

**EVIDENCE FOR THE HYDROLYSIS OF TOPICAL APPLIED  
LIPOSOMAL LIPIDS IN HUMAN STRATUM CORNEUM**

SEBASTIAN ZELLMER\*

Labsoft Diagnostics AG, Robert-Franz-Ring 21, 06108 Halle, Germany

The outer layer of human skin is the epidermis. It consists of keratinocytes in distinct states of differentiation. The outer layer of the epidermis is the stratum corneum (SC), which consists of terminally differentiated keratinocytes (corneocytes) embedded in multilamellar lipid layers. This architecture is described by the 'brick-and-mortar' model. However, this model does not reflect the highly dynamic structure of the SC, which can respond to changes of the environment and hosts several hydrolytic enzymes: lipases, proteinases and glycosidases.

The fate of topically applied liposomal lipids during the penetration into the epidermis is not known and difficult to determine. Evidence will be presented that enzymes are present in the SC, which can hydrolyse liposomal lipids.

Liposomes were incubated with the aqueous extract of human plantar stratum corneum (SCE). HPTLC analysis demonstrated that the composition of the liposomes changes. With increasing amounts of liposomes made of PL 90 or phosphatidylglycerol the amount of free fatty acids increased. No hydrolysis occurred with liposomes made of phosphatidylserine and rigid phosphatidylcholine (DSPC). Therefore the enzyme (PL A<sub>2</sub>) has a substrate specificity for PC and PG and a preference for fluid membranes.

The PL A<sub>2</sub> activity NBD-C<sub>6</sub>-PC had a maximum between 30 and 35 °C, which is the temperature at skin surface.

The PL A<sub>2</sub> in the SCE follows the Michaelis-Menten kinetic. The K<sub>m(app)</sub> and V<sub>max(app)</sub> values were 3.3 ± 1.7 μM and 0.8 ± 0.1 nkat for NBD-C<sub>6</sub>-PE. NBD-C<sub>6</sub>-PS and NBD-C<sub>6</sub>-PA showed no detectable hydrolysis.

Therefore we concluded that a hydrolytic activity (PL A<sub>2</sub>) is in the human stratum corneum, which is able to degrade topical applied lipids in the course of penetration.

---

\* E-mail: zellmer@labsoft.de