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CONTROLLING SPECTRAL PROPERTIES OF SKIN WITH OPTICAL CLEARING

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Background and Objective: Previously we have proposed a method of enhancement of epidermal permeability *via* creating a lattice of islands of damage (LID) in the stratum corneum (SC) to provide more effective action of optical clearing agents (OCA). The goal of this study was to compare the efficacy of optical clearing attainable at different wavelengths and measure the effect of optical clearing on the skin autofluorecence.
Materials and Methods: Pig skin was used for *ex vivo* measurements, and human skin was used for both *ex vivo* and *in vivo* experiments. A flashlamp EsteLux system (Palomar Medical Technologies, Inc.) (10–20 ms, 650–1200 nm, and 9–27 J/cm^2) including a mask providing patterned light delivery (center size ~75–120 μm, lattice pitch ~450–500 μm) was used to create the LID. Various OCA were applied. Measurements of transmittance and autofluorecence spectra were conducted.
Results: In the visible and near IR spectral ranges the efficiency of clearing differed 1.5–2.5 times depending on wavelength. Realistic Monte Carlo simulations of skin spectral properties correlated well with the experimental spectra and their dynamics after OCA applications.
Conclusion: Enhancement of skin permeability using LID proved to be an effective technique for delivery of OCA into skin. Changes in the skin autofluorecence signal were consistent with the hypothesis of modifying spectral filtration properties of skin by immersion optical clearing.