

Analysis of Core Region from Egg White Lysozyme Forming Amyloid Fibrils

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Abstract :

Some of the lysozyme mutants in humans cause systemic amyloidosis. Hen egg white lysozyme (HEWL) has been well studied as a model protein of amyloid fibrils formation. We previously identified an amyloid core region consisting of nine amino acids (designated as the K peptide), which is present at 54-62 in HEWL. The K peptide, with tryptophan at its C-terminus, has the ability of self-aggregation. In the present work we focused on its structural properties in relation to the formation of fibrils. The K peptide alone formed definite fibrils having β -sheet structures by incubation of 7 days under acidic conditions at 37°C. A substantial number of fibrils were generated under this pH condition and incubation period. Deletion and substitution of tryptophan in the K peptide resulted in no formation of fibrils. Tryptophan 62 in lysozyme was suggested to be especially crucial to forming amyloid fibrils. We also show that amyloid fibrils formation of the K peptide requires not only tryptophan 62 but also a certain length containing hydrophobic amino acids. A core region is involved in the significant formation of amyloid fibrils of lysozyme.

Key Word :

lysozyme, amyloid fibril formation, core region, tryptophan, egg white.

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