

Contents

Part I Basic Structural Principles

1. The Building Blocks

Proteins are polypeptide chains
The genetic code specifies 20 different amino acid side chains
Cysteines can form disulfide bridges
Peptide units are building blocks of protein structures
Glycine residues can adopt many different conformations
Certain side-chain conformations are energetically favorable
Many proteins contain intrinsic metal atoms
Conclusion
Selected readings

2. Motifs of Protein Structure

The interior of proteins is hydrophobic
The alpha (α) helix is an important element of secondary structure
The α helix has a dipole moment
Some amino acids are preferred in α helices
Beta (β) sheets usually have their β strands either parallel or antiparallel
Loop regions are at the surface of protein molecules
Schematic pictures of proteins highlight secondary structure
Topology diagrams are useful for classification of protein structures
Secondary structure elements are connected to form simple motifs
The hairpin β motif occurs frequently in protein structures
The Greek key motif is found in antiparallel β sheets
The β - α - β motif contains two parallel β strands
Protein molecules are organized in a structural hierarchy
Large polypeptide chains fold into several domains

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