Extracellular Matrix Alteration in HaCaT Cells After Lasertherapy

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Low-power laser has been largely used in clinical practice, but the effects of laser therapy in keratinocytes specifically on the extracellular matrix (ECM) components are unknown. We propose to investigate glycosaminoglycans (GAG) profile of human keratinocytes (HaCat) after treatment using low-power laser. Cells were submitted to one or six laser irradiations using 470, 660 nm or association of both wavelengths. Sulfated GAG were analyzed by metabolic labeling using radioactive sulfate, electrophoresis and enzymatic degradation. Hyaluronan quantification and cell viability were also analyzed. The mRNA expression of heparanase, hyaluronan synthase and hyaluronidase isoforms were evaluated by qRT-PCR. Results demonstrated a significantly increased in heparan sulfate and chondroitin/dermatan sulfate, as well as hyaluronan after six laser irradiations treatment, using both wavelengths. It was also showed a decreased in cell viability with all laser treatment. There was a significant decreased in the mRNA expression of all hyaluronic acid synthases and hyaluronidases, suggesting that possibly hyaluronan present lower turnover after laser therapy. Finally, heparanase isoforms mRNA expression was also decreased which corroborates with heparan sulfate increased. The results led us to conclude that low-power laser in the HaCat cells change the GAG profile and mRNA enzymes expression related to extracellular matrix remodeling.

Keywords: lasertherapy, glycosaminoglycans, keratinocytes.

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