

CHAPTER OVERVIEW

12: BIOMOLECULES- AMINO ACIDS, PEPTIDES, AND PROTEINS

LEARNING OBJECTIVES

When you have completed Chapter 26, you should be able to

1. fulfill all of the detailed objectives listed under each individual section.
2. use the information provided by an amino acid analysis, an Edman degradation and a carboxypeptidase hydrolysis to determine the structure of an unknown polypeptide.
3. outline the approach that you would use to synthesize a given peptide, providing appropriate mechanistic details if requested to do so.
4. define, and use in context, the key terms introduced in this chapter.

Amino acids are important biochemicals, as they are the building blocks from which proteins and polypeptides are assembled. We begin this chapter with an examination of some of the fundamental chemistry of amino acids: their structures, stereochemistry and synthesis. We then discuss the nature of peptides and of the peptide bond, and present the complex issue of determining the order in which the various amino-acid residues occur in a given peptide. Once a chemist knows the exact order of the residues in a given peptide, the next challenge is to determine a method by which the same peptide can be prepared in the laboratory. Thus, two sections are devoted to the problem of protein synthesis. The final sections in the chapter deal with the classification, overall structure and denaturation of proteins.

[12.1: Introduction](#)

[12.2: Structures of Amino Acids](#)

[12.3: Amino Acids, the Henderson-Hasselbalch Equation, and Isoelectric Points](#)

[12.4: Synthesis of Amino Acids](#)

[12.5: Peptides and Proteins](#)

[12.6: Amino Acid Analysis of Peptides](#)

[12.7: The Edman Degradation](#)

[12.8: Peptide Synthesis](#)

[12.9: The Merrifield Solid-Phase Technique](#)

[12.10: Protein Structure](#)

[12.11: Enzymes and Coenzymes](#)

[12.12: How do Enzymes Work? Citrate Synthase](#)

[12.13: Summary of Reactions](#)

[12.14: Additional Problems](#)

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