

BIOCHEMISTRY

1. Cell Revision of ultrastructure of the cell, functions of various cellular constituents. Applications of biochemical principles to the pharmacy.
2. Carbohydrates Types of carbohydrates, their functions, digestion, & absorption. Aerobic & anaerobic oxidation with energetics. Glycogenesis, glycogenolysis, & gluconeogenesis. Hexose monophosphate shunt [HMP shunt]. Diseases associated with carbohydrate metabolism.
3. Proteins Different types of proteins. Their functions, digestion & absorption. Denaturation & its effect on biological activity. Renaturation of proteins. Urea formation, urea cycle, creatinine formation. Transamination & deamination. Proteins as enzymes.
4. Lipids Different types of lipids. Their functions, digestion, absorption & metabolism. (Beta-Oxidation of fatty acids with energetics. Biosynthesis of cholesterol [from acetate], adrenocorticoids, androgens, progesterone, estrogens, & bile acids / salts. Ketone bodies, their formation & biochemical significance. Diseases associated with lipid metabolism.
5. Vitamins Definition. Classification, structures [except B12] biochemical role, sources, daily requirements, & deficiency symptoms. Vitamins as co-factors in biochemical reactions.
6. Biological oxidations & reductions Oxidation-reduction systems in the body their role. Oxidative phosphorylation & Electron transport chain. Cytochromes & inhibitors of the same.
7. Enzymes Classification & their various roles. Enzyme co-factors. Enzyme kinetics. Michaelis-Menton equation along with its transformations. Double reciprocal plot. Factors affecting enzyme action. Enzyme inhibition, competitive & non-competitive, & kinetics.
8. Nucleic acids Different types of nucleic acids [NAs] & their composition. Purine & pyrimidine bases, sugars, & phosphoric acid. Nucleosides & nucleotides. Formation of NAs & their backbone. Different ways of representing DNA & RNA molecules. Physico-chemical properties of NAs. Their stability in acidic & basic solutions. Isolation, purification & identification, buoyant density, sedimentation coefficient, & Svedberg constant of NAs. De-novo biosynthesis of NAs. DNA & the Watson - Crick Model & its features. DNA as the bearer of genetic information. The Central dogma of molecular genetics & the processes defined in the same. Replication of DNA. Different types of RNAs with their special features & functions. Minor or rare bases. Transcription & translation. Different post-translational modifications of proteins. Triplet codon & the codon dictionary. Mutations. An introduction to different types of mutations. Their nature & repair.
9. Hereditary diseases. Elyptocytosis, spherocytosis, HNPCC, diabetes insipidus.