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Evaluation of Anticancer Effect of Punica granatum Extract in Combination of Hypericin Mediated Phototoxicity on MCF-7 Cells

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Cancer has been established as one of the prevalent causes of death globally, rating second after cardiovascular disease. The GLOBOCAN 2020 report has estimated global new cancer cases of approximately 19.3 million, with a death toll of nearly 10.0 million. The report also estimates about 2.3 million of new cases of female breast malignancy, making it the most commonly diagnosed cancer type. The 2020 South African National Cancer Registry recorded a 23.25% female breast cancer incident rate as the leading type of cancer. Natural plants and fruits have been important to the medical community due to their therapeutic properties and low cost. They contain phytochemicals important in cancer prevention and treatment. Punica granatum is a fruit with anticancer, antiproliferation, and antioxidant qualities. Its limitations come with its lack of water solubility and bioavailability. In recent years, combination therapy has gained interest among researchers and clinicians as one of the anticancer strategies to overcome the limitations of each modality to enhance the effective treatment outcome. Photodynamic therapy (PDT) is a photochemical based therapeutic modality that depends light excitation of photosensitizer to generate toxic reactive oxygen species to kill cancer cells. Hypericin is a natural photosensitizer with significant antitumor effects by targeting specific signaling pathways. Thus, this study aims to investigate the combined anticancer effect of P. granatum extract in combination with hypericin as a photosensitizer against breast cancer cells. MCF-7 treated with different concentrations (50-400 µg/ml) of P. granatum chloroform extract followed by 600nm of laser irradiation at IC50 concentration of hypericin with 5 J/cm² light dose with. Post treatment cell variability was analysed by MTT assay, and morphological changes were visualized using brightfield microscopy and cell viability by live dead assay. Results have shown significant cytotoxic effects in combination therapy compared to single treatment alone. This study provides a promising approach to effective combination anti-cancer therapy using natural plant-based compounds.

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

Yes

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

MSc

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