Antitumor Effect of Honey and Squirting Cucumber Fruit Juice Mixture on Glioblastoma Cells in Vitro

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Abstract

Original Research Paper: This study aimed to investigate the antitumor effects of Ecbalium elaterium (squirting cucumber) (Cucurbitaceae) fruit juice and some fruit extracts as well as bee honey separately and in mixture. The fruit juice of E. elaterium, which is found to be rich in cucarbitacins, was selected for further evaluation of antitumor activity on the bases of a phytochemical study by thin layer chromatographic technique (TLC). The antitumor effects of the fruit juice and bee honey (separately and in mixture) were assessed for human brain tumor cell line (U251) using trypan blue exclusion assay for evaluating cytotoxicity, and H3-thymidine assay for estimating DNA synthesis. ELISA technique for measuring cell cycle regulation and the evaluation of the effects on metastasis and angiogenesis were also achieved. Results suggested that honey did not inhibit tumor cell growth through cyclin D1, P21 regulation or cell number reduction but through a significant inhibition of DNA synthesis. Results showed that E. elaterium fruit juice significantly down regulated P21, up-regulated cyclin D1, decreased cell number and inhibited DNA synthesis. Mixing of honey with E. elaterium fruit juice decreased the cytotoxicity induced by the latter and produced intermediate inhibition of DNA synthesis and down regulation of P21. All treatments inhibited MMP2 and MMP9. Thus, honey was able to reduce the cytotoxic effect of E. elaterium juice on glioblastoma cells enhancing its ability of inhibiting DNA synthesis and they acting together as antiangiogenic and antimetastatic agents.

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