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117 Video-rate Confocal Scanning Laser Microscope for Imaging Human Tissues In Vivo

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ABSTRACT

We have built a video-rate confocal scanning laser microscope for reflectance imaging of human skin and oral mucosa in vivo. Design and imaging parameters were determined for optimum resolution and contrast. Mechanical skin-holding fixtures and oral tissue clamps were made for stable objective lens-to-tissue contact such that gross tissue motion relative to the microscope was minimized. Confocal imaging was possible to maximum depths of 350 mum in human skin and 450 mum in oral mucosa, with measured lateral resolution of 0.5-1 mum and axial resolution (section thickness) of 3-5 mum at the 1064-nm wavelength. This resolution is comparable with that of conventional microscopy of excised biopsies (histology). Normal and abnormal tissue morphology and dynamic processes were observed.