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Interactions between liposomes and human skin in vitro, a confocal laser scanning microscopy study.

van Kuijk-Meuwissen ME, Junginger HE, Bouwstra JA.; Biochim Biophys Acta. 1998 Apr 22;1371(1):31-9.

ABSTRACT

One major problem in (trans)dermal drug delivery is the low penetration rate of drugs through the barrier of the skin.

Encapsulation of a drug in lipid vesicles is one strategy to increase the penetration rate of a drug across the skin.

In this study, the interactions between fluorescent-labelled liposomes and skin are visualized by confocal laser scanning microscopy (CLSM).

Bilayer labelled gel-state and liquid-state liposomes (conventional or with flexible bilayers) were non-occlusively applied on human skin in vitro.

The penetration pathway and penetration depth of the lipophilic fluorescent label into the skin were visualized.

From the CLSM images, it was clear that the label applied in micelles and gel-state liposomes did not penetrate as deep into the skin as the label applied in liquid-state vesicles.

Among the liquid-state vesicles, the suspensions with the flexible bilayers showed the highest fluorescence intensity in the dermis.

Thus, the thermodynamic state of the bilayer and, to a smaller extent, the flexibility of the bilayer influence, strongly the penetration depth of the label into the skin.

The label applied non-occlusively in flexible liposomes penetrated deeper into the skin than after occlusive application.