

Surgery (Laser)

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Induction of aquaporin 3 in skin dermal fibroblasts by a CO2 laser

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It is widely regarded that the biological mechanism of skin CO2 laser is by increase of collagen and change of fibroblasts as in wound healing process. Although the clinical effect is mainly caused by heat in the treated dermis by laser energy, other underlying mechanisms at early stage are obscure. Utilizing in vivo skin model, we applied a CO2 laser on the intact skin at 2 hr and 24 hr. We demonstrate that a CO2 laser treatment upregulated novel genes including aquaporin 3 at 2 hr simultaneously in 2 patients by microarray and quantitative real-time PCR. Aquaporin-3 (AQP-3) is water and glycerol channel in skin and its presence in epidermis is related to skin hydration, elasticity and barrier recovery. Some report showed that AQP-3 is also expressed in cultured human skin fibroblasts, which may be related to role of fibroblast migration. Additional genes upregulated in treated skin were those related to heat shock proteins and matrix metalloproteinase. Identification of such underlying mechanisms would offer potential targets for novel therapy approaches. Given the significant cost and pain accompanying skin CO2 laser therapy, alternative efforts with enhancing or combination are indeed necessary.

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