

This course deals with the various aspects of break down and synthesis of the main bioorganic compounds. This includes carbohydrates, proteins, fats and nucleic acids. The main focus will be on the generation and consumption of energy. The overall coordination of the various metabolic pathways will be stressed.

### Syllabus

1. A general consideration of overall metabolism.
2. Carbohydrate metabolism.
  - A. Glycolysis: from glucose to pyruvate.
  - B. Interrelationships in glycolysis and gluconeogenesis.
  - C. Stereochemical relationships in citrate metabolism.
  - D. Glyoxylate and gluconeogenesis.
  - E. ATP production in mitochondria.
  - F. Chemiosmotic theory.
  - G. Photosynthesis.
3. Synthesis and degradation of fatty acids.
  - A. Fatty acid synthase.
  - B. Parallels in synthesis and degradation of fatty acids.
4. Metabolism of 20 amino acids.
  - A. Outline of biosynthesis of 20 amino acids.
  - B. The nitrogen cycle.
  - C. Degradation of amino acids.
5. Synthesis and breakdown of nucleotides.
6. Synthesis of complex carbohydrates.
7. Locations of the main cell structures involved in metabolism.
8. Processing of oligosaccharides.
9. Sorting of proteins.
10. Synthesis of complex lipids.
11. Glycolipid synthesis.
12. Formation of cholesterol and its derivatives.
13. Fate of cholesterol in liver and dietary cholesterol.
14. Adenylate cyclase.
15. Phosphatidylinositol pathway.
16. Hormone synthesis and secretion.

### Suggested references

1. M. Campbell and S. Farrel, Biochemistry, Thomson Brooks/Cole. USA, 2006.
2. C. Mathews and K. vanHolde, Biochemistry, the Bingamin/Cummings publishing Company, Inc. New York, 1990.
3. D. Voet and J. Voet, Biochemistry, John Wiley and Sons, Inc. New York 2006.
4. G. Zubay, Biochemistry, Addison-Wesley Publishing Company. USA, 2007.