P. P. SAVANI UNIVERSITY

Third Semester of B.Sc. Examination

December-2021

SSBT2070–Immunology I

09.12.2021, Thursday **Time: 09:00 a.m. to 11:30 a.m.** **Maximum Marks: 60**

Instructions:

1. The question paper comprises of two sections.
2. Section I and II must be attempted in separate answer sheets.
3. Make suitable assumptions and draw neat figures wherever required.
4. Use of scientific calculator is allowed.

Section-I (Total Marks - 30)

Q.1 Short Questions **[10]**

1.1 Objectives **[05]**

1.1a ..... can be considered as a component of both innate and adaptive immunity

- **A** T cell receptors
- **B** TLRs
- **C** Phagocytes
- **D** Mucous

1.1b Plasma therapy introduces ..... in the body of recipient

- **A** specific antigen
- **B** specific immunogen
- **C** specific antibodies
- **D** saline water

1.1c These plasma cells are differentiated form of ..... cells

- **A** B cells
- **B** T cells
- **C** both B and T cells
- **D** stem cells

1.1d Vaccination in our body

- **A** induces formation of new B-cells and/or T-cells with specific antibodies against the introduced immunogen
- **B** induces proliferation of pre-existing B-cells and/or T-cells with specific antibodies against the introduced immunogen
- **C** Adds new antibodies in our body
- **D** Adds new TLRs in our body

1.1e Antigen presentation to T_H cells is mediated by

- **A** Class-I MHC molecule
- **B** Class II MHC molecule
- **C** Class-I TLR molecule
- **D** Class-II TLR molecule

1.1f T cells can recognize

- **A** Soluble antigens
- **B** Processed antigens bound to MHC molecules
- **C** Both A and B

D None of the above

1.1g T cells can bind to

A Conformational epitopes
B Epitopes made of sequential amino acids
C Epitopes made of non-sequential amino acids
D All of the above

1.1h The type of immunity that helps in fight against broad range of pathogens by recognizing some common patterns is known as

A acquired immunity
B adaptive immunity
C innate immunity
D cell-mediated immunity

1.1i The strongest argument in the favor of instructional theory was

A presence of many disulfide bonds in antibody
B presence of many peptide cleavage site on antibody
C presence of many disulfide bonds in antigen
D presence of many peptide cleavage site on antigen

1.1j According to which theory, the specificity of the receptor is determined before its exposure to antigen

A Selective theory
B Instructional theory
C Clonal selection theory
D Selective and Clonal Selection theory both

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a Innate and adaptive immunity work in harmony to remove a pathogen from the system (True / False)

1.2b MHC plays crucial role in B-cell-antigen interaction (True / False)

1.2c Innate immunity displays memory response (True / False)

1.2d All immunogens are antigens but all antigens are not immunogens (True / False)

1.2e Instructional theory and selection theory are the same (True / False)

Q.2 Short Notes (Attempt any two) **[06]**

A Physical barrier

B Louis Pasteur's contribution in the field of immunology

C Comparative account of adaptive and innate immunity

Q.3 Explain in detail (Attempt any two) **[14]**

A Explain (i) Instructional Theory, (ii) Clonal Selection Theory. Draw suitable diagram wherever necessary.

B Explain (i) Cell-mediated Immunity, (ii) Humoral immunity

C Explain various factors that can influence immunogenicity of a foreign molecule

Section-II (Total Marks - 30)

Q.1 Short Questions [10]

1.1 Objectives [05]

1.1a ..... are the most potent immunogens

- **A** Proteins
- **B** Lipids
- **C** Carbohydrates
- **D** Nucleic acids

1.1b T-cell recognize

- **A** soluble antigen
- **B** processed antigen
- **C** both A and B
- **D** none of the above

1.1c The myeloma cells used for production of monoclonal antibody

- **A** are HGPRT negative
- **B** are HGPRT positive
- **C** are NADPH reductase positive
- **D** are NADPH reductase negative

1.1d Which of the following cells secretes antibodies

- **A** Macrophages
- **B** Dendritic cells
- **C** Plasma cells
- **D** T cells

1.1e HAT in 'HAT media stands for

- **A** Hypoxanthine Aminopterin Thymidine
- **B** Hydroxymethyl Aminopterin Thyroxine
- **C** Hypoxanthine Acetaaminophen Thymidine
- **D** Histidine Aminopterin Thymidine

1.1f Which metabolic pathway is exploited for the hybridoma cells using HAT media?

- **A** amino acid biosynthesis pathway
- **B** nucleic acid biosynthesis pathway
- **C** nucleic acid breakdown pathway
- **D** Gluconeogenesis pathway

1.1g Which of the following is(are) used by HGPRT enzyme as substrate(s)?

- **A** Hypoxanthine
- **B** Hypoxanthine and Thymidine
- **C** Hypoxanthine and Aminopterin
- **D** Aminopterin and Thymidine

1.1h ..... region of antibody is involved in effector response

- **A** Fab
- **B** Fc
- **C** Fab and Fc both
- **D** None of the above

1.1i Immunization of hapten-carrier conjugae to animals produces antibodies

specific for:

A hapten
B unaltered epitopes on the carrier protein
C new epitopes formed by combined parts of both the haptens and carrier
D all of the above

1.1j T_H cells assist in the functions of

A B cells
B Tcells
C B and T cells
D None of the above

1.2 Answer the Following: (MCQ/Short Question/Fill in the Blanks) **[05]**

1.2a IgM always exists as a monomer (True/False)
1.2b Light and heavy chains are connected to each other by disulfide bonds (True/False)
1.2c Fc end of antibody is its highest variable region (True/False)
1.2d All foreign molecules are immunogens (True/False)
1.2e Fab end of antibody is its highest variable region (True/False)

Q.2 Short Notes (Attempt any two) **[06]**

A Haptens
B Immunogenicity vs. antigenicity
C Epitopes

Q.3 Explain in detail (Attempt any two) **[14]**

A Factors affecting immunogenicity
B What are the important functions of antibodies? Explain the structure of antibody with a suitable diagram of IgG.
C Hybridoma technology