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Structural Polymorphism of Lysozyme Amyloid Fibrils

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According to the modern concepts, polymorphism of amyloid fibrils can be the cause of the differences in its cytotoxicity, as well as the variability of amyloidosis. The aim of this work was to study the structure and properties of the lysozyme amyloid fibrils obtained under various conditions (at different concentrations of the denaturing agent guanidine hydrochloride) using a wide range of physicochemical methods, including specially elaborated ones. As a

result, the difference was shown: 1) the propensity of amyloid fibers to interact with each other and the size of their clusters; 2) secondary structure and microenvironment of tryptophan residues of amyloid-forming proteins; 3) the characteristics of the fibrils interaction with the amyloid-specific probe thioflavin T (ThT), as well as 4) the resistance of amyloids to the action of the ionic detergent sodium dodecyl sulfate and boiling. Our results indicate the polymorphism of the studied protein aggregates. The results of the work allowed us to conclude that the obtained amyloid fibrils are an attractive object for further research aimed at identifying the relationship between the structure of amyloids and their cytotoxicity.

Keywords: amyloid fibrils, lysozyme, structural polymorphism, thioflavin T, guanidine hydrochloride, equilibrium microdialysis