

Could photobiomodulation be safe on breast cancer?

Saulo T. Pereira¹, Silvia C. Núñez², Martha S. Ribeiro¹

¹ Center for Lasers and Applications, Energy and Nuclear Research Institute
(IPEN-CNEN/SP), São Paulo, SP, Brazil
(e-mail: marthasribeiro@gmail.com)

² Biomedical Engineering and Bioengineering Department, Brasil University, São Paulo, SP,
Brazil

BACKGROUND: Photobiomodulation therapy (PBMT) has been recently used to accelerate wound healing and relieve pain in mothers with nipple injury and/or mastitis during breastfeeding. However, women who are using PBMT could have an undiagnosed malignant tumor. **OBJECTIVE:** We aimed to verify if the use of a single application of PBMT could impact clinical appearance, tumor progression and blood cell count of breast cancer-bearing mice. **METHODOLOGY:** Tumor was induced by inoculation of 4T1 cells into the mammary fat pad of female BALB/c mice. Tumor volume was monitored with a caliper and when it reached 100 mm³, animals were irradiated by a red LED irradiator (660±20 nm) at irradiance of 24.3 mW/cm². The animals were randomly divided into groups that received energy densities of 1.8, 5.6 and 9.4 J/cm². Control group was equally manipulated but did not receive irradiation. After treatment, clinical signs as body weight loss, hunching, hypokinesia and piloerection as well as tumor volume, platelets, white and red blood cell levels were registered weekly during 15 days. **RESULTS:** Although tumor volume for treated groups was smaller than control groups, no significant differences were observed among groups. Clinical appearance was also similar for irradiated and untreated groups. Platelet levels of the irradiated groups remained within reference values of healthy animals but control group showed a significant decrease after 15 days. Regarding the total number of red blood cells no significant differences were observed among groups. In contrast, white blood cells increased after 15 days for treated and untreated groups, but no statistically significant differences were noticed between them. **CONCLUSION:** These findings indicate that PBMT applied directly on the breast tumor at a single application do not promote significant impact on breast cancer-bearing mice regardless the dose protocol used and could be safe for women who breastfeed with undiagnosed cancer.

CEUA approval: IPEN no. 214/18

Keywords: red LED, total blood count, murine model, preclinical assay

Funding: CNPq and CNEN