## NPTEL- DTH Swayamprabha Video Lectures in Biochemistry

Biochemistry aims to train medical students to acquire the knowledge to deeply understand the precision of cellular events and prepares them to apply this in relevance to clinical medicine. A sound knowledge of biochemistry is a prerequisite to make the medical curriculum holistic and provide a sustainable foundation for a successful medical career.

Biochemistry being a preclinical subject has to train the medical students by providing a platform to understand the chemical structure and changes that drives the life. Knowledge of biochemistry is essential for understanding the maintenance of health, causes and the rationale for treatment of many diseases.

The scope of Biochemistry is vast and provides a strong foundation for research in all branches of medical science. It provides a basis to study various basic functions of the body and hence is a necessity to understand the physiology of the various systems of a human body.

Modern day medical practice is highly dependent on laboratory analysis of body fluids especially the blood. The manifestations of various diseases are also closely monitored and reviewed with various biochemical findings. Biochemistry prepares a medical graduate in understanding the basis of the judicious use of various biochemical investigations and to realize that it is an integral component of diagnosis and monitoring of treatment. Thus Biochemistry study is inevitable to draw a significant margin or demarcate the abnormal from normal constituents of the body.

Thus Biochemistry, today is regarded as the most rapidly developing discipline of medicine.

## 1.1. BIOCHEMISTRY

### 1.1.1. BLOCK 1 – ENZYMES

| S.NO | BLOCK 1: ENZYME TOPICS | FACULTY | DURATION |
|---|---|---|---|
| 1.1 | Active site | Dr. Pragna Rao | 30 min |
| 1.2 | Mechanism of enzyme action | Dr. Vinutha. R. Bhat | 30 min |
| 1.3 | Applications and importance of factors affecting enzyme action | Dr. Krishnananda Prabhu. R. V. | 30 min |
| 1.4 | Coenzymes and cofactors | Dr. Krishnananda Prabhu. R. V. | 30 min |
| 1.5 | Types of enzymes | Dr. Nagamma. T | 30 min |
| 1.6 | Zymogens | Dr. Indira Adiga. K. | 30 min |
| 1.7 | Isoenzymes | Mr. Bijay. K. Barik | 30 min |
| 1.8 | Role of enzymes in IEM | Dr. Anupama Hegde | 30 min |
| 1.9 | Epigenetics | Dr. Babi Dutta | 30 min |
| 1.11 | Post translational modifications | Dr. Chandrika. D. Nayak | 30 min |
| 1.12 | Clinical applications of enzyme inhibition | Dr. Chandrika. D. Nayak | 30 min |

### 1.1.2. BLOCK 2 - AMINOACIDS

| S.NO | BLOCK 2: AMINO ACIDS & PROTEIN CHEMISTRY | FACULTY | DURATION |
|---|---|---|---|
| 2.1 | understanding structural organization of proteins as a basis for understanding its function | Dr. Ravindra Maradi | 30 min |
| 2.2 | Plasma proteins in health and disease | Dr. Maya Roche | 30 min |
| 2.3 | Sources of Ammonia, detoxification and associated disorders | Dr. Ravindra Maradi | 90 min |
| 2.4 | Overview of metabolism of the following amino acids and its application in understanding the associated inborn errors of metabolism and build up of secondary metabolites i. Glycine ii Sulphur containing amino acids | Dr. Ravindra Maradi | 60 min |
| 2.5 | Overview of neurotransmitter metabolism with emphasis on myasthenia gravis and Parkinson's disease | Dr. Nagamma. T | 30 min |

### 1.1.3. BLOCK 3 - HEME METABOLISM; ROLE OF LIVER

| S.NO | BLOCK 3: HEME METABOLISM; ROLE OF LIVER | FACULTY | DURATION |
|---|---|---|---|
| 3.1 | heme containing compounds, structure of heme, understanding reactions of heme synthesis to relate it with the biochemical basis of lead poisoning and findings in porphyria cutanea tarda and acute intermittent porphyria | Dr. Krishnananda Prabhu. R. V. | 90 min |
| 3.2 | Application of structural knowledge of hemoglobin in understanding the genetics and pathogenesis of major hemoglobinopathies | Dr. Krishnananda Prabhu. R. V. | 30 min |
| 3.3 | Catabolism of heme | Dr. Chandrika. D. Nayak | 30 min |
| 3.4 | Formation and fate of bilirubin | Dr. Chandrika. D. Nayak | 30 min |
| 3.5 | Jaundice: A introduction classification and causes of each type with emphasis on physiologic jaundice | Dr. B. Shivananda Baliga | 30 min |
| 3.6 | Biochemical basis for findings and role of laboratory investigations in differential diagnosis | Dr. Vijetha Shenoy Belle | 60 min |
| 3.7 | Alcohol metabolism | Dr. Chandrika. D. Nayak | 30 min |
| 3.8 | Biochemical basis for consequences of acute alcohol intoxication | Dr. Chandrika. D. Nayak | 30 min |

### 1.1.4. BLOCK 4 - CARBOHYDRATES

| S.NO | Block 4: CARBOHYDRATES | FACULTY | DURATION |
|---|---|---|---|
| 4.1 | Carbohydrate absorption, enzymes involved, glycemic index and factors affecting absorption | Dr. Krishnananda Prabhu. R. V. | 30 min |
| 4.2 | Glucose transporters and disorders | Dr. Krishnananda Prabhu. R. V. | 30 min |
| 4.3 | Regulation of blood glucose, fate of absorbed glucose, preferntial use of glucose in normal and abnormal conditions | Dr. Ravindra Maradi | 60 min |
| 4.4 | Screening, diagnosis & monitoring of diabetes mellitus newer markers | Dr. Guruprasad Rao | 60 min |

### 1.1.5. BLOCK 5 - LIPIDS

| S.NO | BLOCK 5: LIPIDS | FACULTY | DURATION |
|---|---|---|---|
| 5.1 | Lipoprotein structure, chemistry and functions | Dr. Ullas Kamath | 30 min |
| 5.2 | LDL receptors and metabolism; Lp(a) | Dr. Vijetha Shenoy Belle | 30 min |
| 5.3 | Biochemistry of atherosclerosis | Dr. Vijetha Shenoy Belle | 30 min |
| 5.4 | Role of mitochondria in lipid metabolism | Dr. Vijetha Shenoy Belle | 30 min |
| 5.5 | Cholesterol important aspects of its structure and biochemical functions | Dr. Somashekar Shetty | 30 min |
| 5.6 | Extended lipid profile (fasting vs non-fasting) | Dr. Varashree B. S. | 60 min |
| 5.7 | Digestion and absorption (Lipases & inhibitors, reesterification, importance of bile & its clinical significance) | Dr. Krishnananda Prabhu. R. V. | 30 min |
| 5.8 | Inborn errors of lipid metabolism (Lipid storage, lysosomal, oxidation disorders) | Mr. Babi Dutta | 30 min |
| 5.9 | Biochemistry of lipid lowering agents | Dr. Rukmini M. S. | 30 min |
| 5.11 | VLDL, fatty liver & lipotropic factors | Dr. Pragna Rao | 30 min |
| 5.12 | Understanding ketosis: Conditions predisposing to ketone body formation and their significance | Dr. Chandrika. D. Nayak | 30 min |
| 5.13 | Sweets are fattening: The carbohydrate to fat link | Dr. Chandrika. D. Nayak | 30 min |
| 5.14 | Adipose tissue metabolism | Mr. Sambit Dash | 30 min |
| 5.15 | Dysregulation of lipid metabolism in diabetes mellitus | Mr. Abhishek Chaturvedi | 30 min |
| 5.16 | Hyperlipoproteinemias | Dr. Somashekar Shetty. B. | 30 min |