

BIM -E601
DSE-6 IMMUNOLOGY

MM : 100
Time : 3 hrs
L Credit
4 4

Sessional : 30
ESE : 70
Pass Marks : 40

Total Hours: 60

Learning objectives:

- Students will learn about the components of the immune system as well as their functions and response..
- To develop understanding of innate and adaptive immunity
- To understand different serological reaction for the diagnosis of diseases.
- To integrate immunology with medical sciences and enrich the knowledge for autoimmune disorders, hypersensitivity reactions.

Learning outcomes:

At the end of course student will be able to

- Explain the different components of immune system and how they provide defense against infections.
- Describe how our immune system protects against foreign pathogens.
- Diagnose the viral and bacterial infection through different serological tests.
- Gain knowledge of different diseased conditions generated due abnormalities in immune system.
- Explain antigen antibody reactions.

UNIT - I

Introduction; Concept of Innate and Adaptive immunity; Contributions of following scientists to the development of field of immunology - Edward Jenner, Karl Landsteiner, Paul Ehrlich, Elie Metchnikoff; Functions of immune cells - Stem cell, T cell, B cell, NK cell, Macrophage, Neutrophil, Eosinophil, Basophil, Mast cell, Dendritic cell; and Immune Organs – Bone Marrow, Thymus, Lymph Node, Spleen.
(14 Lectures)

UNIT - II

Antigens and antibodies; Characteristics of an antigen (Foreignness, Molecular size and Heterogeneity); Haptens; Epitopes (T & B cell epitopes); T-dependent and T-independent antigens; Adjuvants; Structure, Types, Functions and Properties of antibodies; Antigenic determinants on antibodies (Isotypic, allotypic, idiotypic); VDJ rearrangements; Monoclonal and Chimeric antibodies.
(12 Lectures)

UNIT - III

Major Histocompatibility Complex; Organization of MHC locus (Mice & Human); Structure and Functions of MHC I & II molecules; Antigen processing and presentation (Cytosolic and Endocytic pathways); Complement System-Components of the Complement system; Activation pathways (Classical, Alternative and Lectin pathways); Biological consequences of complement Activation.
(14 Lectures)

UNIT - IV

Generation of Immune Response; Primary and Secondary Immune Response; Generation of Humoral Immune Response (Plasma and Memory cells); Generation of Cell Mediated Immune Response (Self MHC restriction, T cell activation, Co- stimulatory signals); Killing Mechanisms by CTL and NK cells.
(12 Lectures)

UNIT - V

Immunological Techniques; Principles of Precipitation, Agglutination, Immunodiffusion, Immunoelectrophoresis, ELISA, Western blotting, Immunofluorescence, Flow cytometry.
(08 Lectures)

Suggested Reading

1. Janis Kubcy, Immunology, W.H.Freeman
2. Peter J Delves, S.J. Martins, D.R. Burtens, Roitts Essential Immunology, Wiley Blackwell
3. C.V.Rao , An Introduction to Immunology, Alpha Science International Ltd , ISBN 978-1842650356

DSE 6 SEMESTER VI / BIM-E651 (LAB COURSE CC-06)

1. Blood group determination by slide agglutination method.
2. Demonstration of bacterial plasmid isolation.
3. Demonstration of Genetic recombination in bacteria.
4. UV induced auxotrophic mutant production, isolation replica plate technique.
5. Determination of nitrate production in nitrite broth soil cultures.
6. Isolation of *Fusarium* sp. from soil.
7. Isolation of *Macrophomina phaseolina* from soil.
8. Isolation of Rhizobia from root nodule.
9. Isolation of *Azotobacter*.
10. Isolation of antibiotic resistant bacteria by gradient plate technique.
11. Estimation of DNA by diphenylamine method.
12. Predict the microorganism on the basis of reaction on TSI slant
13. Perform citrate utilisation test.
14. Determination of titre by slide agglutination method.

Handwritten signatures and dates:

- Shubh
- 21/5/22
- 25/5/22
- 27/5/2022
- 31/5/22
- 27/5/22
- 31/5/22