

Red LED light in skin regeneration: an in vitro study on human dermal fibroblasts

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The use of noncoherent light (light-emitting diodes, LEDs), in particular the Red LED light, represents an innovative approach to tissue regeneration. In dermatological field, experimental studies on its regenerative effect started about ten years ago (1) but the exact mechanism of its action should be better elucidated. Today, a new treatment, named "Dermodinamica" (Elisor, Milan), uses this approach with a wavelength of 630nm to promote skin regeneration. Dermal fibroblast is a primary cell type responsible for synthesis and remodeling of extracellular matrix in human skin. Several studies have reported cytokine-dependent changes in extracellular matrix composition and in particular transforming growth factor (TGF)-b1 is a fibroblast stimulating cytokine effective on both type I collagen and hyaluronan production (2). Moreover, ROS-detoxifying enzymes, such as superoxide dismutases (SOD) and heme-oxygenase 1 (HO-1), have an important role in cutaneous wound repair. The aim of the present in vitro preliminary study was to evaluate the effect of Red LED light (Dermodinamica, Elisor, Milan) on normal human dermal fibroblast (NHDF) at 24h from exposition monitoring: cell viability using MTT assay; TGF-b1 production using ELISA kit; expression of SOD-1 and HO-1 using immunohistochemical technique. Moreover, short (15 min exposition) and prolonged (30 min exposition) treatments were investigated. The results showed a progressive increase in TGF-b1 release respectively in the short treatment (15 min exposition) and in the prolonged treatment (30 min exposition). Moreover, the ROS-detoxifying enzymes were modulated by this treatment and the cell viability was maintained. These data support the hypothesis of the positive influence of Red LED light in the biological processes involved in skin regeneration.

References

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Key words

Red LED light, skin, regeneration.