Nesters Microbiology A Human Perspective 8th edition Anderson Solutions Manual

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Chapter 2 The Molecules of Life

Overview

All living organisms are built of chemicals; thus to understand the function and structure of microorganisms, it is necessary to understand their chemistry. This chapter presents the basic concepts of chemistry as it relates to the biological sciences, with a slant towards topics and terminology important for microbiology. The chapter includes an introduction to atoms and the major elements of organic compounds, chemical bonding, special properties of the H_2O molecule, and pH. The chapter closes with a discussion of the 4 major classes of organic large molecules found in cells: carbohydrates, lipids, proteins, and nucleic acids (ATP is included in the latter class). The structure and function of the most important molecules found in microorganisms is presented.

The case presentation discusses a patient with lactose intolerance, and focuses on the role of bacteria in producing lactose intolerance symptoms, as well as diagnosis of this condition.

Learning Objectives

These are taken from the learning outcome headings of each chapter section – instructors may find it useful to use and/or modify these to provide students with a framework for making a study guide.

After studying the material in this chapter, you should be able to:
1. Describe the general structure of an atom and its isotopes.
2. Describe the importance of valence electrons.
3. Compare and contrast ionic bonds, covalent bonds, and hydrogen bonds.
4. Explain the role of an enzyme in chemical reactions.
5. Describe the properties of water, and explain why it is so important in biological systems.
6. Explain the concept of pH, and how the pH of a solution relates to its acidity.
7. Describe the role of buffers.
8. Describe the characteristics of the different groups of carbohydrates.
9. Compare and contrast the structure and function of simple lipids, compound lipids, and steroids.
10. Compare and contrast the factors that affect protein structure and function.
11. Compare and contrast the chemical compositions, structures, and major functions of DNA, RNA, and ATP.

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