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SELECTIVE PHOTOTHERMOLYSIS OF LIPID-RICH TISSUE

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Treatment of acne and removal of unwanted fatty tissue are potential new applications for lasers in dermatology. The purpose of this study was to develop a procedure that can selectively heat lipid-rich tissue. We evaluated the near and mid IR spectrum for bands with selective absorption of lipids. By spectro-photometric measurements we found bands at 915 nm, 1205 nm, 1715 nm and 2305 nm where lipid-rich tissue has approximately 50% more absorption than aqueous tissue. The 915 nm wavelength is weakly absorbed by lipid-rich tissue and does compete with melanin absorption. The 2305 nm band is strongly absorbed by fatty tissue and has potential for ablation of fatty lesions like xanthelasma or fatty atheromatous plaques. The 1205 nm and 1715 nm bands are not absorbed by melanin and are appropriate for intradermal targeting. Additionally the heat capacity of lipid-rich tissue is approximately half as much as of aqueous tissue. Therefore, for the same energy absorbed per unit volume, the temperature rise of lipid-rich tissue will be approximately twice as high. In a pilot study we evaluated the potential of a 1206 nm laser for selective heating of lipid-rich tissue. By thermographic measurements we were able to observe selective heating of lipid-rich tissue. We also demonstrated by histology the ability of this wavelength to be focused within the skin. These results could help to develop a laser-assisted treatment of acne or unwanted fatty tissue without adding an artificial chromophore.