

Pulsing Influences Photoradiation Outcomes in Cell Culture

Philip Brondon, MS, Istvan Stadler, PhD, and Raymond J. Lanzafame, MD, MBA*
Rochester General Hospital Laser Center, Rochester, New York

Background and Objectives: Skin pigmentation can adversely affect phototherapy outcomes. Delivering pulsed light has been suggested as a means of enhancing efficacy. Suitable pulse frequencies remain indeterminate, often being selected empirically. This study was undertaken to determine whether pulsed light delivery mitigates the filtering effect of melanin pigment on photomodulation in vitro.

Study Design and Methods: Human HEP-2 cells were cultured in complete DMEM media. Photoradiation was delivered through 0.025% melanin filters at 670 nm (5.0 J/cm²/treatment/24 hours) for 72 hours at different pulse rates. Group A received no light treatment. Group B received treatments without pulsing. Groups C, D, E, F, and G received treatments at 6, 18, 36, 100, and 600 Hz. Cell proliferation was assessed by MTT assay and oxidative burst was measured using the 2.7 dichloro-fluoresce indiacetate assay.

Results: Cell proliferation was maximally stimulated at 100 Hz at 48 and 72 hours (n=4, P<0.05). Oxidative burst was maximally stimulated at 600 Hz (n=4, P<0.05). All frequencies were stimulatory at 48 and 72 hours (n=4, P<0.05).

Conclusion: This investigation suggests that light pulsing may improve outcomes by mitigating the filtration effects of cutaneous melanin. Further studies to further define these effects are warranted. *Lasers Surg. Med.* 41:222–226, 2009. © 2009 Wiley-Liss, Inc.