

PBT5I101 GENETIC ENGINEERING

Module-I

Basic principle of DNA isolation and purification; Restriction endonuclease, Ligase and other modifying enzymes; DNA& RNA Markers, Linker, Adapter and MCS; Gene cloning vectors- Plasmid, bacteriophage, cosmid, BAC, YAC; Expression vectors: basic concept, bacteria and yeast based expression vector; Gene library- genomic and c-DNA, contig library; Polymerase Chain reaction,

Module-II

Basic concept of gene cloning; Cloning of interacting gene: two hybrid and three hybrid assay; Cloning of differentially expressed gene; DNA micro arrays and Chips - principle and manufacturing process; DNA finger printing and DNA foot printing; DNA Sequencing; Site directed mutagenesis; Expression of heterologous gene; In vitro transcription and translation; Gene knock out strategies; RNA interference: Antisense RNA, si RNA and mi RNA; Ribozyme Technology.

Module-III

Molecular markers- Types (RFLP, RAPD, AFLP, SCAR, SSR, SNP, EST), Principle and methodology; Application of molecular markers: in diagnostics, gene tagging, gene mapping, Physical mapping of the genome. Genome analysis using 16S rRNA typing/ sequencing, Genome projects: Human, Rice; Gene therapy and its applications; DNA vaccines and rDNA products; Genetic engineering regulations and safety guidelines.

Text Books:

1. H S Chawla, Plant Biotechnology, Oxford University Press
2. Genetic Engineering, Smita Rastogi & Neelam Pathak, Oxford University Press
3. T A Brown, Gene cloning and DNA Analysis, Black well publishing
4. Primerose et al., Principle of gene manipulation and genomics, Black well publishing.

Reference

1. Sambrooks et al., Molecular cloning (Vol.I,II,II), CSH Press.
2. Spurr N & Young TD, ICRF Hand book of genome analysis, Blackwell