INFLUENCE OF PHOTOBIOMODULATION ON CELL VIABILITY OF MULTIPOTENT MESENCHYMAL STEM CELLS FROM ADIPOSE TISSUE IN VITRO

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Background: The use of mesenchymal stem cells (MSCs) has been an alternative to conventional therapeutic modalities for wound healing, with recent advances in cellular and molecular biology to aid in tissue repair. The use of photobiomodulation (FBM) is used in the healing process by modulating cell metabolism through photochemical action, but many parameters and inappropriate use can disrupt this process, and there is no standardization for the application of the LASER to assist in the healing process.

Objective: To investigate the effect of different energies of LASER photobiomodulation on mesenchymal stem cells, which play a key role in the healing process.

Methods: Mesenchymal stem cells were cultured in αMEM medium with 10% FBS (Fetal bovine serum), penicillin, and streptomycin. Cells were incubated at 37 °C in an 80% humidified atmosphere containing 5% CO² in the dark, until reaching 90% confluence. The 3 groups with a wavelength of 830 nm were submitted to LASER applications: G1: 0.5 J, G2: 2 J and G3: 4 J, with irradiation at 24 and 48 hours. The cells were stained with markers for viable cells (Hoechst) and dead cells (Propidium Iodide). The analysis of the plates with MSCs was performed with the MetaXpress® software at 48 and 72 hours, and the statistical analyses were performed with the software GraphPad Prism® 7.0.

Results: The results obtained in the experiments showed that irradiation with the 830 nm wavelength laser showed an increase in cell viability at 48 and 72 hours compared to the control group and showed a significant difference when using 2 J energy.

Conclusion: Photobiomodulation assists in increasing cell viability when using the correct parameters, capable of assisting in the process of tissue regeneration.

Implication: The use of appropriate parameters influences the cellular response and consequently the effectiveness of the treatment.

Keywords: Low-level laser therapy, Cell survival, Tissue healing

Conflict of interest: The authors declare no conflict of interest.

Acknowledgment: Fundação de Amparo à Pesquisa do Estado de São Paulo, process n°. 2019/09329-1

Ethics committee approval: Hospital das Clínicas – FMRP/USP, CAAE 18691919.3.0000.5440

https://doi.org/10.1016/j.bjpt.2024.100626