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Photophysical behavior and photodynamic therapy activity of conjugates of zinc monocarboxyphenoxy phthalocyanine with human serum albumin and chitosan

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Abstract

Zinc monocarboxyphenoxy phthalocyanine (ZnMCPPc) was linked to human serum albumin and chitosan via amide bond formation. The photophysical behavior and photodynamic therapy (PDT) activity (against human breast adenocarcinoma cell line (MCF-7 cells) of ZnMCPPc alone and its conjugates were investigated. The conjugates showed improved fluorescence, triplet and singlet oxygen quantum yields when compared to ZnMCPPc alone. The *in vitro* dark cytotoxicity and PDT studies were carried out at a dose of 3.6 μg/mL to 57.1 μg/mL. The *in vitro* dark cytotoxicity studies of ZnMCPPc showed percent (%) cell viability less than 50% at 28.6 μg/mL and 57.1 μg/mL, while the conjugates showed up to 50% in all their tested concentrations doses (3.6 to 57.1) μg/mL. Thus, conjugation of ZnMCPPc to HSA and chitosan improves its dark cytotoxicity, an important criteria for molecules meant for photodynamic therapy. Complex **1** showed the most efficacious PDT activity with % cell viability less than 50 at concentration range of (14.3 to 57.1) μg/mL in comparison to the conjugates which only showed less than 50 % cell viability at 28.6 μg/mL and 57.1 μg/mL for **1**–HSA and 57.1 μg/mL for **1**–Chitosan.

Key words: human serum albumin, chitosan, zinc monocarboxyphenoxy phthalocyanine, singlet oxygen quantum yields, dark cytotoxicity

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