

## Immunohistochemistry of cytokeratin proteins 10 (CK10) and 14 (CK14) demonstrates that photobiomodulation improves epithelial maturity of radiation-induced oral mucositis wounds

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### Abstract

**Background.** Oral mucositis (OM) is a common injury in cancer patients that can be caused by radiation therapy to the head and neck or certain chemotherapy drugs. The clinical extent of its manifestation is variable, especially when induced by ionizing radiation. In such cases, OM causes ulceration, severe pain when accompanied, risk of local and systemic infections, and increased treatment costs. There is no therapeutic consensus for the treatment of OM in recent decades.

**Objectives.** The focus was placed on photobiomodulation (PBM) using low-intensity lasers at red and infrared wavelengths. This is a non-drug option that can ease discomfort and speed wound healing. The mechanism of action of PBMs in the evolution of OM reduction is not clear.

**Materials and methods.** With the aim of clarifying the role of PBM in the progression of epithelial maturity in OM ulcerations induced by ionizing radiation, the present study evaluated the effect of PBM with a wavelength of red ( $\lambda$ ), 660 nm and infrared, and 780 nm in radio-induced OM lesions, on the tongue of mice, 8 and 20 days after irradiation, in a single year, with 20 Gy, from a source of gamma lightning. The percentage area corresponding to the positive staining for cytokeratin proteins 10 (CK10) and 14 (CK14) was evaluated in the epithelial area of the lesions using the immunohistochemistry (IHC) technique, after 8 and 20 days of lesion challenge and compared to an untreated control group. The CK10 is a protein related to epithelial cells with a higher degree of maturity and differentiation. It can collaborate with the tissue's innate defense response and was significantly more expressed in the group treated with 660-nm PBM.

**Discussion.** The protein related to epithelial layers of lower cell maturity (CK14) is important for the resistance of the basal area of the epithelium and should be restricted to these cell layers, closer to the connective tissue in healthy epithelia. In this study, it did not show quantitative differences between groups. Its distribution pattern, however, remained altered on the 20<sup>th</sup> day of the experiment for the control group. In the groups treated with PBM, CK14 was already present with its marking delimited to the basal layer of the epithelium.

**Conclusions.** According to the analyses obtained in the evaluated samples, the PBM treatment was able to optimize the expression of the epithelial proteins studied here and related to the epithelial maturation process.

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