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Determination of the structure of a new nanoscaled ultrasound contrast agent

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Ultrasound active liposomes currently have gained a lot of interest as therapeutic agents for targeted drug delivery. A well known problem is their fast clearance from the circulation and thus the short time frame for drug release. The use of ultrasound as external trigger for drug release is attractive because it can be easily focused and only few adverse effects on the healthy tissue can be observed.

To prolong the blood circulation kinetics the liposome surface can be modified with poly(ethylene glycol) (PEG) derivatives to prepare so called 'Stealth' liposomes[1]. Lin and Thomas described that the PEG content in the liposome membrane influences the drug release during ultrasound application [2].

A new ultrasound contrast agent composed of dipalmitoylphosphatidylcholine or distearoylphosphatidylcholine and varying concentrations of polyethyleneglycol-40stearate was prepared using the thin-film hydration method. It was demonstrated that concentrations of 1 mol% and 10mol% polyethyleneglycol-40stearate show very good ultrasound activity. This result was unexpected due to the small size of only 100–200nm.

The aim of this study was to determine the physico-chemical properties and the structural behavior of these contrast agents. Therefore ^{31}P-NMR measurements, AFM investigations and TEM images were correlated. A combination of these methods should enable us to distinguish between organisations such as micelles, SLN and liposomes.

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[1] Bendas G, Krause A, Bakowsky U, Vogel J, Rothe U. Targetability of novel immunoliposomes prepared by a new antibody conjugation technique. Int J Pharm. 1999; 181: 79–93. doi:10.1016/S0378-5173(99)00002-2

[2] Lin HY, Thomas J. PEG-Lipids and Oligo(ehtylene glycol) Surfactants Enhance the Ultrasonic Permeabilizability of Liposomes. Langmuir. 2003; 19: 1098–1105. doi:10.1021/la026604t