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Interaction of DOPG model membranes with the saponin aescin

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Saponins are ususally plant derived amphiphiles which exhibit strong physiological effects. In the present contribution we discuss the saponin ß-aescin with respect to its interaction with model membranes made of the negatively charged lipid 1,2-dioleoyl-sn-glycero-3-phosphoglycerol (DOPG). The study is conducted at a pH value at which aescin is negatively charged as well, and mixtures up to an aescin content of 50 mol% (equivalent to a molecular ratio of 1:1) were investigated, so that the cmc of aescin is exceeded by far. Analysis of the system by scattering and NMR methods was performed with respect to two reference systems made of the bare components: DOPG SUVs and aescin micelles. Wide-angle X-ray scattering (WAXS) was used to determine molecular correlation distances for both kinds of molecules, and small-angle neutron and X-ray scattering (SANS and SAXS) revealed a structural picture of the system, which was further confirmed by diffusion-ordered nuclear magnetic resonance spectroscopy (DOSY-NMR). Contrary to the expected solubilization of the DOPG membrane, most probably none- or only weakly-interacting, separated DOPG SUVs and aescin micelles were found [1]. This is in line with prelimnary results from neutron spin-echo (NSE). The study highlights the importance of using independent methods to characterize a rather complex colloidal system in order to obtain a complete picture of the structures formed.

[1] F. Gräbitz-Bräuer et al.; Colloid and Polymer Science (2023) 301:1499–1512

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