

Contents

LIST OF CONTRIBUTORS	v
PREFACE	vii
CONTENTS OF VOLUME II	xiii

Chapter 1

Amino Acid Analysis of Peptides and Proteins

ALBERT LIGHT AND EMIL L. SMITH

I. General Introduction	2
II. Preparation of Material for Analysis	3
III. Evolution of Amino Acid Analysis--From Macrochemistry to Microchemistry	5
IV. Analysis of Intact Protein	9
V. Estimation of Free Amino Acids	20
VI. Methods of Protein Hydrolysis	32
VII. Conclusions and Recapitulation	37
References	39

Addendum to Chapter 1

Amino Acid Composition of Certain Proteins

G. R. TRISTRAM AND R. H. SMITH

Tables	46
References	51

Chapter 2

Synthesis and Function of Peptides of Biological Interest

KLAUS HOFMANN AND PANAYOTIS G. KATSOYANNIS

I. Introduction	54
II. Synthesis of Peptides	55
III. Synthetic Pituitary Hormones	108
IV. Biologically Active Protein Fragments	141
V. Structure-Function Relations	149
VI. Specificity of Peptides	172
References	174

*Chapter 3***Chemical Aspects of Protein Synthesis**

JOSEPH S. FRUTON

I. Introduction	190
II. Experimental Criteria of Protein Synthesis	191
III. "Activation" of Amino Acids	195
IV. Specificity of Amino Acid Incorporation into Peptide Chains	214
V. Amino Acid Incorporation by Nonmicrosomal Subcellular Elements	249
VI. Are Peptides Intermediates in Protein Synthesis?	254
VII. Special Aspects of the Biosynthesis of Individual Proteins	271
VIII. Conclusion	286
References	287

*Chapter 4***Concepts and Experimental Approaches in the Determination of the Primary Structure of Proteins**

ROBERT E. CANFIELD AND CHRISTIAN B. ANFINSEN

I. Introduction	311
II. Methods for the Determination of the Covalent Structure of Proteins	312
III. Primary Structures of Specific Proteins	357
IV. Future Development of Sequence Analysis	371
References	372

*Chapter 5***Intramolecular Bonds in Proteins****I. The Role of Sulfur in Proteins**

R. CECIL

I. Introduction	380
II. Analytical Methods	380
III. The Reactions of Sulfhydryl, Disulfide, and Thio Ether Groups in Proteins	391
IV. The Functions of Sulfhydryl, Disulfide, and Thio Ether Groups in Proteins	456
References	466

*Chapter 6***Intramolecular Bonds in Proteins****II. Noncovalent Bonds**

HAROLD A. SCHERAGA

I. Introduction	478
II. Nature of Noncovalent Interactions	478
III. Statistical Thermodynamic Theories of Noncovalent Interactions	480
IV. Denaturation	542
V. Influence of Noncovalent Interactions on Other Protein Reactions	561
VI. Conclusions	579
Appendix A: Matrix Method for Evaluation of Lifson-Roig (LR) Partition Function	580
Appendix B. Partition Functions for the Structure of Water and Aqueous Hydrocarbon Solutions	584
Appendix C. Peller's Theory for the Helix-Coil Transition	587
AUTHOR INDEX	595
SUBJECT INDEX	625