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Antiproliferative and Cytotoxicity Effects of Aluminium (III) Phthalocyanine Chloride Tetra Sulphonic Acid Mediated Photodynamic Therapy on Oesophageal Cancer

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Oesophageal cancer is an aggressive and lethal malignancy accounting for the eighth leading cause of cancer and sixth cause of cancer-related death globally. Conventional treatments for oesophageal cancer are characterised by suboptimal efficiency resulting in treatment resistance and relapse. Photodynamic therapy (PDT), a non-invasive modality, has emerged as a potential alternative cancer therapy. Report has shown that aluminium (III) Phthalocyanine Chloride Tetra sulfonic Acid (AlPcS4Cl) is a promising photosensitiser in PDT owing to its photochemical and photophysical features. This study examined the antiproliferative and cytotoxic impacts of AlPcS4Cl-mediated PDT in an oesophageal cancer cell line (HKESC-1). The HKESC-1 cells were grown and maintained in a culture medium incubated at 37° C, with 5% CO2 and 85% humidity. The cells were treated with increasing dose concentrations of AlPcS4Cl and irradiated at a fluence of 5 J/cm2 using a diode laser at 673.2nm wavelength. The cellular activities following 24-hours post-PDT were evaluated using microscopy and biochemical tests to determine the response of HKESC-1 cells to treatments. Results from treated cells displayed a dose-dependent response as shown by the significant morphologic changes, increased cytotoxic damage, and reduced cell viability and proliferation. Fluorescent microscopy revealed that AlPcS4Cl was internalised in the mitochondria and lysosomes, suggesting the possible cell death pathways. The study showed that AlPcS4Cl mediate PDT is an efficient treatment modality for oesophageal cancer. Further research on the mechanism of cell death pathways in oesophageal cancer could enhance and translate the potential application of AlPcS4Cl mediated PDT of cancer in clinical settings.

Apply to be considered for a student ; award (Yes / No)?

Yes

Level for award;(Hons, MSc, PhD, N/A)?

PhD

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