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Reflectance confocal microscopy for in vivo skin imaging.

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ABSTRACT

Reflectance confocal microscopy (RCM) is a novel noninvasive technique for "in vivo" examination of the skin. In a confocal microscope, near- infrared light from a diode laser is focused on a microscopic skin target. As this light passes between cellular structures having different refraction indexes, it is naturally reflected, and this reflected light is then captured and recomposed into a two-dimensional gray scale image by computer software. Focusing the microscope (adjusting the focal point on the z-axis) allows images to be obtained of different levels within the skin. Commercially available microscope systems of this type can create images with enough detail for use in histological analysis. The first investigations using these microscopes served to identify the appearance of the various cell populations living in the different layers of normal skin. Today, the main interest has become focused on the use of these microscopes as a diagnostic tool: a means of investigating benign and malignant tumors of melanocytes and keratinocytes, and, more importantly, the findings of this field of study can be used to develop a diagnostic algorithm which would be not only highly sensitive but specific as well. The aim of the paper is to provide an updated literature review and an in-depth critique of the state-of-the-art of RCM for skin cancer imaging with a critical discussion of the possibilities and limitations for clinical use.