

## NanoInnovation 2020

### Monitoring of skin response following the topical administration of vesicular drug delivery systems

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Topical drug delivery systems have a significant relevance in the therapeutic field because they enhance skin permeation/accumulation of the carried drugs, thus improving their therapeutic efficacy. Any changes in the stratum corneum lipid structure, that can occur during the skin permeation of these systems, can be monitored by evaluating the Transepidermal Water Loss (TEWL), the main indicator of skin integrity<sup>1</sup>. In this study, colloidal nanocarriers, having suitable biopharmaceutical properties for skin delivery (niosomes, ethosomes<sup>®</sup> and transfersomes<sup>®</sup>) were administered on skin and *in vitro* and *in vivo* evaluations of TEWL values were performed both in occlusive and non-occlusive conditions using In-vitro Tewameter<sup>®</sup> VT310 and Tewameter<sup>®</sup> TM 300 probes. Results showed an initial alteration of TEWL values followed by a gradual restoration of the native skin structure until 72 h from the application of vesicles. The administration of nanosystems in occlusive condition produced higher initial TEWL values, both for *in vitro* (up to 20 g/m<sup>2</sup> × h) and *in vivo* (above 20 g/m<sup>2</sup> × h) studies, nonetheless showing a restoration of the original values within 72 h from the administration. Changes in TEWL values were influenced by the composition of nanovesicles, the experimental conditions and incubation times. Data suggest that niosomes, ethosomes<sup>®</sup> and transfersomes<sup>®</sup> are safe carriers for topical application, able to increase the percutaneous permeation of drugs without causing permanent damage to the native skin structure.

1. M.C. Cristiano, F. Froiio, A. Mancuso, M. Iannone, M. Fresta, S. Fiorito, C. Celia, D. Paolino. *J Pharmaceut Biomed* 2020, 186, 113295.

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