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PHOTOBIOMODULATION THERAPY COMBINED WITH RADIOACTIVE GOLD NANOPARTICLES IN BREAST CANCER-BEARING MICE

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Breast cancers are responsible for the highest number of worldwide deaths among women requiring new therapeutic strategies to promote better life's quality and survival rates for patients. Nanobrachytherapy (NB) and photobiomodulation therapy (PBM) emerge in this context as less invasive approaches for breast cancer treatment. NB is a technique that might deliver high doses of ionizing radiation in a shorter time and in a localized way in comparison to conventional radiotherapy and PBM could enhance cell sensitivity when applied before NB. In this work, we aim to investigate the impact of PBM combined with NB involving radioactive gold nanoparticles (AuNPs) in the treatment of breast cancer in a murine model. Murine 4T1 cells were cultivated in RPMI medium and after injected into the lower-left mammary fat pad animals' breast. When the tumor reached approximately 0.1 cm^3, AuNPs (~ 284 μCi) were inoculated in the mouse breast. Thereafter, the tumor was irradiated with a red LED (660 nm, 40 mW, 150 s, 6 J) in a single application. Animals were monitored for 3 weeks until euthanasia. Our results demonstrated an arrestment in tumor growth for NB group in comparison to Control, PBM and PBM + NB groups. These data suggest that a single PBM session was not able to enhance the NB of breast cancer. The following steps will involve applying NB and PBM in two sessions. The first session will take place on the same day as NB application, and the second one after 6 days, corresponding to two half-lives of ^{198}AuNPs.

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