

An Alternative Structure Model for the Polypentapeptide in Elastin

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Polypentapeptides (GVGVP)_n which are designed in analogy to the connective tissue protein elastin are reported to transform various kinds of energy into mechanical work by the so-called ΔT_t -mechanism in cross-linked macroscopic polypentapeptide (PPP) films. In the literature, the responsible element of conformation in such polypeptides is described as a β -spiral and the ΔT_t effect is explained as a sudden change of macroconformation of single polypeptide molecules from an extended but not regular state below a transition temperature T_t to the β -spiral above T_t . We examined the secondary structure of the linear PPP C(GVGVP)₆ in solution with DSC, CD, UV absorption, FTIR and NMR spectroscopy. The results suggest that the β -spiral is not present in the conformational structure of the PPP molecules. The antiparallel β -sheet is proposed to be the basic regular part of conformation because it agrees with all spectroscopic data. As a consequence, the elasticity of natural elastin must be considered from a new perspective.

Key words: Peptides, Elastin, β -Spiral