

LESSON PLAN

Class: B. Sc. Biotechnology

Semester: 4th sem

Paper VIII: Recombinant DNA Technology

Session: 2023-24

S. No	Week	Topic
1.	01/01/24-06/01/24	Recombinant DNA Technology and Genetic Engineering: Introduction, history, scope and applications
2.	08/01/24-13/01/24	Tools of Recombinant DNA technology: Steps in gene cloning. Gene cloning tools - Restriction enzymes- class I, II and class III restriction enzymes, their features. Ligases, polymerases, alkaline phosphatases, kinases, transferases and other DNA engineering enzymes
3.	15/01/24-20/01/24	Gene Cloning Vectors: Introduction, nomenclature of vectors, properties of a suitable vector. Plasmid vectors, bacteriophage, cosmids and phagemids. Properties of host. M13 vector
4.	22/01/24-27/01/24	Expression vectors, shuttle vectors. Vectors for cloning in eukaryotic cells, YACs and BACs. In vitro construction of r-DNA molecules
5.	29/01/24-03/02/24	Isolation of gene of interest and vector DNA, cohesive and blunt ends, modification of cut ends, linkers and adaptors. Integration of DNA inserts into the vectors.
6.	05/02/24-10/02/24	Transformation: Techniques of introducing r-DNA into the desired host, competent cells, electroporation and microinjection. Screening and selection of transformants and their characterization,
7.	12/02/24-17/02/24	selection of clone having the specific DNA insert - immunological screening and colony hybridization. Marker genes- selectable and scorable markers.
8.	19/02/24-24/02/24	Gene Libraries: Construction of Genomic and cDNA library, advantages and limitations, screening of gene libraries.
9.	26/02/24-02/03/24	DNA amplification through PCR: Basic features and applications of PCR, types and modifications. Site directed mutagenesis. DNA sequencing techniques: Maxam – Gilbert’s method, Sanger’s dideoxy chain termination method, Automated DNA sequencing.
10.	04/03/24-09/03/24	Genome Mapping: Concept and applications. Restriction enzyme digestion and restriction mapping. Southern and Northern analysis. DNA finger printing. PAGE
11.	11/03/24-16/03/24	Western blotting, dot blots and slot blots. RFLP, RAPD (brief only), microarrays
12.	18/03/24-22/03/24	Gene expression in prokaryotes: expression cassette. Promoters- tissue specific promoters, wound inducible promoters, strong and regulated promoters

13.	23/03/24-31/03/24	Holi break
14.	01/04/24-06/04/24	Increasing protein yield-factors affecting level of recombinant protein production. Production of recombinant proteins in E. coli, translational and transcriptional fusion-advantages and disadvantages
15.	08/04/24-13/04/24	Applications of Recombinant DNA technology: Production of recombinant proteins of pharmaceutical importance-insulin, human growth hormone
16.	15/04/24-20/04/24	Recombinant vaccines (hepatitis B) etc. Transgenic plants and animals.
17.	22/04/24-30/04/24	REVISION AND QUERIES

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