

MOLECULAR BIOLOGY

Unit 1

Identification of DNA as genetic material- Aveng, Merlead, Maccarty experiment – Griffth experiment. Genomic organization - Histone and Non histone protein coding and Non coding DNA - DNA replication semiconservative mode of replication. Enzyme machinery for DNA replication- topoisomerases, polymerases, ligase- supercoiling of DNA. DNA damage and repair photo reactivation excision and post replication- repair.

Unit 2

Transcription. RNA polymerase, strages of transcription, inhibitors of RNA synthesis, reverse transcription. Post transcriptional modification of t RNA, r RNA and m RNA.

Unit 3

Genetic code: Major features of genetic code and Wobble hypothesis. Gene-Cistron, recon, muton, one gene one enzyme hypothesis.

Translation- structure of prokaryotic and eukaryotic ribosomes. Mechanism of translation- amino acid activation, initiation, elongation and termination. Inhibitors of protein synthesis. Post translation modification of protein

Unit 4

Gene expression- prokaryotic transcriptional regulation. Enzyme induction and repression. The operon hypothesis. Lac, trp operons.

Unit 5

Genetic engineering: Vehicles for cloning- plasmids, phages and cosmids. Restriction

endonucleases and their applications. Splicing of DNA molecules- cohesive end, poly dA-dT tailing and blunt end ligation methods. Outlines of gene cloning: plasmids, cosmids as vectors. Restriction endonucleases and ligases- selection of clones. Applications of genetic engineering in medicine

References:

1. Molecular Cell Biology – Lodish.
2. Principles of Biochemistry – Lehninger.
3. Molecular Biology – Freifelder.
4. Molecular Biology of the Cell – Bruce Albert.
5. Molecular Biology of the Gene – Watson.
6. Biochemistry. Davidson and Sittmann, NMS 4th edn. Lippincott Williams and Wikins, 1999.