

Semester IV
C9: Immunology (Theory MBTCR4092T; Practical MBTCR4092P)

Theory: CIA: 10 Marks; End-Sem: 50 Marks

Practical: 40 Marks

Theory:

Module A: (25 marks)

(2 classes per week)

UNIT I: Immune Response: an overview; components of mammalian immune system; humoral & cellular immune responses; T-lymphocytes & immune response (cytotoxic T-cell, helper T-cell, suppressor T-cells); immunogenicity versus antigenicity; epitopes; molecular structure of immunoglobulins or antibodies; antibody-mediated effector functions; antibody classes and biological activity.

UNIT II: Vaccines & Immunodiagnostics:

1. Vaccines & Vaccination: active and passive immunization; adjuvants; cytokines; live, attenuated vaccines; inactivated or “killed” vaccines; DNA vaccines; recombinant vaccines; vaccines to infectious agents other than bacteria and viruses.

2. Introduction to immunodiagnostics: RIA, ELISA.

Module B: (25 marks)

(2 classes per week)

UNIT III: Regulation of immunoglobulin gene expression: Genetic basis of antibody diversity - genome rearrangements during B-lymphocyte generation, development and differentiation; allelic exclusion; activation of B-cells - clonal selection theory, class switching, antibody affinity maturation; immunologic memory; assembly of T-cell receptor genes by somatic recombination.

UNIT IV: Major Histocompatibility Complex: Major Histocompatibility complexes – class I & class II MHC antigens, antigen processing.

UNIT V: Complement system: components, activation and biological functions.

Teachers involved: Prof. Souvik Roy (Module A), Dr. Uma Siddhanta (Module B)

Practicals

1. Haemagglutination assay - tutorial
2. Haemagglutination inhibition assay - tutorial
3. Double immunodiffusion test using specific antibody and antigen.
4. ELISA
5. Western Blotting
6. Immunoprecipitation - demonstration
7. Immunofluorescence - demonstration

Teachers involved: Dr. Uma Siddhanta, Prof. Souvik Roy

Texts & Reading/Reference Lists:

1. Abbas AK, Lichtman AH, Pillai S. (2007). Cellular and Molecular Immunology. 6th edition Saunders Publication, Philadelphia.
2. Delves P, Martin S, Burton D, Roitt IM. (2006). Roitt's Essential Immunology. 11th edition Wiley-Blackwell Scientific Publication, Oxford.
3. Goldsby RA, Kindt TJ, Osborne BA. (2007). Kuby's Immunology. 6th edition W.H. Freeman and Company, New York.
4. Jane, Travers, Walport, Shlomchik. Immunology. 6th or later Edition.
5. Khan FH. The Elements of Immunology. Pearson Publishers.
6. Murphy K, Travers P, Walport M. (2008). Janeway's Immunobiology. 7th edition Garland Science Publishers, New York.
7. Peakman M, and Vergani D. (2009). Basic and Clinical Immunology. 2nd edition. Churchill Livingstone Publishers, Edinburgh.
8. Richard C and Geffrey S. (2009). Immunology. 6th edition. Wiley Blackwell Publication.