

## ANIMAL DIVERSITY

- **Invertebrates:** Protista: Locomotory Organelles and locomotion in Protozoa. Porifera: Canal System in Sycon. Cnidaria: General characters and classification up to classes. Polymorphism in Hydrozoa. Platyhelminthes: Life history of Taenia solium. Nematelminthes: Life history of Ascaris lumbricoides and its parasitic adaptations. Annelida: Metamerism in Annelida. Arthropoda: Vision in Arthropoda. Metamorphosis in Insects. Mollusca: Torsion in Gastropods. Echinodermata: Water-vascular system in Asteroidea.
- **Vertebrates:** General features and Phylogeny of Protochordata. Agnatha: General features of Agnatha and classification of cyclostomes up to classes. Pisces: Osmoregulation. Amphibia: Parental Care. Reptiles: Poisonous and nonpoisonous snakes, Biting mechanism in snakes. Aves: Flight adaptations. Mammals: Origin of mammals.

## CYTOLOGY AND DEVELOPMENTAL BIOLOGY

- **Cytology:** Organization of cell (prokaryotic and eukaryotic); differences between a plant and animal cell; structure and function of cell membrane, nucleus, chloroplast, mitochondria, endoplasmic reticulum, Golgi complex and lysosome.
- **Early embryonic development:** Gametogenesis: Spermatogenesis and oogenesis wrt mammals. vitellogenesis in birds. Fertilization: external (amphibians), internal (mammals), blocks to polyspermy. Early development of frog and humans (structure of mature egg and its membranes patterns of cleavage, fate map, upto formation of gastrula). Types of morphogenetic movements. Fate of germ layers. Neurulation in frog embryo.
- **Late embryonic development:** Implantation of embryo in humans, Formation of human placenta and functions, other types of placenta on the basis of histology. Metamorphic events in frog life cycle and its hormonal regulation.
- **Control of Development:** Fundamental processes in development (brief idea) – Gene activation, determination, induction, Differentiation, morphogenesis, intercellular communication, cell movements and cell death.

## BIOCHEMISTRY AND MOLECULAR GENETICS

- **Biochemistry:** Structure and functions of proteins, DNA, carbohydrates, lipids & vitamins. Bioenergetics, Glycolysis, TCA cycle, Electron Transport System and ATP synthesis, oxidation and synthesis of fatty acid, membrane structure and function. Techniques: Principles and applications of chromatography, spectroscopy, microscopy, electrophoresis, centrifugation, blotting, PCR & radioisotope techniques.

**Molecular Genetics:**

Principles of inheritance, linkage & crossing over, chromosomal aberrations, extrachromosomal inheritance, replication, transcription, translation, DNA repair. Genetic Material: DNA structure and replication, transcription and translation.



genetics. Biotechnology: Recombinant DNA technology, principles of gene cloning. applications of biotechnology in medicine,

## PHYSIOLOGY

- **Physiology of digestion, respiration and excretion of different phyla:** osmoregulation and endocrine regulation in animals. Pulmonary ventilation. Respiratory volumes and capacities. Transport of Oxygen and carbon dioxide in blood. Heart structure, Origin and conduction of the cardiac impulse. Cardiac cycle. Structure of nephron. Mechanism of Urine formation.
- **Reproductive physiology:** Physiology of male reproduction: hormonal control of spermatogenesis. Physiology of female reproduction: hormonal control of menstrual cycle. Structure and function of pituitary, thyroid, parathyroid, pancreas and adrenal.
- **Physiology of nervous system:** Structure of a neuron. Resting membrane potential and Graded potential. Origin of Action potential and its propagation in myelinated and non-myelinated nerve fibres. Ultrastructure of skeletal muscle. Molecular and chemical basis of muscle contraction.

## ECOLOGY, ENVIRONMENT AND ECONOMIC ZOOLOGY

- **Environment and Economic Zoology**
- **Biosphere, Organizational levels of biosphere, Ecosystem:** Structure and Types. Food Chain and Energy Flow, Population and Community Ecology, Biodiversity and its Conservation, environmental biotechnology. Origin of life: Theories of evolution, genetic drift, speciation, cell organelles, cell division.
- **Insects of Economic Importance and Insects of Medical Importance:** Biology, Control and damage caused by *Helicoverpa armigera*, *Pyrilla perpusilla* and *Papilio demoleus*, *Calliosobruchus chinensis*, *Sitophilus oryzae* and *Tribolium castaneum*; Safe storage of stored grains. Life cycle, medical importance and control of *Pediculus humanus corporis*, *Anopheles*, *Culex*, *Aedes*, *Xenopsylla cheopis*, *Phlebotomus argentipes*.
- **Fish culture technique:** Monoculture, Polyculture and monosex culture. Induced fish breeding, Integrated fish farming

## Suggested reading

- Kapoor: Theory and Practicals of Animal Taxonomy (1988, Oxford & IBH).  
 Simpson: Principles of Animal Taxonomy (1962, Oxford).  
 Dorit, Walker & Barnes: Zoology (1991, Saunders)  
 Taylor, Green & Stout : Biological Sciences (3rd ed. 2005, Cambridge)  
 Mader: Biology (9th ed. 2007, W.C. Brown)  
 Alberts et al: Essential Cell Biology (1998, Garland)  
 Alberts et al: Molecular Biology of the Cell (2008, Garland)  
 Karp: Cell and Molecular Biology (2008, John Wiley)  
 Lodish et al: Molecu  
 Boyer: Concepts in Biochemistry (3rd ed. 2006, Brooks/Cole)  
 Lehninger, Nelson & Cox: Principles of Biochemistry (4th ed, 2007, Worth)  
 Murray et al: Harper's Biochemistry (25th ed. 2000, Appleton & Lange)

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