Investigation of antimicrobial propensities of amyloidogenic peptides derived from sequences of bacterial ribosomal proteins S1

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The prospects for the use of natural and artificially synthesized antimicrobial peptides (AMPs) are currently being discussed. However, the amyloidogenic properties of such antimicrobial peptides are rarely considered. Recent work has examined development strategies based on the amyloidogenic properties of AMPs [Previously published in: Kurpe SR et al. (2020) Int J Mol Sci 21(24), 9552.] Prediction and theoretical analysis of amyloidogenic regions based on the sequences of bacterial ribosomal proteins S1 was performed using the FoldAmyloid, Aggrescan, Waltz and PASTA 2.0 programs. The predicted peptides were synthesized using the Fmoc methodology. The amyloidogenic properties of the synthesized peptides were experimentally studied using electron microscopy and fluorescence spectroscopy. [Previously published in: Grishin SY et al. (2020) Int J Mol Sci 21(15), 5199]. The antimicrobial effect of peptides on bacterial cells was assessed by spectrophotometry. The proteome of peptide-treated and intact cells was compared by mass spectrometry. Determination of toxicity for eukaryotic cells was assessed using a cell viability assay with resazurin. [Previously published in: Kurpe SR et al. (2020) Int J Mol Sci 21(17), 6382]. The described specific amyloidogenic regions can be potential targets for modulating the aggregation properties of bacterial ribosomal S1 proteins. The obtained results are important for understanding the process of fibrillogenesis of amyloidogenic peptides with antimicrobial activity and can be used to develop new AMPs against pathogenic microorganisms. This study was supported by the Russian Science Foundation (project no. 18-14-00321).