

## CSIR NET UNIT 3 Syllabus

### FUNDAMENTAL PROCESSES

CSIR NET UNIT 3 focuses on DNA replication, repair, recombination, RNA synthesis and processing, protein synthesis and processing, and control of gene expression. Topics include replication machinery, transcription factors, translation processes, and gene regulation mechanisms.

CSIR NET UNIT 3	Topics
A) DNA Replication, Repair, and Recombination	<ul style="list-style-type: none"><li>- Unit of replication</li><li>- Enzymes involved</li><li>- Replication origin and replication fork</li><li>- Fidelity of replication</li><li>- Extrachromosomal replicons</li><li>- DNA damage and repair mechanisms</li><li>- Homologous and site-specific recombination</li></ul>
B) RNA Synthesis and Processing	<ul style="list-style-type: none"><li>- Transcription factors and machinery</li><li>- Formation of initiation complex</li><li>- Transcription activator and repressor</li><li>- RNA polymerases</li><li>- Capping, elongation, and termination</li><li>- RNA processing, editing, splicing, and polyadenylation</li><li>- Structure and function of different types of RNA</li><li>- RNA transport</li></ul>
C) Protein Synthesis and Processing	<ul style="list-style-type: none"><li>- Ribosome</li><li>- Formation of initiation complex</li><li>- Initiation factors and their regulation</li><li>- Elongation and elongation factors</li><li>- Termination</li><li>- Genetic code</li><li>- Aminoacylation of tRNA</li><li>- tRNA-identity, aminoacyl tRNA synthetase, and translational proofreading</li><li>- Translational inhibitors</li><li>- Post-translational modification of proteins</li></ul>

D) Control of Gene Expression

- Regulation of phages, viruses, prokaryotic, and eukaryotic genes
- Role of chromatin in gene expression and gene silencing
- Transcription and translation level control

**Study tips for CSIR NET UNIT 3:** Create timelines for DNA processes, practice identifying key components in RNA and protein synthesis, understand genetic code intricacies, explore various gene expression regulatory mechanisms, and use mnemonic devices for effective memorization.

BioTECHNIKA