The pleural cavity retains liposomal drugs providing extended topical drug bioavailability

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ABSTRACT

Liposomes are well known for their potential applications as efficient carriers for drug delivery, with the most common administration route so far being intravenous administration. Little is known about the potential therapeutic advantages as well as the retention of topically administered liposomal drugs into confined body cavities. In the present study the retention of various types of liposomes in the pleural cavity following their intrapleural administration was monitored by live animal imaging. Different formulations of liposomes all incorporating DiR in the lipid membrane, were prepared, characterized and injected intrapleurally in healthy and pleural diseased mice. Bodily distribution of the DiR was followed by Biofluorescence imaging. The experimental results reveal that certain liposome preparative parameters significantly affect the local bioavailability of liposomes. However, the most important factor that prolonged liposome retention in the pleural cavity was the lipid dose injected. Moving a step further, we administered intrapleurally a liposomal formulation of the drug deltarasin, which is a novel *KRAS* inhibitor, to an experimental mouse model of malignant pleural effusion (MPE). A single injection was enough to halt MPE accumulation in mice indicating the high potential of this route of liposome administration as a method to dramatically increase the therapeutic potential of liposomal drugs for local diseases.

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