

normal to improved healing compared with previous treatments and no adverse effects occurred.

Conclusion: Topical perfluorodecalin resolves post-laser whitening within seconds and permits safe immediate sequential treatment of tattoos up to three passes in a single session, allowing more effective tattoo removal in only a few minutes of treatment time.

#LB3

SELECTIVE PHOTOTHERMOLYSIS OF THE SEBACEOUS FOLLICLE WITH GOLD-COATED NANOSHELLS FOR TREATMENT OF ACNE

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Background: Acne could potentially be treated by selective injury of sebaceous glands. We examined the potential for selective photothermolysis with externally-introduced nanoparticles engineered for very strong near-infrared absorption.

Study: Nanoshells (150 nm diameter) of gold surrounding a silica core, were constructed for strong absorption at 800 nm based on optical plasmon resonance. The vehicle formulation and delivery methods were first optimized *ex vivo* and *in vivo*, in porcine skin. A suspension of nanoshells with an absorption coefficient of 345 cm^{-1} was then used for an IRB-approved human study at two sites. Skin damage and responses were examined in 13 subjects treated with an 800 nm diode laser at $40\text{--}50 \text{ J/cm}^2$, 30 ms following application of the nanoshells (Sebacia; Duluth, GA) in bilateral 1 in^2 areas on post- and peri-auricular skin. Biopsies were taken within 30 minutes after treatment and examined by routine light microscopy.

Results: After wiping off the nanoshell suspension and following laser exposures, there was minimal and transient erythema and edema. Discomfort was minimal, with no anesthetic. The number of follicles per biopsy sample ranged from 4–7. Selective, localized photothermal injury was noted in greater than 60% of the follicles. The infundibular epithelium and outer root sheath were damaged to the depth of the sebaceous gland duct. In some follicles, deeper damage was noted, including partial destruction of the sebaceous glands. No damage to the surrounding dermis or epidermis was noted.

Conclusion: External delivery of plasmonic nanoparticles, excited by subsequent laser exposure, is capable of producing selective photothermolysis of sebaceous follicles including partial destruction of sebaceous glands. This treatment strategy was well tolerated and produced no significant side effects. A pilot clinical trial for treatment of acne is currently in progress.

#LB4

REAL-TIME MELANIN MEASUREMENTS TO OPTIMIZE TREATMENT SETTINGS AND AVOID COMPLICATIONS

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Background: Eyeball assessment of background epidermal melanin content is inconsistent and often inaccurate.

Overestimation leads to unnecessarily conservative settings and disappointing results; underestimation leads to excessive settings that can result in vesiculation and even scarring. We evaluated the predictive value of real-time Melanin Index (MI)

measurements for determining appropriate intense pulsed light (IPL) treatment settings across 5 treatment centers. The goal was to identify a starting point fluence setting that was at or just below the optimal treatment settings. Since skin tolerance is predicted to be related to melanin content, then real-time measurement of melanin should make it possible to accurately predict appropriate treatment settings.

Study: Pulse width and fluence settings (selected based on eyeball assessment of experienced operators) collected during patient treatments were compared to MI-determined presets that were derived from maximum tolerated fluence measured on over 100 patients. A 3-wavelength, backscattering reflectometer was used for MI values which transmitted settings to the base which then provided preset fluence values based upon selection of pulse width (Icon system and Skintel™ Melanin Reader, Palomar Medical, MA). Additionally, in over 30 patients, test spots were performed in affected areas at the MI determined presets as well as fluences 2 J/cm^2 below and above the preset. The spots were evaluated 1 hour after irradiation for optimized visual endpoints (darkening of pigmented lesions and vessel clearing).

Results: 70 to 90% of the patient treatment settings ($n = 85$) were at or just above ($0\text{--}4 \text{ J/cm}^2$) the suggested starting test spot fluence setting as predicted based upon MI measured within the treatment area. Only 4% of the cases had the starting point settings above the treatment settings (all within 4 J/cm^2). Test spots in affected skin likewise showed that across the range of reflectometer guided settings, no settings were determined to be unsafe; moreover the settings were within 20% of settings the provider would have chosen without reflectometer guidance. Individuals of different Fitzpatrick Skin Type, but with similar melanin content were found to have similar skin tolerance to IPL treatment. Setting guidance using an objective measure was found to direct settings that were without complications in all cases and in many instances led to better optimization of settings.

Conclusion: Real-time measurement of skin's melanin content was found to accurately guide selection of appropriate and safe photodermatologic treatment settings. Used appropriately, MI-based guidance has the potential to reduce risk of complications, particularly in less experienced operators.

#LB5

THE MOST COMMON CAUSES OF LITIGATION IN LASER SURGERY

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Background: Medical malpractice litigation remains a significant risk to laser surgeons. The objective of this study is to identify behaviors that make practitioners vulnerable to litigation in an effort to close practice gaps and minimize the risk for future suits.