Involvement of non-protein thiols, mitochondrial dysfunction, and reactive oxygen species in the honey-induced apoptosis

Saravana Kumar Jaganathan[1], Mahitosh Mandal[1, *]

[1]School of Medical Science and Technology, Indian Institute of Technology, Kharagpur 721 302, West Bengal, India.

[*]Author for correspondence: E. mail: mahitosh@smst.iitkgp.ernet.in , Tel.: +91 - 3222 - 283578 Fax: +91 3222 255303, 282221

Honey is a complex mixture of different biologically active constituents. Honey possesses anti-inflammatory, anti-oxidant and anti-tumor properties. Our chief investigation was to assess the crude-honey induced apoptosis and its molecular mechanism in the colon cancer cell proliferation. Honey exerted anti-proliferative potential against the two tested colon cancer cell lines (HCT 15 and HT 29 cells) as assessed by 3-(4, 5-dimethylthiazol-2-yl)-2, 5-diphenyl tetrazolium bromide (MTT) assay. Flow cytometry analysis indicated the increasing accumulation of hypodiploid nuclei in the sub-G_1 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 (Rh123 staining) and increasing the reactive oxygen species generation as detected by dichlorodihydrofluorescein diacetate (DCFDH-DA). Further apoptosis induction in the HCT 15 cells was confirmed using DNA fragmentation assay.