DERMOSCOPY AND SKIN IMAGING

ASSESSMENT OF THE LIP BARRIER: MICROSPECTROSCOPIC CONFOCAL RAMAN SPECTROSCOPY AND MACROSCOPIC BIOPHYSICAL MEASUREMENTS

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Background: Unlike the skin, neither the biophysical properties, nor the molecular composition and structure of lips have been well-studied. We address this lack in understanding of the lip barrier function and structure for the first time in vivo.

Objective: The aim of this study was to investigate the lip barrier molecular composition using confocal Raman spectroscopy (CRS) and the lip barrier through biophysical methods including transepidermal water loss (TEWL) and skin capacitance.

Methods: Healthy female subjects (mean age, 48.4 years) were included. Measurements of ceramide content, and water profiles were performed by in vivo CRS. Depth profiles of Raman spectra in the region 2600-4000 cm (-1) were obtained at 2 mm intervals from the lip surface The concentration profiles of total ceramides (Ceramide [a.u.]) and NMF (Total NMF [a.u.]) were calculated from Raman spectra (wave number range from 400 to 1800 cm-1) that were taken at skin depths of 5 and 10 µm, Additionally, skin capacitance was measured by Corneometer® and transepidermal water loss (TEWL) was measured with a closed-chamber system (Aquaflux®).

Results: Water content was lowest on the surface and increased gradually until reaching the Stratum granulosum (SG) border. Starting from the SG border, the water gradient showed a very small gradual increase. Stratum corneum thickness was calculated to be 19.49 ± 3.70 µm. Both, NMF and ceramide content slightly decreased at greater depths. Of the parameters assessed, the largest variability was observed in NMF. The lowest variability was noted in the water content including increased skin depth.

Conclusions: For the first time in vivo, biophysical and structural characteristics of the lip are described. The lip is a comparatively well hydrated body region. In addition to the measured biophysical properties, in vivo Raman spectroscopy provides insightful parameters for the characterization of the lip barrier.