

CHAPTER OVERVIEW

14: BIOMOLECULES - NUCLEIC ACIDS

LEARNING OBJECTIVES

When you have completed Chapter 14, you should be able to

1. fulfill all of the detailed objectives listed under each individual section.
2. draw the structure of a given nucleotide.
3. discuss the structure of DNA and RNA.
4. describe the processes involved in DNA replication, transcription, translation, and protein synthesis.
5. define, and use in context, the key terms introduced in this chapter.

Two types of nucleic acids are found in cells—deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). These highly complex substances are built up from a number of simpler units, called nucleotides. Each nucleotide consists of three parts: a phosphoric acid residue, a sugar and a nitrogen-containing heterocyclic base. Thus, in order to understand the biochemistry of the nucleic acids, you must first study the chemistry of the sugars (see Chapter 25) and simple heterocyclic systems. We have already discussed certain aspects of the structure of heterocyclic ring systems during our study of aromaticity (Sections 15.5–15.6). You may find it helpful to review this chapter.

Chapter 14 examines the structure and replication of DNA and then describes the structure and synthesis of RNA. The chapter closes with a brief study of the role played by RNA in the biosynthesis of proteins.

[14.1: Chapter Objectives](#)

[14.2: Nucleotides and Nucleic Acids](#)

[14.3: Base Pairing in DNA - The Watson-Crick Model](#)

[14.4: Replication of DNA](#)

[14.5: Transcription of DNA](#)

[14.6: Translation of RNA - Protein Biosynthesis](#)

[14.7: DNA Sequencing](#)

[14.8: DNA Synthesis](#)

[14.9: The Polymerase Chain Reaction](#)

[14.10: Additional Problems](#)

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