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Evaluation of Ce6 Photosensitisers-Induced Dark Toxicity and Phototoxicity (660 nm) on Melanoma Cells

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Skin cancer may be classified into three types - cutaneous malignant melanoma, squamous cell carcinoma, and basal cell carcinoma. Radiotherapy, chemotherapy, targeted therapy, and immunotherapy are some of the traditional therapies, all of which present significant side effects. Photodynamic treatment has revolutionized cancer treatment because of its effectiveness against various cancer types and low side effect rates. One non-invasive, localized therapeutic option is photodynamic therapy. Photodynamic therapy (PDT) relies on a photosensitizer to create cytotoxic reactive oxygen species that destroy cancer cells. Since PDT's effectiveness primarily depends on the photosensitizer, much effort has been put into identifying the ideal one. Chlorin E6 (Ce6) is a second-generation photosensitizer that has FDA clearance and meets the clinical standards for PDT. Its potent ability to generate reactive oxygen species (ROS) and its potent anticancer impact on various cancer types are well established.
The phototoxic effects of Ce6 on the melanoma cancer cell line (A375) are examined in this study. The A375 cells were grown and maintained in a culture medium at 37° C, 5% CO2, and 85% humidity. The cells were subjected to a diode laser with a wavelength of 660 nm and gradually increasing concentrations of Ce6 photosensitizer. To ascertain how A375 cells responded to treatments, the cellular activities were assessed 24 hours after PDT using microscopy and biochemical testing. The substantial morphologic alterations, enhanced cytotoxic damage, and decreased cell viability and proliferation in PDT-treated cells demonstrated a dose-dependent response. Our findings reveal that Ce6 significantly inhibits the growth of A375 melanoma cells, offering a more precise and less toxic alternative to conventional treatments. Ce6 has shown success in treating melanoma cancer in vitro; however, when used clinically, the ensuing PDT efficacy will ultimately rely on biological characteristics. PDT might be regarded as an adjuvant treatment until established procedures for different tumor types and a relevant PS have been confirmed. These findings highlight the potential of Ce6-based PDT as a promising, targeted therapy for melanoma with reduced toxicity compared to conventional treatments.

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