

Co-Registered Identification and Treatment of Skin Tumor with Optical Coherence Tomography-Guided Laser Therapy

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Abstract : Optical coherence tomography (OCT) enables to provide advantages of noninvasive imaging, high resolution, and high imaging speed. In this study, we integrated OCT and a CW laser for tumor diagnosis and treatment. The axial and transverse resolutions of the developed OCT system are 3 μm and 1 μm , respectively. The frame rate of OCT system is 30 frames/s. In this study, the tumor cells were implanted into the mice skin and scanned by OCT to observe the morphological and angiographic changes. With OCT imaging, 3D microstructures and skin angiography of mice skin can be simultaneously acquired, which can be utilized for identification of the tumor distribution. Then, the CW laser beam can be accurately controlled to expose on the center of the tumor, according to the OCT results. Moreover, OCT was used to monitor the induced photothermolysis and to evaluate the treatment outcome. The results showed that OCT-guided laser therapy could efficiently improve the treatment outcome and the extra damage induced by CW can be greatly reduced. Such OCT-guided laser therapy system could be a potential tool for dermatological applications.

Keywords : optical coherence tomography, laser therapy, skin tumor, position guide

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