

Key notes of Biochemistry

1. The proteins can be separated on the basis of mass in chromatography called size exclusion chromatography.
2. The biological membranes are negatively charged at pH 7 is due to the fact that the membranes are made of phospholipids. The phosphate group imparts negative charge to the membrane.
3. The first regulatory enzyme of glycolysis is phosphofructokinase.
4. Animals cannot convert acetyl-CoA derived from fatty acids into glucose; plants and microorganisms can.
5. Formation of one molecule of glucose from pyruvate through gluconeogenesis requires 4 ATP, 2 GTP, and 2 NADH.
6. In mammals, gluconeogenesis in the liver and kidney provides glucose for use by the brain, muscles, and erythrocytes.
7. Three irreversible steps in the glycolytic pathway are bypassed by reactions catalyzed by gluconeogenic enzymes: (1) conversion of pyruvate to PEP via oxaloacetate, catalyzed by pyruvate carboxylase and PEP carboxykinase; (2) dephosphorylation of fructose 1,6-bisphosphate by FBPase-1; and (3) dephosphorylation of glucose 6-phosphate by glucose 6-phosphatase.
8. The pentose phosphate pathway is the source of ribose sugar and NADPH.
9. The NADH is required for catabolic processes and NADPH is required for anabolic processes.
10. The glucose-6-phosphate is utilized by three pathways viz. Glycolysis, pentose phosphate pathways and glycogenesis.
11. Gluconeogenesis is regulated at the level of pyruvate carboxylase (which is activated by acetyl-CoA) and FBPase-1 (which is inhibited by fructose 2,6-bisphosphate and AMP).
12. Glucagon or epinephrine decreases [fructose 2,6-bisphosphate]. The hormones do this by raising [cAMP] and bringing about phosphorylation of the bifunctional enzyme that makes and breaks down fructose 2,6-bisphosphate. Phosphorylation inactivates PFK-2 and activates FBPase-2, leading to breakdown of fructose 2,6-bisphosphate. Insulin increases [fructose 2,6-bisphosphate] by activating a phosphoprotein phosphatase that dephosphorylates (activates) PFK-2.
13. The glycogen phosphorylase that is required for breakdown of glycogen is stimulated by hormones glucagon and epinephrine.
14. The glycogen synthase is stimulated by hormone insulin.
15. TCA cycle produces three numbers of NADH and one GTP and one FADH₂.
16. One molecule of Acetyl CoA upon complete oxidation yields 10 number of ATPs.
17. The beta oxidation of fatty acids occurs in mitochondria. But in animals cells, the reaction also peroxisomes.
18. The α oxidation of fatty acids occurs in endoplasmic reticulum.
19. The reactions of ω -oxidation, occurring in the endoplasmic reticulum, produce dicarboxylic fatty acyl intermediates, which can undergo β -oxidation at either end to yield short dicarboxylic acids such as succinate.
20. Ketone Bodies, Formed in the Liver, Are Exported to Other Organs as Fuel.
21. Glutamic acid is the important amino acid for transport of nitrogen.
22. Alanine serves as a carrier of ammonia and of the carbon skeleton of pyruvate from skeletal muscle to liver. The ammonia is excreted and the pyruvate is used to produce glucose, which is returned to the muscle.