Subject Code : P8BC10

CORE COURSE–X - IMMUNOLOGY

Unit 1

Elements of Immunology. Types of immunity- innate and acquired. Humoral and cell mediated immunity. Central and peripheral lymphoid organs- Thymus, bone marrow, spleen, lymph nodes and other peripheral lymphoid tissues- GALT. Cells of the immune system- lymphocytes, mononuclear phagocytes- dendritic cells, granulocytes, NK cells and mast cells, cytokines.
Antigens vs immunogens, Haptens. Factors influencing immunogenicity. Immunoglobulinsstructure, classification and functions. Isotypes, allotypes and idiotypes.

Unit 2

Complement activation and its biological consequences. Clonal selection theory. Organization and expression of immunoglobulin genes generation of antibody diversity. Class switching.
T-cell, B-cell receptors, Antigen recognition- processing and presentation to T-cells. Interaction of T and B cells. Immunological memory. Effector mechanisms- macrophage activation. Cell mediated cytotoxicity, immunotolerance, immunosuppression.

Unit 3

MHC genes and products. Polymorphism of MHC genes, role of MHC antigens in immune response, MHC antigens in transplantation. Transplantation types. Immune responses to infectious diseases- Viral, bacterial and protozoal. Cancer and immune system. AIDS and other immunodeficiency disorders. Autoimmunity. Hypersensitivity- types.

Unit 4

Immunization practices- active and passive immunization. Vaccines- killed, attenuated- toxoids. Recombinant vector vaccines- DNA vaccines, synthetic peptide vaccines- antiidiotype vaccines production of polyclonal and monoclonal antibodies. Principles, techniques and application. Genetically engineered antibodies.
Fractionation of leucocytes by density gradient centrifugation. Identification of lymphocytes and their subsets in blood. Leukocyte migration inhibition technique. Delayed type hypersensitivity technique

Unit 5

Agglutination and precipitation techniques. Immuno-electrophoresis, RIA, immunoblotting, Avidin- biotin mediated immuno assay. Immunohistochemistry- immunofluorescence, immunoferritin technique. Fluorescent immunoassay. Cytokines assay: ELISA and ELISPOT. Production of cytokines in vitro. Interferon production. Abzymes.

Experimental animal models: inbred strains, SCID mice, nude mice, knock out mice cell culture system: Primary lymphoid culture, cloned lymphoid cell lines.

Books recommended

1. Roitt et al. Roitt's. Essential Immunology. 10th ed. Blackwell Sci. 2001.
2. Richard A. Goldsby et al. Kuby Immunology. 4th ed. WH Freeman & Co. 2003.
3. Abbas et al. Cellular and Molecular Immunology. W.B. Saunders Company, 2000.
4. Janeway, C. (Ed), Paul Travers. Immunobiology. 5th ed. Garland Publ. 2001.
5. Eli Benjamini AU et al. Immunology: A short course. 4th ed. Wiley-Liss, 2000.
6. NMS Series in Immunology. 3rd ed. Lippincott Willams & Wilkins.
7. Bier et al. **Fundamentals** of immunology Springer Verlag, 1986.