



PHOTOTHERAPY, PHOTODYNAMIC THERAPY

NONPIGMENTED HAIR REMOVAL USING PHOTODYNAMIC THERAPY

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Introduction: Lasers have been used for decades to remove dark hair. However, laser removal of nonpigmented hair is not possible.

Objective: The aims of this study were to use photodynamic therapy (PDT) to remove nonpigmented hair.

Materials and Methods: A photosensitizing cream (16% methyl aminolevulinate) was applied to the depilated backs of 7-week-old BALB/c mice. After 4-hr incubation, 630-nm light-emitting diode irradiation was performed. Skin biopsy specimens were collected, and post-PDT histologic changes were investigated. Molecular changes were evaluated with either Western blot analysis or ELISA assay. The efficacy of permanent hair removal was compared in white BALB/c and black C57BL/6 mice treated with PDT or 800-nm diode laser.

Results: A temporary, catagen-like transformation was observed in nonpigmented hair follicles after PDT. Keratin 15 staining in the bulge area and alkaline phosphatase staining in the dermal papilla were also observed throughout the 3-week period following PDT. Apoptotic cells were observed in the hair matrix after PDT. One day after PDT, levels of interleukin-6, tumor necrosis factor- α , transforming growth factor- β 1, superoxide dismutase 2, and cyclooxygenase-2 increased. Irradiation with an 800-nm diode laser did not achieve nonpigmented hair removal.

Permanent removal of nonpigmented hair was achieved on a small portion of the mouse back after multiple PDT sessions. Removal of black hair using PDT was less efficient compared with 800-nm diode laser removal.

Conclusion: Our results suggest that PDT can damage the nonpigmented hair matrix, but not stem cells or dermal papillae. Repeated PDT may impair the hair-regeneration capacity via a bystander effect on bulge stem cells or dermal papillae. PDT could be considered a new treatment option for nonpigmented hair removal.

