

Phenotype characterization of pericytes during tissue repair following low-level laser therapy.

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Abstract

Background/purpose: The action of low-level laser therapy (LLLT) on pericytes during wound healing is not well established. The objective of this study was to identify the effect of laser treatment on pericytes during tissue repair.

Methods: Punch biopsies were performed on 40 Wistar rats. Twenty animals had their wounds treated with a dose of 4 J/cm² using a 670 nm diode laser (9 mW output, 0.031 W/cm²) every other day, while the controls received sham irradiation. Animals were sacrificed 3, 7, 10 and 14 days after punch biopsy. Immunohistochemistry staining with anti-desmin, anti-smooth muscle alpha-actin and anti-NG2 antibodies was used to characterize and count pericytes around blood vessels and myofibroblasts dispersed in the extracellular matrix (ECM). The morphology of pericytes was confirmed by transmission electronic microscopy.

Results: The laser group exhibited significantly more smooth muscle alpha-actin-positive staining cells at day 7 and more desmin-positive staining cells at day 10 around blood vessels. Laser treatment was also associated with higher numbers of NG2-positive staining cells, especially on days 3 and 7 post-biopsy ($P < 0.05$). Ultrastructural findings confirmed the presence of pericytes sharing the basal membrane with endothelial cells. **Conclusion:** LLLT stimulated the proliferation and migration of pericytes to the ECM and their phenotypic modulation to myofibroblasts.

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