Poster

Design, study and possible biomedical applications of the coiled coil nanofibrils.

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Recently, we designed a short α-helical fibril-forming peptide (αFFP) that can form α-helical nanofibrils at acid pH (Potekhin *et al.*, 2001). The non-physiological conditions of the fibril formation hamper biomedical application of αFFP. It was hypothized that electrostatic repulsion between glutamic acid residues presented at positions (g) of the αFFP coiled coil sequence prevent the fibrillogenesis at neutral pH, while their protonation below pH 5.5 triggers axial growing of the fibril. To test this hypothesis, we synthesized αFFPs where all glutamic acid residues were substituted by glutamines or serines. The electron-microscopy study confirmed that the modified αFFPs form nanofibrils in a wider range of pH (2.5 to 11). Circular dichroism spectroscopy, sedimentation, diffusion and differential scanning calorimetry showed that the fibrils are α-helical and have elongated and highly stable cooperative tertiary structures (Melnik *et al.*, 2003). This work leads to a better understanding of interactions that control the fibrillogenesis of the αFFPs and opens opportunities for their biomedical application.

1. S.A. Potekhin, T.N. Melnik, V. Popov, N.F. Lanina, A.A. Vazina, P. Rigler, A.S. Verdini, G. Corradin, A.V. Kajava, *De novo* design of fibrils made of short α-helical coiled coil peptides, Chem. & Biol., 8, (2001), 1025-1032.

2. T.N. Melnik, V. Villard, V. Vasiliev, G. Corradin, A.V. Kajava and S.A. Potekhin, Shift of fibril-forming ability of the designed α-helical coiled coil peptides into the physiological pH region, Prot. Eng. 16 (12), (2003), 1125-1130.