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Synthesis of phthalocyanine conjugates with gold nanoparticles and liposomes for photodynamic therapy

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ABSTRACT

The efficiency of [2,9,17,23-tetrakis-(1,6-hexanedithiol)phthalocyaninato]zinc(II) as a photodynamic therapy (PDT) agent was investigated. This compound belongs to the second generation of photosensitizers currently tested for the cellular photo-damage of cancer cells. The production of reactive oxygen species (ROS) and phototoxicity of the photosensitizer were assessed. Healthy fibroblast cells and breast cancer (MCF-7) cells were treated with either free phthalocyanine or phthalocyanine bound to either gold nanoparticles or encapsulated in liposomes. Cell viability studies showed the optimum phototoxic effect on non-malignant cells to be 4.5 J cm^{-2}. The PDT effect of the liposome bound phthalocyanine showed extensive damage of the breast cancer cells. Gold nanoparticles only showed a modest improvement in PDT activity.