Title:
The *in vitro* effects of LASER on human mammary epithelial and human breast cancer cell lines.

Abstract:

Background: Despite limited safety data, Low Level Laser Therapy (LLLT) is used in the clinical treatment of breast cancer-related lymphoedema (BCRL).
Objective: We aimed to compare the cell proliferative effects of a range of doses of LLLT at wavelengths of 780, 830 and 904 nm on human breast and immortalised human mammary epithelial cell lines *in vitro*.
Materials and Methods: Human breast adenocarcinoma (MCF-7), human melanoma cell line (MDA-MB-435S/M14) and immortalised human mammary epithelial (SVCT and Bre80hTERT) cell lines were irradiated with a single exposure of LASER at 0.5, 1, 2, 3, 4, 10 and 12 J/cm^2 (λ=780 nm) and 0.5, 1, 2, 3, 4, 10 and 15 J/cm^2 (λ=830 and 904 nm). MCF-7 cells were further irradiated with two and three exposures of all wavelengths. Cell proliferation was assessed 24 hours after irradiation.
Results: SVCT cell proliferation significantly increased after exposure to a range of doses at 780 and 904 nm irradiation. MDA-MB-435S and Bre80hTERT cell lines showed negligible effects to LASER exposure. MCF-7 cells irradiated with 780 nm LASER demonstrated an increasing dose response relationship after one exposure and a decreasing dose response relationship after three exposures. MCF-7 cells irradiated with 904 nm LASER demonstrated a decreasing dose response relationship after two and three exposures.
Conclusion: Although certain LASER doses increased MCF-7 cell proliferation, multiple exposures had no effect or a decreasing effect on dose response relationships. Before a definitive conclusion can be made regarding LASER safety for BCRL, further *in vivo* research is necessary.

[Powell K, Low P, McDonnell PA, Laakso E-L and Ralph SJ (2009) The effect of laser irradiation on proliferation of human breast carcinoma, melanoma, and immortalized mammary epithelial cells. *Photomedicine and Laser Surgery*, E-print ahead of publication: DOI: 10.1089=pho.2008.2445]