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In Vivo Confocal Scanning Laser Microscopy of Human Skin: Melanin Provides Strong Contrast

Rajadhyaksha M, Grossman M, Esterowitz D, Webb RH, Anderson RR.; J Invest Dermatol. Jun 1995; 104(6):946-52.

ABSTRACT

Confocal scanning laser microscopy of live human skin was performed to investigate the correlation of in vivo cellular and morphologic features to histology, the effect of wavelength on imaging, and the role of melanin as a contrast agent. We built a video-rate confocal scanning laser microscope for in vivo imaging of human skin. Using a 100 x microscope objective, we imaged high-contrast optical sections of normal skin, vitiliginous skin, and a compound nevus. In vivo confocal histology correlated well with conventional histology. The maximum imaging depth increased with wavelength: the epidermis was imaged with visible 400-700-nm wavelengths; the superficial papillary dermis and blood cells (erythrocytes and leukocytes) in the deeper capillaries were imaged with the near infrared 800-900-nm wavelengths. For confocal reflectance imaging, melanin provided strong contrast by increased backscattering of light such that the cytoplasm in heavily pigmented cells imaged brightly. In vivo confocal microscopy potentially offers dermatologists a diagnostic tool that is instant and entirely non-invasive compared to conventional histopathology.