

In vitro survival of breast cancer cell lines following chemotherapy or radiotherapy in comparison with gold-mediated phototherapy

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Background: Breast cancer is a heterogeneous disease that mandate efficient therapeutics, lower drug toxicity, and overcoming drug resistance. Combination therapy was suggested as a future treatment to attain the required efficacy and tolerable side effects. **Aim:** The current study aimed to compare and evaluate the efficacy of single and combined treatments in the MCF-7 breast cancer cell line. **Materials and Methods:** The study included seven MCF-7 groups according to the treatment modality. Cell viability was evaluated by MTT assay at different doses and time course treatments. **Results:** When nanoparticles were used alone, the starting point of significant cell death was 100 µg, but when using a photothermal combination modality the loss of viability % was about 2-fold higher than nanoparticles alone especially in low concentrations and there was a significant difference between the 2 groups. There was a significant difference in cell viability between FAC + AuNPs group when compared to FAC only or control group ($p \leq 0.05$). There was a significant difference in cell viability between Taxol + AuNPs when compared to control ($p \leq 0.05$). there is a significant effect of radiation doses on cell viability within all subgroups ($p < 0.001$ for R0, and $p=0.001$ for R2 subgroup). there is a significant effect of the radiation doses on the cell viability within each subgroup as indicated by significant p values ($p= 0.027$ for RN0, and $p=0.001$ for RN2). **Conclusion:** Combined GNPs and FAC, paclitaxel, and Radiotherapy treatment modalities could improve breast cancer outcomes and prognosis.

Keywords: Breast cancer; Chemotherapy; MCF-7; Photothermal treatment; Radiosensitizers

Editor-in-Chief: Prof. M.L. Salem, PhD - Article DOI: 10.21608/JCBR.2021.60568.1150