppressive drugs
  - (v) Privileged sites
- (b) When IL-2 is secreted by one T cell in a peripheral lymphoid organ, do all the T cells in the vicinity proliferate in response to IL-2 or only some of them. Explain (12,2)
6. (a) How does immunodeficiency differ from immunologic tolerance?
- (b) What is the major advantage of immunoelectrophoresis tests over immunodiffusion tests?
- (c) Why is it difficult to devise a vaccine against HIV-1?
- (d) Describe some characteristics of type III hypersensitivity reaction. Give one example of autoimmune disease caused by this type of hypersensitivity. (3,2,5,4)
7. (a) Distinguish between the following pairs (any 4) -
- (i) Active and Passive Immunization
  - (ii) Type I and Type II Hypersensitivity
  - (iii) Direct and Indirect Immunofluorescence
  - (iv) Tumor-specific transplantation antigen (TSTA) and tumor associated transplantation antigen (TATA)
  - (v) Autograft and Xenograft
  - (vi) Affinity and Avidity
- (b) Explain -Oral Tolerance (12,2)
8. (a) Explain Graft versus Host Disease (GvHD).

- (b) Patients with X-linked hyper IgM syndrome express normal genes for other antibody subtypes, but fail to produce IgG, A, or E. Explain how the defect in this syndrome accounts for lack of other antibody isotypes.
- (c) Which cells play a major role in recognizing tumor cells and how do these cells mount an immune response to tumors?
- (d) What are the hallmarks of DTH reactions? Name the effector cells in DTH.  
(3,3,4,4)