POLYMORPHISM OF PRION PROTEIN AMYLOID FIBRILS

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Protein aggregation into amyloid fibrils is linked to multiple neurodegenerative disorders, such as Alzheimer‘s, Parkinson‘s or Creutzfeldt-Jakob disease [1]. Usually each disease is related to aggregation of different protein or peptide, but structural polymorphism in amyloid aggregates of the same protein in vivo can lead to different pathologies [2]. It is believed that formation of structurally distinct amyloid fibrils is related either to the changes in protein amino acid sequence or to the different conditions of aggregation.

We have studied 120 samples of mouse prion protein (MoPrP 89-230) amyloid aggregates formed at six different conditions. Thioflavin T fluorescence assay revealed that polymorphism of amyloid fibrils is not only environment-dependent, but may also be observed between the samples aggregated at identical conditions. The structural differences between samples were confirmed by the assessment of the secondary structure by Fourier transform infrared spectroscopy and morphological variability observed by atomic force microscopy.

[1] H. Khanam, A. Ali, M. Asif, and Shamsuzzaman, “Neurodegenerative diseases linked to misfolded proteins and their therapeutic approaches: A review,” *Eur. J. Med. Chem.*, vol. 124, pp. 1121–1141, Nov. 2016.

[2] M. Fändrich, S. Nyström, K. P. R. Nilsson, A. Böckmann, H. LeVine, and P. Hammarström, “Amyloid fibril polymorphism: a challenge for molecular imaging and therapy,” *J. Intern. Med.*, vol. 283, no. 3, pp. 218–237, Mar. 2018.