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BOOK REVIEW

Human Biochemistry and Disease

(by Gerald Litwack, Elsevier, Amsterdam-Boston-Heidelberg-London-New-York-Oxford-Paris, 2008, 1254 p., $199.95)

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The book consists of 17 chapters, three appendixes, terminological glossary, and subject index. In the preface the author states that the idea of writing this book was based on his desire to encourage dialogue between biochemists, who usually know rather little about disease, and clinicians, for whom biochemistry can be a challenging subject that is often not utilized effectively for treatment of disease. The structure and content of this book is based on many years of the author's experience teaching biochemistry to medical students.

Chapter 1 is an introduction containing general concepts of the human body and organ systems, as well as information about various tissues, cell structure, intracellular organelles, mechanisms of cell movement, receptors, biological role of water, and structure of ion channels.

Chapter 2 is devoted to proteins. Major attention is given to normal protein conformation and disease-associated mutations that result in changes in native protein conformation. For example, mad cow disease is discussed as an example of a disease state that arises due to misfolding of protein with unaltered amino acid sequence. Changes in protein molecules can also be due to substitution of a native amino acid to another amino acid that does not exist in the amino acid sequence of the normal protein. This chapter also considers basic steps of protein biosynthesis, including multiple types of post-translational modifications.

Chapter 3 highlights enzymes, including topics in clinical enzymology and it significance in the diagnosis of disease. A special part of this chapter considers the use of enzymes and their inhibitors as pharmacological drugs.

Chapter 4 describes carbohydrates and diseases related to certain abnormalities in their metabolism. A significant place in this chapter is devoted to characterization of various type of diabetes. There is also information about structure of mono-, oligo-, and polysaccharides such as starch and glycogen.

In chapter 5 there is discussion related to biochemical aspects of lipid metabolism. As examples of diseases with dysfunction of lipid metabolism, the chapter considers hypercholesterolemia, abnormalities in metabolism of fatty acids, phospholipids, and glycolipids. A part of this chapter is devoted to lysosomal storage diseases—Gaucher, Fabry, Krabbe, Tay–Sachs, Sandhoff, Niemann–Pick, and metachromatic leukodistrophy. Disorders related to abnormalities in metabolism of lipoproteins are also discussed using familial hyper- and hypolipoproteinemia, hyperhylomicronemia, and others as examples.

Chapter 6 highlights nucleic acids and molecular genetic of diseases as results of various types of mutation in DNA sequence. As examples of such type of diseases, Huntington's and Lesch–Nyhan diseases are discussed along with gene therapy approaches for treatment.

Chapter 7 deals with transcription and diseases associated with aberrant transcription, such as asbestosis.

Chapters 8 and 9 discuss data about polypeptides and steroid hormones and disorders developing as result of abnormalities in their biosynthesis or in mechanisms of their action.

Chapter 10 highlights basic metabolic pathways and such disruptions of metabolism as hyperammonemia and urea cycle disorders. There is consideration of amino acids metabolism in the normal state and diseases with deficiency of enzymes involved in an amino acid pathway. There is presentation of metabolic pathways with designation of enzyme deficiency in phenylketonuria, albinism, creatinism, tyrosinosis, and alkaptonuria.

Chapter 11 is devoted to characterization growth factors and cytokines.

Chapter 12 describes membrane transport and related diseases such as cystic fibrosis. Special parts of this chapter contain data about passive ion transport, osmosis, and diffusion.

In chapter 13 there is a discussion about the role of metals and vitamins in the diet and also part of this chapter describes diseases associated with deficiency of these compounds in nutrition, e.g. anemia as result of dietary iron deficiency.

Chapter 14 describes the blood and lymphatic system. The molecular basis of deep vein thrombosis is dis-

cussed. There is also description of blood group factors and their relationship with certain diseases.

Chapter 15 deals with immunobiochemistry and autoimmune diseases such as erythematosus, Grave's disease, insulin-dependent diabetes mellitus, and complement system's disorders.

Chapter 16 highlights diseases related to neurobiochemistry. The author focuses attention on mechanisms of pain as a symptom of neurological disease. There is discussion of definition of acute and chronicle pain and their relationship with certain types of receptors. There is a discussion of neurons as a pain transmitters, as well as information on neuropeptides involved in pain transmission, opioid hormones, receptors, neurotransmitters, catecholamines, monoamines, and amino acids. A part of this chapter deals with structure and chemistry of brain tissue.

Chapter 17 summarizes data about microbial biochemistry and diseases caused by viruses and microbes. Human immunodeficiency virus (HIV) that causes the syndrome known as acquired immunodeficiency syndrome (AIDS) is also discussed. This chapter contains detailed discussion on all steps of HIV penetration into host cells, its duplication, and the following events of this deadly disease. One part of this chapter describes the interaction of influenza viruses with host cells. There is also a description of molecular mechanisms underlying severe acute respiratory syndrome (SARS) caused by the action of certain coronaviruses. One of sections the of this chapter deals with various bacteriophages, viruses that infect bacterial cells. Mechanisms of microbial infection by *Escherichia coli* are also discussed.

Appendix 1 consists of a table with amino acid characterization (molecular weight, abbreviation, chemical properties). Appendix 2 contains data about the genetic code (base pairing, codon position). Units of weights and measures are listed in Appendix 3.

The book includes also glossary of terms and a subject index.

The book is well illustrated; it contains over a thousand full-color pictures and schemes, thus helping the readers to assimilate book content better.

This book is rather large in volume and scope. It will undoubtedly be a desktop manual for many researchers in the field of biochemistry, medicinal chemistry, and researchers specializing in pharmacology and molecular medicine. This book can be a very useful tool for teachers and students of colleges and universities.

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