

Z-3603 & Z-3604

CELL AND MOLECULAR BIOLOGY-II & LAB

Cr. 3(2+1)

Theory

Recombinant DNA technology

General Principles, molecular tools involved (vectors, enzymes, expression system) DNA sequencing, chromosome walking, PCR techniques.

Role of Genetic Engineering in Economic Development in the areas of

Medicine and Human Health (Therapeutic Drug, Vaccines, Monoclonal antibodies, Gene therapy, Animal Cloning, Human Genome Project, Stem Cells, Transgenics Ethical issues),
Agriculture (Livestock Health, increase in agricultural produce),
Industry (organic solvents, petroleum industry, ore leaching etc.).

Cytoplasmic Organelle: Membrane system (structural and functional commonalities). Ultrastructure, chemical composition and functions of Endoplasmic Reticulum with special reference to their role in protein synthesis and drug metabolism), Golgi Apparatus (with reference to its role in synthesis of glycoprotein), Mitochondria (with reference to its role in cellular respiration, and its significance as semi-autonomous organelle), Lysosome (with reference to its diverse roles due to hydrolytic activity of enzymes), peroxisome (with reference to metabolism of hydrogen peroxide), glyoxysome (with reference to glyoxylic acid cycle).

Plasma membrane and its functions: Chemical composition and structure of plasma membranes, cell permeability, active transport, endocytosis, phagocytosis.

Cytoskeleton: Microfilaments, Microtubules, Intermediate filaments.

Practicals

Isolation and characterization of proteins on polyacrylamide gel electrophoresis; Western blotting; Cloning and transformation; PCR amplification of DNA.

Books Recommended:

Text Book

1. DeRobertis and DeRobertis Cell And Molecular Biology, 8 Ed., Publisher: Lippincott Williams and Williams (2008)

Books Recommended:

2. Albert, B., Bray, D., Lewis, J., Raff, M. et al. 2002. Molecular Biology of the cell 4th Ed. Garland publishing Inc. New York.
3. Karp G. 2009. Cell and Molecular Biology Wiley; 6 Ed., ISBN-10: 0470483377
4. Harvey Lodish et al. 2000. Molecular Cell Biology 4th Ed. W.M. Freeman, New York.
5. Fobert F. Weaver. 2005. Molecular Biology 3rd Ed. The McGraw Hill companies Inc. International Ed.
6. Bernard R. Glick and Jack J. Pasternate. 1994. Molecular Biotechnology: Principles and applications of Recombinant DNA. ASM press, Washington, D.C., USA.