

Formation of the three-dimensional structures of proteins

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In this paper the phenomenon of the folding of proteins to their compact native conformations is reviewed. It begins from general considerations on the unique secondary structures of the peptide segments. It is stressed that the tertiary structures of proteins are determined by a variety of physical, chemical and biological factors, e.g. amino acid composition and sequence, short-, medium- and long-distance interactions, interactions between the environment and the protein molecule and biological functions. In the following chapter the alcohol-induced unfolding of proteins was analyzed. It is postulated that, in fact, each unfolding process is a multistate conformational transition. The reconstitution of disulfide bonds from sulfhydryl groups is discussed, and some of its implications for the phenomenon of protein folding are considered. Following this, a number of experimental results on the refolding of the protein fragments into the unique three-dimensional native structures are given. In the two last chapters the influence of cis-trans isomerism of proline residues on the refolding process in vitro and the mechanisms of protein folding are discussed.