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In vivo fluorescence confocal microscopy: indocyanine green enhances the contrast of epidermal and dermal structures.

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ABSTRACT

In recent years, in vivo skin imaging devices have been successfully implemented in skin research as well as in clinical routine. Of particular importance is the use of reflectance confocal microscopy (RCM) and fluorescence confocal microscopy (FCM) that enable visualization of the tissue with a resolution comparable to histology. A newly developed commercially available multi-laser device in which both technologies are integrated now offers the possibility to directly compare RCM with FCM. The fluorophore indocyanine green (ICG) was intradermally injected into healthy forearm skin of 10 volunteers followed by in vivo imaging at various time points. In the epidermis, accurate assessment of cell morphology with FCM was supplemented by identification of pigmented cells and structures with RCM. In dermal layers, only with FCM connective tissue fibers were clearly contoured down to a depth of more than 100 μ m. The fluorescent signal still provided a favorable image contrast 24 and 48 hours after injection.

Subsequently, ICG was applied to different types of skin diseases (basal cell carcinoma, actinic keratosis, seborrheic keratosis, and psoriasis) in order to demonstrate the diagnostic benefit of FCM when directly compared with RCM. Our data suggest a great impact of FCM in combination with ICG on clinical and experimental dermatology in the future.