



DRAVIDIAN UNIVERSITY
Centre for Off-Campus Education & Research
Syllabus for M.Phil/Ph.D Zoology
Paper II: Broad Field

Unit - I

Mutations: Types (Spontaneous and Induced), causes and detection, mutant types (lethal, conditional, biochemical, loss of function, gain of function, germinal versus somatic mutants), Molecular basis of mutations, Glycolysis, TCA cycle and their Biomedical importance Pentose phosphate pathway, Gluconeogenesis Regulation of carbohydrate metabolism (Glycolysis and TCA cycle).

Unit - II

Bioluminescence - Chromatophores and regulation of their function - Hibernation & Aestivation - Biological rhythms - Cancer suppressor genes, prevention and treatment Regulation of programmed cell death, caspases and apoptosis, cell death receptors and caspase activation, signaling cell survival

Unit - III

Cell signaling: Models of cell-cell signaling (steroid receptors, nitric oxide and carbon monoxide - Functions of cell surface receptors (G-protein coupled receptors, Tyrosine kinases, cytokine receptors, receptors linked to other enzymatic activities) Pathways of intracellular signal transduction (c-Amp pathways, cyclic cGMP, phospholipids and Ca²⁺, Ras, Raf and MAP kinases) Signalling in development and differentiation (the receptor -tyrosine kinase, Ras, MAP kinase pathway in Drosophila, notch signaling

Unit - IV

Humoral immunity: Immunoglobulins (fine structure of immunoglobulins and immunoglobulin classes); the complement system, Classical and alternate pathway, inflammation - Cell mediated immunity: Mechanism of cell mediated immunity; Brief account on Antigen presentation, Major histocompatibility complex -Antigen - Antibody interactions: Affinity, Avidity, Cross - reactivity, precipitation reactions, and Agglutination reactions and ELISA. -Brief account on immunological disorders: Tolerance and Autoimmunity -Transplantation

Unit -V

Microscopy - Ultracentrifuge- Spectrofluorimeter- Spectrophotometry-Chromatography -Autoradiography -Microtomy and staining procedures -Basic concept of radioactive methods in Biology -Genetic regulation: Induction, Repression, Lac Operon, Lambda Operon -Tryptophan Operon, Britten and Davidson model for Eukaryotic regulation DNA sequencing, DNA finger printing, Polymerase chain reaction cDNA library, Genomic library, Western and Northern blotting