Gene chip analysis of early effects of ablative fractional resurfacing CO₂ laser on human dermis

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To produce the potential benefit of full surface ablative skin resurfacing while minimizing adverse effects, new concept of dermal remodeling, ablative fractional photothermolysis (AFR) CO₂ laser is under much clinical investigation but without knowledge of molecular mechanism. This study is to evaluate the early RNA changes after AFR CO₂ laser on human dermal skin semisolid culture, and to assess similar change of human fibroblasts by heating AFR CO₂ laser was performed on intact full thickness skin from the abdomen of 5 subjects of females of their fifty’s. At 2 hr and 24 hr, RNA was extracted from dermis and DNA microarray was performed and was followed by RT-PCR to validate modulation of candidate genes. Heated human dermal fibroblasts were also evaluated. Upregulated genes by 3 folds at the same time in 2 patient samples at 2 hr included 36 genes including aquaporin 3 and heat shock protein (HSP) 90. Heating of dermal fibroblasts also showed similar profiles. MMPs and procollagen were variable. We demonstrate that AFR CO₂ laser upregulated novel genes in skin differentially depending on the time course.