IMPROVING CYTOTOXICITY AGAINST CANCER CELLS BY CHEMO-PHOTODYNAMIC COMBINED MODALITIES USING SILVER-GRAPHENE QUANTUM DOTS NANOCOMPOSITES

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The combination of chemotherapy and photodynamic therapy has emerged as a promising strategy for cancer therapy due to its synergistic effects. In this work, PEGylated silver nanoparticles decorated with graphene quantum dots (Ag-GQDs) were tested as a platform to deliver a chemotherapy drug and a photosensitizer, simultaneously, in chemo-photodynamic therapy against HeLa and DU145 cancer cells in-vitro. Ag-GQDs have displayed high efficiency in delivering doxorubicin (DOX) as a model chemotherapy drug to both cancer cells. The Ag-GQDs exhibited a strong antitumor activity by inducing apoptosis in cancer cells without affecting the viability of normal cells. Moreover, the Ag-GQDs exhibited a cytotoxic effect due to the generation of the reactive singlet oxygen upon 425 nm irradiation, indicating their applicability in photodynamic therapy. In comparison with chemo or photodynamic treatment alone, the combined treatment of Ag-GQDs conjugated with DOX under irradiation with a 425 nm lamp significantly increased the death in DU145 and HeLa. This study suggests Ag-GQDs as a multifunctional and efficient therapeutic system for chemo-photodynamic modalities in cancer therapy.

Keywords: Graphene quantum dots, Cancer therapy, Drug delivery

References:


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