

In this study, we employed X-ray induced photodynamic therapy (X-PDT) for the treatment on triple negative breast cancer (TNBC) cells. To do this, we rationally developed a liposome delivery system co-loaded with protoporphyrin IX (PPIX) and perfluorooctyl bromide (PFOB). Low-dose X-ray at 2Gy was employed to activate PPIX for reactive oxygen species (ROS) generation, and the co-loading of PFOB provided additional oxygen to augment ROS production. The highly toxic ROS triggered TNBC cell death. In vitro X-PDT effects including intracellular ROS generation, cytotoxicity, cell viability and apoptosis/necrosis assay in TNBC cells were studied. Our results indicate that the nanocarriers effectively induced X-PDT effect with very low dose radiation, which makes it possible to damage cancer cells. Our strategy may offer a paradigm-shifting treatment alternative for TNBC patients who need neoadjuvant radiotherapy but wish to avoid long term detrimental effect on functional outcome by undergoing X-PDT using only a fraction of the conventional radiotherapy.