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BRAINWARE UNIVERSITY

Term End Examination 2023
Programme – M.Sc.(BT)-2022
Course Name – Immunology
Course Code - MBTC201
(Semester II)

Full Marks : 60 **Time : 2:30 Hours**

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group-A

(Multiple Choice Type Question) 1 x 15=15

1. *Choose the correct alternative from the following :*

(i) Indicate which of the following cells is involved in cell-mediated immunity

a) Cancer cells b) Mast cells
c) T cells d) Thrombocyes

(ii) The antibiotic penicillin is a small molecule that does not induce antibody formation. However, penicillin binds to serum proteins and forms a complex that in some people induces antibody formation resulting in an allergic reaction. Penicillin is therefore

a) an antigen b) A hapten
c) an immunogen d) both an antigen and a hapten

(iii) Infer type I hypersensitivity classically involves which one of the following

a) IgE b) IgM
c) IgD d) Macrophages

(iv) Explain which two immune reactions are called the two sides of a coin

a) Autoimmunity & Tolerance b) Tolerance & Hypersensitivity
c) Autoimmunity & Hypersensitivity d) Tolerance & GvH

(v) Interpret which of the following is used for typing when a patient is being prepared for an organ transplant

a) MHC class I molecules b) MHC class II molecules
c) MHC class III molecules d) All of the above

(vi) An IL-4 deficient mice is infected with the nematode Nippostrongylus brasiliensis (Nb), predict the possible outcome

a) IgG and IgE in equal proportion b) heightened IgE response
c) unable to mount an IgE response d) cannot say

(vii) Tumor cells that can reproduce indefinitely are combined with mammalian cells that create an antibody in monoclonal antibody technology. The result of this cell fusion is a

a) myeloma
b) natural killer cell
c) hybridoma
d) lymphoblast

(viii) Which is the second most abundant Ig?

a) IgD
b) IgA
c) IgM
d) IgE

(ix) Explain Rheumatoid arthritis is different from some other forms of arthritis as it

a) occurs below the waist
b) is more painful than other forms
c) generally occurs above the waist
d) is symmetrical, affecting the right and the left sides of the body

(x) Explain Mismatched blood group transfusion causes

a) Activation of cytotoxic cells
b) Activation of Type II hypersensitivity
c) Activation of IgE
d) Activation of IgM

(xi) Indicate the following types of cell produce IgE

a) Mast cells
b) Eosinophils
c) Plasma cells
d) T lymphocytes

(xii) Interpret,In genetic engineering, a chimera is

a) an enzyme that links DNA molecules
b) a plasmid that contains foreign DNA
c) A virus that infects bacteria
d) A fungi

(xiii) Infer which of the following statements is incorrect concerning antigen-specific receptors on both B and T-cells?

a) They are clonally distributed transmembrane molecules
b) They have extensive cytoplasmic domains that interact with intracellular molecules.
c) They consists of polypeptides with variable and constant regions
d) They are associated with signal transduction molecules at the cell surface

(xiv) Evaluate-A patient is suspicious of having breast cancer. What type of test will a physician conduct first to diagnose the cancer

a) Blood Test
b) Mammography
c) CT scan
d) None of these

(xv) Recall Antigen binding sites are present in

a) Fab regions of an antibody
b) Fc region of an antibody
c) only in the light chain
d) only in the heavy chain

Group-B

(Short Answer Type Questions) 3 x 5=15

2. Differentiate between antibody affinity and antibody avidity. Which of this property of an antibody better reflects its ability to contribute to the humoral immune response to invading bacteria? (3)
3. Draw the basic structure of an "antibody" and label it properly. (3)
4. Estimate how can "chimeric antibody" be used for the treatment of various diseases. (3)
5. For Bacterial agglutination, would you elect to use a polyclonal antibody preparation, a monoclonal antibody, or more than one monoclonal antibody to detect your antigen? Explain your answer. (3)
6. Justify why chloroquine inhibited the response of the class II restricted TC cells to live virus (3)

OR

Predict whether TH-cell proliferation or CTL-mediated cytolysis of target cells will occur with the following mixtures of cells. The CD4 positive TH cells are from lysozyme-primed mice, and (3)

the CD8 positive CTLs are from influenza-infected mice. Use R to indicate a response and NR to indicate no response. _____H-2k TH cells + lysozyme-primed H-2d macrophages; _____H-2d CTLs + influenza-infected H-2d/k macrophages

Group-C

(Long Answer Type Questions) 5 x 6=30

7. Distinguish between innate and adaptive immunity in terms of cells involved and immune response (5)
8. "Antigenic activation of TH cells leads to the release or induction of various nuclear factors that activate gene transcrip tion. a) What transcription factors that support proliferation of activated TH cells are present in the cytoplasm of resting TH cells in inactive forms? b) Once in the nucleus, what might these transcription fac tors do? " Conclude the outcome of the following conditions (5)
9. Genetic deficiencies have been described in patients for allof the complement components except factor B. Particularly severe consequences result from a defi ciency in C3. Describe the consequences of an absence of C3 for each of the following: a. Initiation of the classical and alternate pathways; b. Clearance of immune complexes; c. Phagocytosis of infectious bacteria (5)
10. Molecular mimicry is one mechanism proposed to account for the development of autoimmunity. How has induction of EAE with myelin basic protein contributed to the understanding of molecular mimicry in autoimmune disease? (5)
11. Illustrate at least three different mechanisms by which a localized viral infection might contribute to the development of an organ-specific autoimmune disease (5)
12. "You are supplied with antigen 'A' and the antibody against this protein. When you mix equal volume of these two samples a precipitate was formed. But when you dilute your antibody solution 100-fold and then, mix equal volume of antigen and antibody, no precipitate was formed. a) Explain why no precipitate was formed with the diluted antibody. b) Which species (antigen A or antibody against A) would likely be present in the supernatant of the antibody-antigen mixture in each case? " (5)

OR

Estimate how you can manufacture/produce polyclonal antibodies and assess with diagrams (5)

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