Synthetic Corneocyte Lipid Envelope: A Novel Model for Studying Stratum Corneum Barrier Function

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Skin's outermost layer, the stratum corneum (SC), holds the principal skin barrier[1] and consists of corneocyte dead cells embedded in the lipidic matrix. Corneocyte cells are decorated on their surfaces with covalently anchored ceramides and fatty acids, forming the corneocyte lipid envelope (CLE). During the last decade, attempts to explore the role of the CLE were performed, considering only the lipidic matrix. In our approach we attempted to introduce the ´´anchoring template´´ of ultralong-chain ceramides in our studies, combining organic chemistry with chemical engineering and surface chemistry (Figure 1). Initially, ω-hydroxyl ceramides were synthesized and activated through a high-yielding process to enhance the covalent coupling on novel-modified surfaces. Isolated skin lipids were deposited as monolayers through a Langmuir-Blodgett (LB) technique and applied by Linomat-spraying method on the CLE-mimicking entities. The synthetic models were further studied and analyzed using multiple methods like AFM, Raman, IR, and XRD to investigate the skin lipidic matrix lateral packing and ordering on the CLE-mimicking entities.

The study was supported by GAUK 262821, GAČR 22-20839K and the project New Technologies for Translational Research in Pharmaceutical Sciences/NETPHARM, ID CZ.02.01.01/00/22_008/0004607, co-funded by the European Union.

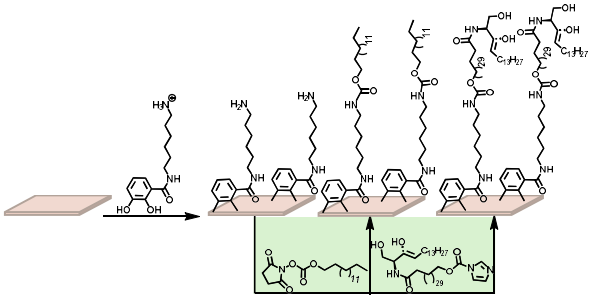

Figure 1. Synthesis of CLE-mimicking entities.

1. Menon K. G.; Cleary W. G.; Lane E. M.; International Journal of Pharmaceutics, 2012, 435 (1): 3-9.