

S.R.R&C.V.R Govt. Degree College

DEPARTMENT OF BIOCHEMISTRY

BOARD OF STUDIES- AY 2019-20

DATE - 19/02/2019



For program MBC

BIOCHEMISTRY SYLLABUS FOR V SEMESTER

BIOCHEMISTRY - PAPER - VI

MOLECULAR BIOLOGY & r DNA TECHNOLOGY

Periods: 60

Max. Marks: 60

Unit- I: Gene & genome

- ✓ 1.1 Organisation of genetic material ;
- 1.2 Experiments to prove DNA as genetic material ;
- ✓ 1.3 Concept of gene, Nature and structure of gene.
- 1.4 DNA replication- models of replication, Meselson-Stahl's experimental proof for semi conservative model. DNA polymerases I, II and III of E.coli, helicase, topoisomerases, primase, ligase.
- 1.5 Mechanism of DNA Replication. Bidirectional replication model. Okazaki fragments. leading and lagging strands of DNA synthesis.
- ✓ 1.6 Inhibitors of DNA replication.

UNIT- II: DNA Replication and Transcription in prokaryotes

- 2.1 Transcription - RNA synthesis, RNA polymerases of prokaryotes. Promoters, Initiation sigma factors and their recognition sites. Elongation- role of core enzyme Termination- rho dependent and rho-independent.
- 2.2 Regulation of prokaryotic gene expression at transcriptional level- Lac operon concept.
- ✓ 2.3 Introduction to post transcriptional modifications-mRNA capping, polyadenylation, splicing.

Unit- III Protein Synthesis and Regulation of Gene Expression

- 3.1 Genetic code, deciphering of genetic code.
- 3.2 Wobble hypothesis, degeneracy of genetic code.
- 3.3 Protein synthesis- activation of amino acids (aminoacyl t-RNA synthetase).
- 3.4 Ribosome structure. Initiation, elongation and termination of protein synthesis.
- ✓ 3.5 Introduction to Post- translational modifications.
- ✓ 3.6 Inhibitors of protein synthesis.

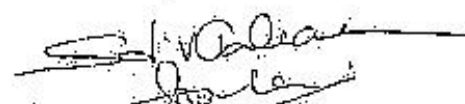
Unit-IV: Recombinant DNA Technology

- 4.1 Outlines of cloning strategies.
- 4.2 Tools of r-DNA technology: Enzymes- Restriction endonucleases, T4 DNA ligase, E.coli DNA ligase phosphatases, reverse transcriptase, polynucleotide kinases, terminal transferases.
- 4.3 Cloning vectors- Plasmids, λ phage vectors, cosmids. Expression vectors-E.coli.
- ✓ 4.4 Construction of c-DNA and Genomic libraries. Isolation of cloned genes- Colony hybridization.

Unit V -Applied Biochemistry

- 5.1 DNA sequencing- Maxam Gilbert and Sanger's method.
- 5.2 Polymerase chain reaction- principle and applications.
- 5.3 Outlines of blotting techniques- Southern, Northern and Western.
- 5.4 Applications of gene cloning- production of insulin and human growth hormone. production of Bt cotton and golden rice.

Additional inputs: C-Value paradox, Telomerase, Signal hypothesis.



BIOCHEMISTRY PRACTICAL SYLLABUS FOR V SEMESTER
BIOCHEMISTRY - PAPER - VI
MOLECULAR BIOLOGY & rDNA TECHNOLOGY

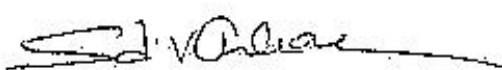
Periods: 30

List of Experiments:

Max. Marks: 50

2. Estimation of DNA by diphenylamine method.
3. Estimation of RNA by orcinol method.
4. Preparation of Buffer stocks (TBE, TE and TAE)
5. Agarose Gel Electrophoresis (AGE).
6. Extraction of DNA from Agarose gel
7. Plasmid Isolation (Mini prep)
8. Extraction of DNA from Fish Fins
9. Isolation of RNA
10. Restriction Digestion





BIOCHEMISTRY SYLLABUS FOR V SEMESTER

BIOCHEMISTRY - PAPER - V

IMMUNOLOGY & ENDOCRINOLOGY

Periods: 60

Max. Marks: 60

UNIT - I Overview of Immune system

- 1.1 Introduction to basic concepts in Immunology.
- 1.2 Innate immunity-mechanism and types of acquired immunity.
- 1.3 Cells of immune system.
- 1.4 Organs of immune system, immune response.

UNIT - II Antigens and Antibodies & Immune system in Health and Disease

- 2.1 Basic properties of antigens, factors influencing immunogenicity.
- 2.2 Haptens and adjuvants.
- 2.3 Structure of antibody, classes and functions of antibodies.
- 2.4 Classification and brief description of various types of hyper sensitivities.
- 2.5 Types of autoimmunity.

Unit - III Immunological techniques

- 3.1 Major histocompatibility complexes.
- 3.2 Monoclonal antibodies.
- 3.3 General introduction to Vaccines, Types of vaccines.
- 3.4 Antigen-antibody reactions-Agglutination, Precipitation, ELISA, RIA.

Unit - IV Endocrinology I

- 4.1 Organization of endocrine system.
- 4.2 Classification of hormones.
- 4.3 Mechanism of hormonal action/ signal transduction pathways.
- 4.4 Pituitary hormones - GH, TSH, LH, FSH, oxytocin and vasopressin (physiological role).

Unit - V Endocrinology II

Structure, physiological role and disorders of:

- 5.1 Hormones of pancreas- insulin, glucagon.
- 5.2 Thyroid, parathyroid hormones.
- 5.3 Hormones of Adrenal glands:-
- 5.4 Introduction to gastrointestinal hormones.
- 5.5 Reproductive hormones-Estrogen, progesterone.

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BIOCHEMISTRY PRACTICAL SYLLABUS FOR V SEMESTER
BIOCHEMISTRY - PAPER - V
IMMUNOLOGY & ENDOCRINOLOGY

Periods: 24

Max. Marks: 50

List of Experiments:

- ✓ 1. Collection of serum from blood.
2. Determination of blood group and Rh typing. ✓
3. HCG based pregnancy test. ✓
4. Glucose tolerance test. ✓
5. Indirect ELISA
6. Sandwich ELISA
7. Direct ELISA
8. Purification of IgG Antibodies with Ammonium Sulphate
9. Ouchterlony Double Diffusion - Titration
10. Ouchterlony Double Diffusion - Patterns

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