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POSTER ABSTRACT PRESENTATIONS

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# Abstract P-38: Comparative Study of the Structure of Amyloid Fibrils Formed From Lysozyme and Beta-2-microglobulin

Anna I. Sulatskaya[1], Maksim I. Sulatsky[1], Evgeny B. Pichkur[2], Irina M. Kuznetsova[1], Konstantin K. Turoverov[1,3]

*[1]Institute of Cytology of the Russian Academy of Science, St. Petersburg, Russia; [2]National Research Center «Kurchatov Institute», Moscow, Russia; [3]Peter the Great St. Petersburg Polytechnic University, St. Petersburg, Russia*

**Background:** The accumulation of amyloid fibrils in tissues and organs is a marker of a large number of diseases, such as Alzheimer's, Parkinson's, prion diseases, etc. Recent studies showed that the structure of these protein aggregates can affect their cytotoxicity. The aim of this work was a comparative study of the fibrils formed from lysozyme and beta-2-microglobulin, which are the cause of systemic lysozyme and hemodialysis amyloidosis, respectively.

**Methods:** We used a wide range of physicochemical approaches: cryo-electron microscopy to visualize tested objects, a number of spectroscopic approaches to study photophysical properties and secondary structure of aggregates, as well as absorption, steady-state and time-resolved fluorescence spectroscopy to characterize their interaction with a specific fluorescent probe thioflavin T. Tested solutions were prepared by equilibrium microdialysis technique.

**Results:** We showed that amyloids formed from lysozyme and beta-2-microglobulin are unbranched fibers up to 1000 nm long. Lysozyme fibrils are thinner and tend to laterally interact with each other to form beams. Evaluation of the samples secondary structure indicated a lower proportion of beta-sheet structure (forming the core of the fibrils), and a greater proportion of disordered structure (which can participate in the interaction of fibrils with each other) for lysozyme amyloids. Furthermore, we found mode of thioflavin T binding to lysozyme fibrils (which is absent in beta-2-microglobulin fibrils) that according to earlier hypotheses is due to the interaction of the dye with fibrillar clots.

**Conclusion:** Our results indicate that despite the similar morphology of amyloids formed from lysozyme and beta-2-microglobulin, the secondary structure of these fibers differs markedly. Observed features of lysozyme fibrils structure can cause their tendency to interact with each other and form clusters, which can increase their stability and resistance to the effects of various external factors, such as proteolytic degradation or chaperones, due to the reduced availability of some fibers areas inside the

bundle. The results of the work can be used for further studies aimed to identifying the relationship between the structure of amyloids and their cytotoxicity.

**Key Words**: lysozyme • beta-2-microglobulin • amyloid fibrils • structural features

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