Shivaji University, Kolhapur
Yashwantrao Chavan College of Science Karad
Department of Microbiology
Class – M.Sc. I, Subject Name: Immunology

Unit I

Q 1

1. Antigen- binding sites are present in constant regions of light and heavy chain of antibody. (F)
2. IgD antibody is pentameric in nature. (F)
3. IgG Type of immunoglobulin that can cross the placenta. (T)
4. IgA Type of immunoglobulin with highest antigen binding capacity.(F)
5. IgA & IgD type of antibodies present in colostrum, saliva and tears (F)
6. IgG is the largest antibody among all other type of antibody. (F)
7. IgA provide passive immunity to foetus. (F)
8. IgE type of Antibody play a role in hypersensitivity reaction which has highest Ig in serum. (F)
9. IgM is the first antibody which is produced in primary immune response(T)
10. IgG provide natural passive immunity to the foetus. (T)
11. IgD type of antibody which is dimeric and tetravalent. (F)
12. IgG is the Smallest antibody on the basis of their molecular weight which has four subclasses. (T)
13. Functional Ig genes -Kappa and lambda chain families contain V, D and J, segments (F)
14. VDJ gene segments encode the variable region of the heavy chain. (T)
15. Pseudogenes are those genes which are defective genes that are incapable of encoding protein (T)
16. Vκ and Jκ gene segments encode the variable region of the k- heavy chain, and the Cκ genesegment encodes the constant region (F)
17. The VH, DH and JH gene segments encode the variable region of heavy chain, and the CH genesegment encodes the constant region.(T)
18. Two DNA joining are necessary to generate a functional heavy-chain gene. (T)
19. Recombination of variable-region gene segments is catalysed by a Gyrase enzymes.(F)
20. The Functional B cells never contain more than one VDJ from the heavy chain and one VJ unitfrom the light chain (T).

Q 2

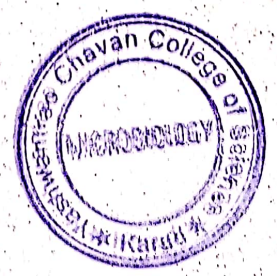
1. Draw a well labelled structure of immunoglobulin. Discuss the characteristic features andfunctions of different types of immunoglobulins. (16)
2. Describe in detail multigene organisation of Ig genes with diagrammatic representation (16)

Q 3

1. Generation of antibody diversity (8)
2. Mechanism of variable region gene rearrangements.

Q 4

1. Define structure and properties of IgM.(4)
2. a) Biological activities of IgG, IgA and IgE
3. b) Regulation of Ig-gene transcription
4. c) Structure and properties of IgM.
5. Structure and Biological activities of IgG



Unit II Major Histocompatible Complex

Q 1

1. Antigen-presenting cells express both class I and class II MHC molecules on their membranes.
2. All nucleated cells express class I MHC molecules. (T)
3. Major histocompatible complex participates in the development of both cell mediated and humoral immune responses. (T)
4. MHC is a collection of genes arrayed within a long continuous stretch of DNA on chromosome 6 in humans. (T)
5. MHC is a collection of genes arrayed within a long continuous stretch of DNA on chromosome 17 in mice. (T)
6. MHC is referred to as the HLA complex in humans and as the H-2 complex in mice. (T)
7. MHC is referred to as the H-2 complex in humans and as the HLA complex in mice. (F)
8. The major function of the class I MHC gene products is presentation of peptide antigens to Tc cells. (T)
9. The major function of the class II MHC gene products is presentation of antigenic peptides to T_H cells. (T)
10. The loci constituting the MHC are highly polymorphic. (T)
11. In outbred populations, the offspring are generally heterozygous at many loci and will express both maternal and paternal MHC alleles. (T)
12. MHC congenic mouse strains are identical at all loci except the MHC. (T)
13. Inbred mouse strains are syngeneic or identical at all genetic loci. (T)
14. Two strains are congenic if they are genetically identical, except at a single genetic locus or region. (T)
15. The class I MHC region is about 2000 kb long and contains approximately 20 genes. (T)

Q 2

1. Draw the schematic diagram of Class I and II MHC and discuss in detail (16)
2. Explain in details the cellular distribution of MHC molecules and add a note on MHC-peptide interactions. (16)

Q 3

1. Draw the schematic diagram of Class I MHC and discuss in brief. (8)
2. Draw the schematic diagram of Class II MHC and discuss in brief. (8)
3. Explain the structure of class I MHC and its interaction with peptide. (8)
4. Structure of Class II MHC and Inheritance

Q 4 (4 Marks)

5. Structure of Class I MHC
6. Structure of Class II MHC
7. Inheritance of the MHC
8. Cellular distribution of MHC molecules
9. Regulation of MHC expression
10. MHC and Disease Susceptibility

Unit III Immune effector mechanisms

1. Cytokines

Q 1

1. Cytokines and their receptors exhibit very high affinity for each other; therefore, cytokines can mediate biological effects at picomolar concentrations. (T)

2. A given cytokine having different biological effects on different target cells is called pleiotrophy. (T)
3. The binding of a cytokine to its receptors on a target cell in close proximity to the producer cell is called as autocrine action. (F)
4. The effects of one cytokine inhibit the effects of another cytokine, it is called antagonism. (T)
5. Combined effect of two cytokines on cellular activity is greater than the additive effects of the individual cytokines, it is called synergy (T)
6. Two or more cytokines that mediate similar functions are called synergy. (F)
7. Cytokines are involved in regulation of hematopoiesis. (T)
8. All the receptors in a subfamily of class I cytokine having an identical signal-transducing subunit. (T)
9. The hematopoietin receptor family is also known as Class I cytokine receptor family. (T)
10. The membrane of Class II cytokine receptor family have conserved cysteine residue (CCCC) and conserved sequence of WSXWS. (F)
11. Is it true that many cytokines are referred to as interleukins, indicating their secretion by some leukocytes and their action on other leukocytes?
12. The sharing of signal-transducing subunits among receptors explains the redundancy and antagonism exhibited by some cytokines. (T)
13. IL-2 and its receptor play central role in the clonal proliferation of T-cells. (T)
14. Is it IL-1Ra act as an antagonist for IL-1 receptor? (T)
15. Interferons are containing nucleic acid.(F)
16. Is it IFN-α and INF-β are belongs to type I interferon's? (T)
17. INF-γ is belongs to type I interferon's. (F)
18. Cytokine overproduction in pathogenesis can be illustrated by bacterial septic shock. (T)
19. The protozoan *Trypanosoma cruzi* is not a causative agent of Chagas' disease. (F)

Q 2 (16 Marks)

1. Describe in details the properties of cytokines with examples.
2. IL-3, IL-5, and GM-CSF exhibit considerable redundancy in their effects. What structural feature of the receptors for these cytokines might explain this redundancy?

Q 3 (4 Marks)

1. Cytokine antagonist with suitable example.
2. Explain the action of cytokine with diagram.
3. What are the therapeutic uses of cytokine?
4. Explain the cytokine related diseases.

2. Complement

Q 1

1. The C4 and C2 complement components are present in the serum in a functionally inactive proenzyme form. (T)
2. Opsonization is the process, which promotes phagocytosis of particulate antigens. (T)
3. Peptide fragments formed by activation of a component are denoted by large letters. (F)
4. Classical pathway begins with the formation of antigen-antibody complexes. (T)
5. IgA and IgE can activate the classical complement pathway. (F)
6. C4b2a complex is called C3 convertase. (T)

7. The trimolecular complex C4b2a3b is called as C5 convertase. (T)
8. The smaller fragments of C4, C3, and C5 refer as an anaphylotoxins. (T)
9. C3b generated by C3 convertase activity, functioning as an opsonin. (T)
10. The activation of complement by alternate pathway is antibody-dependent (F)

Q 2

1. Explain in detail the classical and alternative complement activation pathways with schematic illustration. (16)
2. Describe Classical complement pathway in detail. Add a note on biological significance of complement. (16)
3.

Q 3 (4 Marks)

1. What are the functions of complement?
2. Early components of Classical Pathway
3. Early components and events of Alternate pathway
4. Lectin pathway

Q 4 (8 Marks)

1. Biological consequences of complement activation (8)
2. Classical Pathway for activation of complement.
3. Alternate pathway for activation of complement.
4.

3. Leukocyte Migration and Inflammation

Q 1

1. Recirculation of lymphocytes is critical to development of an inflammatory response. (T)
2. The cells must adhere to and pass between the endothelial cells lining the walls of blood vessels, a process called extravasation. (T)
3. Endothelial cells express leukocyte-specific cell adhesion molecules (CAMs). (T)
4. Cell adhesion molecule interactions play critical role in extravation. (T)
5. Trafficking or homing is a process of different subsets of lymphocytes migrates differentially into different tissue. (T)
6. Bradykinin is a potent basic peptide act as an inflammatory mediator. (T)
7. Anaphylotoxins serve as important mediators of inflammation. (T)
8. Prostaglandins and thromboxanes serves as mediators of inflammation. (T)
9. Neutrophils play an early and important role in inflammation. (T)
10. The chronic inflammation develops when the antigen persists. (T)
11. Chemokines act as chemoattractants and activating molecules during leukocyte extravasation. (T)
12. Blocking of cell adhesion molecules with antibodies can reduce leukocyte extravasation. (T)
13. Histamine is a potent mediator of inflammation.
14. Inflammation is a response of vascular connective tissue towards injury, regardless of cause of injury. (T)

Q 2

1. Describe the inflammatory response in details and add a note on anti-inflammatory agents (16)

Q 3 (4 Marks)

1. Inflammation
2. Role of chemokines in inflammation
3. Describe the localized inflammatory response
4. Vascular events of inflammation
5. Role of corticosteroids in reduction of inflammation
6. Mechanism of action of Nonsteroidal anti-inflammatoy drugs

Q 4 (8 Marks)

1. Explain the types of cell adhesion molecules (8)
2. Describe the four steps in neutrophil extravation
3. Mediators of inflammation
4. Inflammatory response
5. Describe the anti-inflammatory agents

Unit IV Transplantation Immunology

Q 1

1. Hyper-acute rejection of graft is mediated by preexisting host antibodies specific for antigens on the grafted tissue. (T)
2. Second-set rejection is a manifestation of immunologic memory. (T)
3. Histocompatible tissues do not induce an immunologic response that leads to tissue rejection. (T)
4. Acute rejection of graft is mediated by T-cell responses. (T)
5. T cells play a key role in allograft rejection. (T)
6. Cyclosporine A is a fungal metabolite with immunosuppressive properties. (T)
7. Rapamycin is a fungal metabolite with immunosuppressive properties. (T)
8. Injection of monoclonal antibody to the CD3 molecule results in a rapid depletion of mature T cells in circulation. (T)
9. Lacking a co-stimulatory signal, antigen activated T cells become anergic. (T)
10. Kidney is the most transplanted organ. (T)
11. Xenograft transplantation may be solved the problem of organs shortage. (T)
12. Despite the genetic mismatch between donor and recipient cornea of the eye, do not reject transplant. (T)

Q 2 (16 Mark)

1. What is graft? Explain mechanism of graft rejection and add a note on specific immunosuppressive therapy.
2. What is graft? Explain the immunological basis of graft rejection and add a note on specific immunosuppressive therapy.

Q 3 (4 Mark)

1. Explain the types of graft.
2. Mitotic inhibitors
3. Clinical manifestations of graft rejection.
4. Fungal metabolites with immunosuppressive properties.
5. New approaches to vaccine production
6. Q 4 (8 Mark)

1. Describe the immunological basis of graft rejection.
2. Describe the immunosuppressive therapies
3. What is immunotolerance? Explain the mechanism of immune tolerance to allografts