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In vivo quantification of epidermis pigmentation and dermis papilla density with reflectance confocal microscopy: variations with age and skin phototype

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ABSTRACT

Reflectance confocal microscopy (RCM) may help to quantify variations of skin pigmentation induced by different stimuli such as UV radiation or therapeutic intervention.

The objective of our work was to identify RCM parameters able to quantify in vivo dermis papilla density and epidermis pigmentation potentially applicable in clinical studies. The study included 111 healthy female volunteers with phototypes I-VI. Photo-exposed and photo-protected anatomical sites were imaged. The effect of age was also assessed.

Four epidermis components were specifically investigated: stratum corneum, stratum spinosum, basal epidermal layer and dermo-epidermal junction. Laser power, diameter of corneocytes and upper spinous keratinocytes, brightness of upper spinous and interpapillary spinous keratinocytes, number of dermal papillae and papillary contrast were systematically assessed.

Papillary contrast measured at the dermo-epidermal junction appeared to be a reliable marker of epidermis pigmentation and showed a strong correlation with skin pigmentation assessed clinically using the Fitzpatrick's classification. Brightness of upper spinous and interpapillary spinous keratinocytes was not influenced by the skin phototype. The number of dermal papillae was significantly lower in subjects with phototypes I-II as compared with darker skin subjects.

A dramatic reduction in the number of dermal papillae was noticed with age, particularly in subjects with fair skin. The method presented here provides a new in vivo investigation tool for quantification of dermis papilla density and epidermal pigmentation.

Papillary contrast measured at the dermo-epidermal junction may be selected as a marker of skin pigmentation for evaluation in clinical studies.