Subject Code : P8ZO4

CORE COURSE IV - CELL & MOLECULAR BIOLOGY

Unit-I

Cell Membrane

Molecular organization – molecular models – cell permeability – cell surface differentiations and cell – cell communication – membrane receptors and signal transduction patahways

Cytoskeleton and Cell Motility

Microtubules, microfilaments and intermediate filaments – role in cell organization, division and motility.

Methods of Cell Study

Micrometry – cell culture methods – cell fractionation technique – cytochemical staining methods – cytophotometry – immunocytochemistry and autoradiography.

Unit-II

Mitochondria and Energy Transduction

Molecular organization of mitochondria and their role in oxidative phosphorylation.

Nucleus and Chromosomes

Nuclear envelope – Nuclear pore – Nuclear proteins – Nucleosome – exons – introns – extrachromosomal DNA-overlapping genes-Transposble elements Gene amplifications

Unit III

Nucleic Acids and Their Functions

DNA and RNA – Structure, types and functions – Replication of DNA – DNA repair mechanism.

Ribosomes

Morphology, ultrastructure, biochemistry and functions.

Unit-IV

Cell Cycle

Phases of cell cycle – role of cyclin and other molecules – molecular organization and functional significance of mitotic apparatus.

Protein Synthesis

Mechanism of transcription – role of transcription factors – transcription regulators – Genetic code - Processing of mRNA – translation – post translational modifications and control mechanism.

Unit V

Protein Transport

Intracellular compartments and protein sorting
Vesicular traffic in secretary and endocytic pathways, transport from ER through Golgi to lysosome, endosome

Biology of Cancer Cells

Characteristics of Cancer Cells, types of tumours. Apoptosis and its relevance in cancer biology.

Recommended Text Books

CELL AND MOLECULAR BIOLOGY

1. De ROBERTIS, E.D.P. and De ROBERTIS, E.M.F. (1987), Cell and Molecular Biology, VIII Ed., Lea and Febiger, Philadelphia.
2. DAVID FREIFELDER (1998), Molecular Biology, II Ed., Narosa Publishing House, New Delhi.

References

CELL AND MOLECULAR BIOLOGY

1. LEWIS, KELEINSMITH and VALERIS M. KISH (1988), Principles of Cell Biology, Harper and Row Publications, New York.
2. POWAR, C.B. (1983), Cell Biology, Himalaya Publishing House, Bombay.
3. WATSON et al., (1987), Molecular Biology of the Gene, The Benjamin Cummings Publishing Co., Inc., California.