Quatsomes: a novel, thermodynamically stable nanovesicle system

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Thermodynamically stable nanovesicles form a distinguished and particularly interesting class of vesicles, especially for pharmaceutical applications that require a long shelf-life and outstanding vesicle integrity during blood circulation. Due to the poor long-term stability of liposomes, there is a large interest in identifying alternative, non-phospholipid building-blocks, which self-assemble into stable vesicles and satisfy the quality standards for pharmaceutical formulations. We have developed a new nanovesicle system based on the self-assembly of quaternary ammonium surfactants and sterols in aqueous phases.[1] These non-liposomal bilayer vesicles, which we have termed quatsomes, show diameters of about 40 nm, exhibit positive charged surfaces, and can be precisely decorated with multiple targeting groups.

Here we present experimental as well as theoretical evidence that quatsomes form a thermodynamic equilibrium system. Next to the outstanding stability of these nanovesicular architectures and the high homogeneity in vesicle size, lamellarity and composition,[2] we will discuss some further quatsome characteristics that substantiate their high potential for applications in nanomedicine, such as a low toxicity and the possibiltity to be used as protein nanocarriers[3,4] as well as for bioimaging[5,6].

References

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