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188 Automated detection of malignant features in confocal microscopy on superficial spreading melanoma versus nevi.

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ABSTRACT

In-vivo reflectance confocal microscopy (RCM) shows promise for the early detection of superficial spreading melanoma (SSM). RCM of SSM shows pagetoid melanocytes (PMs) in the epidermis and disarray at the dermal-epidermal junction (DEJ), which are automatically quantified with a computer algorithm that locates depth of the most superficial pigmented surface [D(SPS)(x,y)] containing PMs in the epidermis and pigmented basal cells near the DEJ. The algorithm uses 200 noninvasive confocal optical sections that image the superficial 200 μm of ten skin sites: five unequivocal SSMs and five nevi. The pattern recognition algorithm automatically identifies PMs in all five SSMs and finds none in the nevi. A large mean gradient σ (roughness) between laterally adjacent points on D(SPS)(x,y) identifies DEJ disruption in SSM $\sigma = 11.7 \pm 3.7$ [-] for $n = 5$ SSMs versus a small $\sigma = 5.5 \pm 1.0$ [-] for $n = 5$ nevi (significance, $p = 0.0035$). Quantitative endpoint metrics for malignant characteristics make digital RCM data an attractive diagnostic asset for pathologists, augmenting studies thus far, which have relied largely on visual assessment.