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Enhancing the Efficacy of Photodynamic Therapy: The Role of Hypocrellin B, Quercetin, and their combinations in Human Breast Cancer Cell Line

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Photodynamic therapy (PDT) is an emerging treatment modality that utilizes photosensitizers and light to induce cytotoxic effects in cancer cells. This study investigates the combined therapeutic potential of hypocrellin B (HB) and quercetin (Quer) in PDT against human breast cancer cell lines. The primary objective was to evaluate the effects of PDT with HB, Quer, and their combination on cell viability, oxidative stress, mitochondrial integrity, and apoptosis in vitro. We utilized the MTT assay to assess cell viability post-PDT treatment, followed by the LDH assay to measure cellular membrane integrity. The ATP assay was employed to evaluate the energy status of cells after PDT, while reactive oxygen species (ROS) production was measured using a ROS assay to assess oxidative stress. Mitochondrial membrane potential was monitored to determine the effects on mitochondrial health. Finally, apoptosis was assessed using annexin V/PI staining and flow cytometry, which allowed for the detection of early and late apoptotic cells. The results revealed that combination therapy with HB and Quer significantly enhanced cytotoxicity compared to individual treatments, as evidenced by a marked decrease in cell viability, elevated ROS production, and loss of mitochondrial membrane potential. Furthermore, combined treatment induced a higher percentage of apoptosis, suggesting a synergistic effect between HB and Quer in enhancing PDT efficacy. These findings highlight the potential of HB and Quer as effective PDT agents for breast cancer therapy, supporting further exploration of their combination in clinical applications.

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None

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