

References:

1. Nutritional Biochemistry, Tom Brody (1994) Academic Press.
2. Frontiers in Nutrition, Ed. T. Wilson and N.J. Temple, (2000), Humana
3. Nutrition & Health in Developing Countries, eds. R. Semba and M.W. Bloem, (2000), Humana.
4. Food and Nutrition, Swminathan

BCS 454: GENERAL VIROLOGY: SOFT CORE

Lecture Hours: 42

Total Credits: 03

Course Objectives

- To study the properties, nomenclature and classification of viruses
- To isolate, cultivate and purify different types of viruses
- To detect viruses by various assay methods
- To study the major characteristics of different families of viruses

UNIT-I

14 Hours

History: Discovery of viruses and development of Virology. Nature, origin and evolution of viruses. Properties of viruses : Physical- morphology and structure, sedimentation, electrophoretic mobility, buoyant density. Biochemical- chemical composition, nucleic acids, proteins, enzymes, lipids, carbohydrates, polyamines, cations. Antigenic nature of viruses. Biological host range, transmission (vector and non-vector), virus stability. Nomenclature and classification of viruses: Criteria used for naming and classification. Current ICTV classification of viruses of bacteria, plants and animals and humans.

UNIT-II

14 Hours

Isolation, cultivation, assay and maintenance of bacterial, plant and animal viruses : Experimental plants and tissue cultures. Experimental animals, embryonated eggs, organ cultures, primary and secondary cell cultures, suspension and monolayer cell cultures, cell strains, cell lines. Purification of viruses : Need for virus purification. Extraction of viruses from tissues, clarification, concentration of viruses in clarified extracts by physical and chemical methods, further purification of viruses by rate zonal / equilibrium density gradient centrifugation. Criteria of virus purity. Quantitation and preservation of purified virus preparations.

UNIT-III

14 Hours

Quantitation of viruses: Infectivity assay methods (plaque, pock, end point, local / systemic assay of plant viruses), physical (EM), serological (HA, HI, immunofluorescence, ELISA) and chemical (viral protein and nucleic acid based) approaches. Major characteristics of the following virus families / genera / groups : Adenoviridae, Bromoviridae, Bunyaviridae, Caulimoviridae, Flaviviridae, Geminiviridae, Hepadnaviridae, Herpesviridae, Orthomyxoviridae, Paramyxoviridae, Parvoviridae, Picornaviridae, Potyviridae, Poxviridae,

Reoviridae, Retroviridae, Rhabdoviridae, Coronaviridae, Tobamovirus, Insect Viruses: Biology of major RNA and DNA viruses of insects and their applications.

Course Outcome

- Knowledge in properties, nomenclature and classification of viruses
- Familiarity in isolation, cultivation and purification different types of viruses
- Detection of viruses by various assay methods
- Familiarity in major characteristics of different families of viruses.

References

1. Virology: Principles and Applications: John B Carter Reviews, John Wiley & Sons, Limited, 08-Mar-2013 - 400 page
2. Principles of Virology: 2000. by S.J. Flint et al., ASM Press.
3. Introduction to Modern Virology. 2001. 5th ed. Dimmock et al., Blackwell Sci. Publ. Principles of Molecular Virology. 1997. 2nd ed. A. Cann. Academic Press.
4. Basic Virology, 1999. By Waginer and Hewelett, Black Well Science Publ.
5. Medical Virology. 1994. 4th edition. D.O. White and F.J. Fenner. Academic Press. Plant Virology. 2001. 4th ed. By R. Hull. Academic Press.
6. Fundamental Virology, 4th ed. 2001. D.M. Knipe and P.M. Howley.

BCS 455: METABOLISM OF FUEL MOLECULES:

SOFT CORE

Lecture Hours: 42

Total Credits: 03

Course objectives:

- To learn basic concepts of bioenergetics
- To know the mitochondrial electron transport
- To understand the metabolic pathways of carbohydrates and lipids
- To study the synthesis and breakdown of phospholipids

Unit I

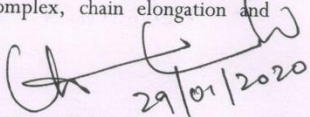
14 hrs.

Metabolism: Catabolism, anabolism, catabolic, anabolic and amphibolic pathways. **Carbohydrate metabolism** - Glycolysis, energetics, regulation. Pathways of utilization of pyruvate, lactate, ethanol, gluconeogenesis, regulation, citric acid cycle, its regulation, energetics, anaplerosis, glyoxylate cycle, HMP pathway, Enter - Doudoroff, Glucuronate and Glyoxylate pathway, Cori cycle, Futile cycles and anaplerotic reactions. Interconversion of hexoses. Biosynthesis of sucrose. **Glycogen and starch** degradation, synthesis and regulation, glycogen storage disorders. Regulation of blood glucose level, hypoglycemia and hyperglycemia. Pentosuria, fructose and lactose intolerance, fructosuria, galactosemia.

Unit II

14 hrs.

Lipids- Degradation of triacylglycerols and phospholipids- lipase, hormone sensitive lipase phospholipases. Fatty acid degradation -Beta oxidation, Knoop's experiment, saturated and unsaturated FA, Regulation, α and ω oxidation, Energetics, Biosynthesis of FA- FA synthetase complex, chain elongation and


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