Four-antennary oligoglycines and their potential as capturing agents for lipopolysaccharides in aqueous media

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Four-antennary oligoglycines (T4) are able to self-organize in aqueous media into hydrophilic nanoaggregates called tectomers. The driving force in the formation of these self-assemblies is the onset of a highly coordinated intermolecular networks of H-bonds. Therefore, the size distribution and properties of the tectomers may be finely tuned by e.g. changes in pH, addition of salts, etc. Earlier it has been established that such tectomers could be used to detect and capture traces of bacterial lipopolysaccharides (LPS) from bacteria Escherichia coli EH100 [1]. In the current presentation a systematic study of aqueous solutions of T4-LPS mixtures is presented. The influence on the formation and stability of 4-LPS complexes, of the endotoxin concentration and the changes in the pH of the solutions in a wide pH range (pH=3-12), is investigated in detail. We have applied a combined experimental protocol including measurements of dynamic and equilibrium surface tension at the air/solution interface, the surface dilational rheology of the adsorption layers and examination on the behavior of the microscopic foam films. Bulk solution properties like sizes and charges of tectomers, LPS, and their complexes, are looked through using the method of Dynamic Light Scattering.

The obtained data give valuable evidences regarding the detailed mechanisms of formation and stability of the tectomers and of LPS-T4 complexes. The results might serve as a basis for further design and fine tuning of complex aqueous systems aimed at the development of e.g. quick tests for purity of drinking water, for biomedical diagnostic purposes, etc.

Acknowledgements:

The studies are performed under the umbrella of COST Action MP1106 “Smart and green interfaces – from single bubbles and drops to industrial, environmental and biomedical applications” (SGI). S.S. acknowledges the World Federation of Scientists for PhD scholarship.

References: