

INVESTIGACIÓN - ODONTOLOGÍA

EFFECTS OF PHOTOBIMODULATION WITH BLUE LIGHT ON STEM CELLS OF TWO ORAL SQUAMOUS CELL CARCINOMA CELL LINES.

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Introduction: Oral squamous cell carcinoma (OSCC) is an aggressive malignant neoplasia, commonly diagnosed in advanced stages and associated with a poor prognosis in most patients. Studies have shown that tumors of OSCC have a subpopulation of stem-like cells, responsible for sustaining tumor growth, metastasis, and resistance to conventional therapies. Photobiomodulation (PBM) with blue light (wavelength between 450 and 470 nm) has shown antitumor effects. However, its effects on OSCC are still unknown. Objective: The aim of this study was to evaluate the effects of PBM with blue LED on the migration capacity and maintenance of the stem cell phenotype of OSCC-derived cell lines. Methodology: Two OSCC-derived cell lines (HSC3 and SCC9) were irradiated with blue LED (460 nm, 350 mW, 105, 168, and 210 J/cm²).

After 24 hours, the cell viability was evaluated using the MTS and crystal violet assays and the irradiation parameter associated with at least a 50% reduction in cell viability was further selected. Next, after irradiation, both cell lines were submitted to the migration, sphere and colony formation assays. Results: Cell viability progressively decreased as the irradiation parameters increased in both cell lines when compared to the control group ($p < 0.05$). A significant decrease in migratory capacity, sphere formation, and clonogenic potential was observed only at 168J/cm² for HSC3 cell line and at 210 J/cm² for the SCC9 cell line. Conclusion: PBM using blue LED light at a wavelength of 460 nm effectively inhibited cellular viability, migration, clonogenic capacity, and sphere formation in vitro, confirming its antitumor activity. These findings highlight its potential as a complementary therapeutic approach for targeting tumor cell aggressiveness, warranting further investigation in preclinical and clinical settings.

Palavras-chave: oral squamous cell carcinoma; cancer stem cells; blue light.