

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

Moussa S<sup>1</sup>, Thanaa Shalaby<sup>1</sup>, Zaher E<sup>2</sup>, Elnaggar M<sup>3</sup> and Sameh Nakhla<sup>1</sup>

<sup>1</sup> Department of Radiation Sciences, Medical Research Institute, Alexandria University, Alexandria, Egypt

<sup>2</sup> Department of Medical Biophysics, Medical Research Institute, Alexandria University, Alexandria, Egypt

<sup>3</sup> Department of Cancer Management and Research, Medical Research Institute, Alexandria University, Alexandria, Egypt

**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