Targeting the MCF-7 Breast Cancer Ostrogen Receptor Cells via Silver Nano-Particle Linked Doxorubicin and Tamoxifen Drugs

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Breast cancer is devastating and the most common life-threatening cancer in Saudi Arabia. Chemotherapy is found to be effective for the treatment of many cancers especially breast cancer. Unfortunately, its clinical use is limited by the toxicity and the development of cellular resistance. The aim of this study is to develop a new formulation to improve drug delivery and selective efficacy. Nanoparticles have shown a promising potential in enhancing drug delivery and reducing chemotherapy resistance in different studies. Nanoparticles are seen to be concentrated in and near the nucleus after the cellular uptake. Doxorubicin is a chemotherapeutic agent that is very effective for the treatment of breast cancer. Therefore, the hypothesis is that encapsulating Tamoxifen which is selective estrogen receptor antagonist, with Doxorubicin, will be able to target the MCF-7 breast cancer cells Oestrogen sensitive without affecting the other organs. The modified formulation of Doxorubicin-Tamoxifen with the silver nanoparticles would deliver the encapsulated Doxorubicin-Tamoxifen directly and selectively into the MCF-7. The efficacy of this formulation in selectively inhibiting the cell viability of the breast cancer cells was evaluated in MCF-7 using the MTT 3-4 5-Dimethylthiaz assay. The preliminary results of this study showed that the Doxorubicin-Tamoxifen combination was markedly successfully in discouragement of the MCF-7 cancer cells much more than either Doxorubicin or Tamoxifen alone. Interestingly, the addition of nano-silver to this combination enhanced the cytotoxic activity of this formulation more than Doxorubicin-Tamoxifen alone. This study may open the doors wide for a new strategy for treating breast cancer patients.

Awards Won:
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