

INTERMEDIARY METABOLISM

Sem	Sub Code	Category	Lecture		Theory		Practical		Credit
			Per week	Per sem.	Per week	Per sem.	Per week	Per sem.	
VI	21CBC6B	Core	4	60	4	60	-	-	4

COURSE OBJECTIVE:

To enable the students to learn and comprehend the pathways of intermediary metabolism of biomolecules, and discuss their bioenergetics, correlate the metabolic activity of tissues and organs with their function.

COURSE OUTCOMES:

On the successful completion of the course, students will be able to

CO Number	CO statement	Knowledge level (K1-K4)
CO1	Understand and relate the function of specific anabolic and catabolic pathways	K2
CO2	Students will analyze the importance of carbohydrate metabolism to energy production.	K4
CO3	Provides a clear knowledge on the substrates and the products of committed steps in fatty acid biosynthesis.	K2
CO4	Provide an understanding on the significance of proteins to the processing of amino acids in the creation of metabolic intermediates	K4
CO5	Understand how nucleotides regulate their de novo and salvage synthesis and their interconversions in the cell	K1

*CO – course Outcomes

Knowledge Level: K1 – Remember; K2 – Understand; K3 – Apply; K4 – Analyze.

MAPPING WITH PROGRAMME OUTCOMES:

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	M	S	S	S	S
CO2	S	M	S	S	M	M
CO3	M	M	M	L	S	M
CO4	M	L	L	M	L	L
CO5	L	L	M	M	M	L

(S- Strong; M-Medium; L-Low)

UNIT I

Introduction to Intermediary Metabolism and Biological Oxidation 10 Hours

Basic metabolic pathways -catabolism, anabolism and amphibolism. Biological transport chain, components of electron transport chain, structure of ATPase complex, Inhibitors of ETC, Oxidative phosphorylation - Chemiosmotic hypotheses, P/o ratio, uncouplers of oxidative phosphorylation.

UNIT II

Carbohydrate Metabolism 10 Hours

Glycolysis - energetics and its regulation, TCA cycle, anaplerotic and amphibolic nature of TCA cycle, Glycogenesis and Glycogenolysis, Gluconeogenesis, Cori cycle.

UNIT III

Lipid Metabolism 15 Hours

Biosynthesis of Fatty acid, Fatty acid synthase complex, mitochondrial synthesis of unsaturated fatty acids, Biosynthesis of cholesterol and its regulation. Biosynthesis of triglycerides and phospholipids - (Cephalin, Lecithin, Sphingomyelin). Degradation of fatty acids by beta – Oxidation, Formation of ketone bodies.

UNIT IV

Protein Metabolism and Detoxification 10 Hours

Degradation of Proteins – Transamination, Oxidative deamination, Non – oxidative deamination and decarboxylation of amino acids, Biogenic amines – biosynthesis and function. Urea cycle. Detoxification mechanism in liver – phases of detoxification.

UNIT V:

Nucleic acid Metabolism

15 Hours

Biosynthesis of Purine nucleotides - De novo synthesis, Salvage pathway, Catabolism of purine nucleotides. Biosynthesis of Pyrimidine nucleotides- De novo and salvage pathways, Catabolism of Pyrimidine nucleotides, Regulation of purine and pyrimidine metabolism. Uriotelic and Uricotelic systems.

DISTRIBUTION OF MARKS: Theory - 100% and Problems – Nil

TEACHING METHODOLOGY:

- Black Board
- Power Point Presentations
- Assignments
- Models
- Demonstrations

TEXT BOOKS:

S. NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	U. Satyanarayana, U.Chakrapani	Biochemistry	Books and Allied (P) Ltd	2010

REFERENCE BOOKS:

S.No	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1	J L Jain	Fundamentals of Biochemistry	S Chand	2016
2	Donald Voet, Judith G.Voet , Charlotte W Pratt	Fundamentals of Biochemistry	John Wiley& Sons.	1999

3	David L. NelsonMichael Cox	Lehninger Principles of Biochemistry	Cox-CBS Publishers	2017
4	Murray R K	Harper's illustrated Biochemistry	P.A. Mayes and U.W.Rodwell - Lange Medical publications	2006
5	Chatterjee	Textbook of Medical Biochemistry	Jaypee brothers medical Publishers (p) Ltd	2012

WEB SOURCES:

- <http://themedicalbiochemistrypage.org/carbohydrates.html>
- https://en.wikibooks.org/wiki/Category:Book:Structural_Biochemistry
- www.oreilly.com/library/view/biochemistry-for-nurses/9788131768563/xhtml/chapter008.xhtml

SYLLABUS DESIGNER:

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