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Fibrin Targeting with Ultrasound Active Antibody-Conjugated Liposomes

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Blood vessel diseases like antherosclerosis lead to formation of blood clots with severe consequences like acute ischemic stroke or myocardial infarction [1].
A well-directed treatment of thrombotic events implies fast localization of the blood clot as well as fast and effective destruction with low doses of lytic agents to prevent the patient from severe damage. Standard procedure is application of high doses of thrombolytic agents with bleeding complications as negative side effects. Daffertshofer *et al*. investigated clot lysis efficiency of thrombolytic drugs alone, in combination with ultrasosund and ultrasound alone and proofed that even ultrasound alone is able to burst clots [2]. The well known fact that blood clots are fibrin rich areas can be used for the development of a site specific drug vehicle for diagnostic and therapeutic applications.
The aim of this study was to proof the concept that ultrasound active liposomes, surface modified with antifibrin antibodies, can act as drug carriers. We focused our work on the development of novel ultrasound active liposomes which are stable under similar conditions as in human body like blood pressure, physiological pH and body temperature. They are composed of DPPC/PEG40-stearate or DSPC/PEG40-stearate and show a small diameter between 100-200 nm with a sharp polydispersity. In order to develop long-circulating immunoliposomes, which combine sterical stabilization with a superior targetability, we attached fibrin antibodies directly onto the distal ends of s synthesized DPPE-PEG derivative, which had been endgroup-functionalized with cyanuric chloride [3]. The binding efficiency of the antibody, the ultrasound activity and the binding ability to fibrin under streaming conditions was investigated.

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