Honey a Potential Anti-Cancer Agent

Involvement of Non-Protein Thiols, Mitochondrial Dysfunction, Reactive Oxygen Species and p53 in Honey-Induced Apoptosis
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Honey is a complex mixture of different biologically active constituents. Honey possesses anti-inflammatory, antioxidant and antitumor properties. Our chief investigation was to assess the honey induced apoptosis and its molecular mechanism in colon cancer cell growth inhibition.

Honey exerted antiproliferative potential against the HCT-15 and HT-29 colon cancer cells as assessed by 3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide (MTT) assay. Flow cytometric analysis showed the increasing accumulation of hypodiploid nuclei in the sub-G1 phase of cell cycle indicating apoptosis.

Honey transduced the apoptotic signal via initial depletion of intracellular non protein thiols, consequently reducing the mitochondrial membrane potential (MMP) and increasing the reactive oxygen species (ROS) generation. An increasing earlier lipid layer break was observed in the treated cells compared to the control.

Honey induced apoptosis was accompanied by up-regulating the p53 and modulating the expression of pro and anti-apoptotic proteins. Further apoptosis induction was substantiated using DNA fragmentation assay and YO-PRO-1 staining.

Results showed honey as a plausible candidate for induction of apoptosis through ROS and mitochondria-dependent mechanisms in colon cancer cells. This will promote honey as a potential chemotherapeutic agent against colon cancer.