

M.Sc., III SEMESTER.
SOFT CORE PAPER-2.
ADVANCED CELL BIOLOGY

THEORY

48 Hrs.

UNIT I

8 Hrs

Overview and Cells of the Immune system: (a) Historical account (b) Types of immunity - Innate immunity: Anatomic barriers, Physiologic barriers, Phagocytic barriers, Microbial antagonism, Inflammation (c) Humoral and cell mediated immunity (d) Hematopoiesis (e) Biology of cells of the immune system: Stem cells, NK cells, Macrophages, T Lymphocytes, B-Lymphocytes

UNIT II

8 Hrs

Antigens and Immunoglobulins: (a) Antigenicity and immunogenicity (b) Factors influencing of antigens (c) Epitopes (d) Haptens (d) Classes of immunoglobulins (d) Structure of IgG (e) Kinetics of immunoglobulin synthesis (f) Genetic basis of immunoglobulin diversity (g) MHC molecules – Types and structure (h) Clonal selection and immunological memory (i) Recognition of endogenous antigen (j) Recognition of exogenous antigen

UNIT III

16 Hrs

Cell Cycle and its regulation: (a) Phases of cell cycle (b) Biochemical studies with oocytes, eggs and early embryo (c) Molecular mechanisms regulating mitotic events (d)Regulators of cell cycle progression (c) Cell cycle control in mammalian cells (d) Check points in cell cycle regulation (e) Cell signaling and molecular basis of signal transduction (f) Causes of aging (g) Theories of aging (h) Longevity genes

UNIT IV

16 Hrs

Biology and genetics of Cancer: (a) Neoplasia (b) Epidemiology (c) Development and causes of cancer: types of cancer, development of cancer, causes of cancer, properties of cancer cells, transformation of cells in culture (d) Carcinogens (e) Tumor viruses (f) Oncogenes: Retroviral oncogenes, proto-oncogenes, oncogenes in human cancer, functions of oncogene products (g) Tumor suppressor genes: Functions of tumor suppressor gene products, roles of oncogenes and tumor suppressor genes in tumor development (h) Cancer as a multistep process (i) Cancer therapy: early detection and prevention, molecular diagnosis, treatment. (i) Apoptosis

Tutorials -----16X2 =32 hrs.

Tutorials/ Demonstration:

1. Immunodiffusion
2. Study of mammalian mitotic chromosomes using bone marrow cells
3. Study of mammalian meiotic chromosomes using germ cells
4. Demonstration of human leucocyte culturing technique
5. Preparation of human chromosomes using cultured leucocytes

References:

1. Abbas, A. K., A. H. Lichtman and J.S. Pober. 1994. Cellular and molecular immunology. W.B. Saunders Company.
2. Gelehrter, T.D., F.S. Collins and D. Ginsburg. 1998. Principles of medical genetics. Williams and Williams. NY.
3. Griffiths A. J. F., J.H. Miller., D.T. Suzuki., R.C. Lewontin and W.M. Gelbart. 1996. Introduction to Genetic analysis. W.H. Freeman and Company. NY.
4. Hesketh, R. (ed). 1997. The Oncogene and tumor suppressor gene facts book. Academic press, NY.
5. Kuby, J. 1998. Immunology. W. H. Freeman and Company. NY.
6. Goldsby, .G., Kindt, T. J., Osborne, B. A. And Kuby, J (2003). Immunology. W. H Freeman and Company.
7. Pollard, T.D and Earnshaw, W. C. (2002). Cell biology. Saunders.

