

Cosmetic & Pharmaceutical Research > Cosmetic & Pharmaceutical Research > Aging

17

A comparative pilot study on ultraviolet-induced skin changes assessed by noninvasive imaging techniques in vivo.

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ABSTRACT

The effects of acute and chronic ultraviolet (UV) on the morphology of human skin have been extensively studied EX VIVO by means of histological investigations.

However, innovative skin imaging techniques enable visualization of micromorphological structures in vivo.

We aimed to perform a correlation study evaluating in vivo dose and time dependent skin changes following solar-simulated irradiation using noninvasive techniques such as optical coherence tomography (OCT) and confocal laser scanning microscopy (CLSM).

The forearms of 10 healthy subjects were exposed to 1 minimal erythema dose (MED) and 3 MED of solar-simulated radiation. Noninvasive measurements were performed before and 24 h and 72 h after UV exposures.

We demonstrate definite OCT and CLSM findings obtained from UV-exposed skin, including an increase in epidermal thickness (hyperproliferation, acanthosis), a reduction in dermal reflectivity (dermal edema), an increase in brightness of the basal layer (pigmentation), and an increase in vessel diameter within the dermal papillae (vasodilatation). A moderate to strong linear association between the methods employed was observed.

IN CONCLUSION, noninvasive high-resolution imaging techniques such as OCT and CLSM may be promising tools for photobiological studies aimed at assessing photoadaptive and/or phototoxic processes in vivo. However, larger studies are needed to demonstrate the applicability of the findings presented in this pilot study.