Anti-proliferative activity of natural antitumor agents (curcumin) against human liver and breast cancers (*in vitro* study)

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Abstract

Human liver and breast cancers are the most common cancer diseases among Egyptian population. Anti-cancer drugs exhibit limited efficacy, associated with severe side effects, and are also expensive. Therefore, safer and more effective chemoprevention for cancer is still required. Curcumin, a polyphenolic compound derived from turmeric (*Curcumin longa)*, showed to have anti-inflammatory and/or anti-cancer activity. Our aim is extensively studying the mechanism of apoptotic effects in vitro on ~~a~~ cellular and molecular levels. The obtained results will be compared with normal cells to determine antitumor activity and apply this for further researches. Curcumin was screened for its cytotoxic effect on Huh7, MCF-7 and Wish as *in vitro models* of human liver cancer, human breast cancer, and human normal fibroblasts cells respectively. Genotoxic effects were performed by DNA fragmentation assays and flow cytometric analysis was performed to evaluate the apoptotic effect on a cellular level. Some apoptotic genes expression was determined on a transcriptional level. Curcumin was prepared at a final concentration of 100uM in DMSO, and IC50 was found to be 41uM, 58uM and 50uM in Huh7, MCF-7 and Wish respectively. MTT results were confirmed by cellular DNA fragmentation which showed lower concentration of cellular DNA after treatment of cells with IC50 compared to untreated cells. Treatment of cells with IC50 generated an increase in the cell population in S phase compared to untreated cells as revealed by flow cytometric analysis. Apoptotic genes expression indicated more expression of mRNA of Bax gene compared to untreated cells. Curcumin is effectively inhibited proliferation of human breast and liver cancer cells but it affected proliferation of human normal cells as well. Special technological application will be adopted to minimize its toxic effect before its application as anti-cancerous treatment in vivo model.

Key word: Curcumin, Human Liver and Breast Cancers, Cytotoxicity, PC