Synthesis and Investigation of Cytotoxic and Anticancer Effects of monoterpenoid stylosin on Prostate Cancer Cells in vitro

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Abstract

Cancer is the second leading cause of death in the world. Due to the fact that treatment of many cancers is still not efficient, the search for finding novel therapeutic approaches continues. The aim of this study was to synthesize a monoterpenoid called stylosin and investigate its cytotoxic and anticancer effects on prostate cancer cell line PC3 and normal human fibroblast HFF3 cells in vitro. To do so, stylosin was first synthesized through esterification reaction of fenchol and vanillic acid. Cytotoxicity and cell survival were then assessed by means of spectroscopy via alamar blue reduction rate under various concentrations of stylosin during 3 days of treatment. Results indicated that stylosin had cytotoxic effects on PC3 cells with IC50 values of 30.95, 30.61 and 27.01 µg/mL after 24, 48 and 72 hours of treatments, respectively. The IC50 values of stylosin on HFF3 cells were identified as 49.73, 47.93 and 41.91 µg/mL after 24, 48 and 72 hours of its administration. Statistical analysis revealed that IC50 values of stylosin on PC3 cells were significantly less than related values on HFF3 cells, indicating probable anticancer properties of this compound. The mechanism of cell death was further investigated by flow cytometry using FITC-annexin V and PI staining and results indicated that apoptosis is the predominant mechanism of cell death induced by stylosin. Further studies are still needed to determine the exact mechanism involved in selective cytotoxic effects of this monoterpene on cancer cells.

Keywords: PC3, Anticancer, Terpenoid, Stylosin, Apoptosis

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