PACIFIC MEDICAL UNIVERSITY

BHILO KA BEDLA, UDAIPUR

SYLLABUS FOR Ph.D ENTERANCE EXAMINATION IN BIOCHEMISTRY

Metabolism.

Vitamins, Hormones and Nutrition.

Genetics and Molecular biology

METABOLISM:

Intermediary metabolism of carbohydrates, Lipids and Proteins and their Inter-relationships, Biological Oxidations, Metabolism of purines and pyrimidines, nucleic acids, Nucleoproteins, Mineral Metabolism. Inborn errors of metabolism.

VITAMINS, HORMONES AND NUTRITION:

Chemistry and Functions of Vitamins and Hormones; Bio-chemistry of blood clotting and respiration. Acid base balance,Muscle contraction. Minerals and their role in nutrition. Nutrition in Health and Disease. Detoxication, Chemical structure and biological activity of antibiotics. Nitrogen fixation. Fermentation.

GENETICS AND MOLECULAR BIOLOGY:

1. The structure and Function of Proteins.

I. Introduction.

II. Classification of proteins.

III. General structure of proteins.

(A) Amino acids.

(B) The peptide bond.

(C) Primary structure.

(D) Protein conformation.

(E) Quantenary structure.

(F) Isozymes.

(G) Multi-enzyme complexes.

IV. Genaral properties of proteins.

(A) Proteins and ampholytes.

(B) Molecular weights.

(C) Proteins as antigens.

V. Effect of mutation.

(A) Protein structure.

(B) Protein properties.

2. Genes, Proteins and the Control of Gene Expression

I. Introduction.

(A) Genotype and phenotype.

(B) The gene.

(C) Mutation.

(D) Complementation.

II. Some established aspects of genetic regulation.

(A) The opron.

(B) Bacteriophage Lambda.

(C) Translational control in RNA bacteriophage.

(D) Autogenous regulation.

III. Genetic regulation of Mammalian protein.

(A) Regulatory aspects of inborn errors.

(B) Expression of specialized proteins in differentiated cells.

(C) The induction of protein synthesis by hormones.

IV. Genetic regulation and development.

(A) Hierarchies of control.

(B) Chromosomal proteins.

(C) Models of genetic regulation.

V. Expression of the differentiated phenotype in vitro.

(A) Analysis of differentiation in culture tumour by cell fusion.

(B) Mechanism of extinction re-expression of luxury functions in hybrids.

(C) Analysis of malignancy.

(D) Taratomas.

VI. Antibody biosynthesis and the generation of antibody diversity.

(A) Antibody biosynthesis.

(B) The problem of antibody diversity.

(C) VE markers in the rabbit and mouse.

(D) A gene stitching model.

(E) Somatic mutation.

VII. Gene clustersin eukaryotes.

VIII. Inserted sequences in structural genes.

IX. Conclusion.

3. Chromosomes and Protein Variation.

I. Introduction.

II. The human chromosomes.

(A) Identification and linear differentiation.

(B) Variability.

(C) Variability and linear differentiation.

(D) Human BHA and the number of genes in man.

III. Mapping.

IV. Protein studies in chromosomal disorders.

(A) Studies of the products of localized.

(B) Further biochemical studies in autosoma anomalies.

(C) Discussion.

(D) Expression of gonosomal genes.

(E) Aneuploidy and the cell cycle.

V. Nuclear organization.

VI. New trends in the analysis of human genome.

4. Polymorphism, Selection and Evolution.

I. Introduction.

II. Selection

(A) Theoretical considerations.

(B) Selection in human populations.

III. Evolution.

(A) Gene flow and anthropology.

(B) General considerations and conclusions.

5. Enzyme Polymorphism.

I. Introduction.

II. Polymorphic enzyme systems.

III. An attempt at a syntheses.

6. Inherited variation in Plasma Proteins.

I. Introduction and scope of chapter.

II. Techniques for recognizing inherited variation in proteins.

(A) Gel electrophoresis.

(B) Immunological techniques.

III. Polymorphism.

(A) Established and high probable polymorphisms.

(B) Some possible polymorphisms.

IV. Rare Variations.

V. Comparative summary of polymorphisms prospects for further investigation.

7. In born Errors of metabolism.

I. Introduction.

II. Molecular concepts.

(A) Structural and control genes.

(B) Dominance and recessiveness.

III. Experimental approach.

(A) General considerations.

(B) Indirect approach.

(C) Direct approach.

IV. Tissue distribution.

V. Heterogenity.

(A) Non allergic genes.

(B) Allergic genes.

VI. Heterozygote detection.

(A) Autosomal recessive transmission.

(B) X-linked recessive transmission

VII. Prenataldetection.

(A) Techniques.

(B) Results.

(C) Future prospects.

VIII. Classification of inborn errors of metabolism.

8. The Immunoglobulinopathies.

I. Introduction.

II. The immunoglobulins.

(A) General introduction

(B) Immunoglobulin genetic markers (Allotypes) in man.

(C) The immunogenetics basis for antibody diversity.

(D) Genetics of the immune response.

(E) Biosynthesis and metabolism of immunolobulins.

(F) Development of immunoglobulins before and after parturition.

III. The immunoglobulinopathies.

(A) Classification and definition of terms.

(B) Hyperimmunoglobulinaemia.

(C) The paraimmunoglobulinopathies.

(D) Hypoimmunoglobulinopathies.

- Clinical and operation theatre equipments

Flame photometer-spectroflurophotometer-pH meters