Apoptotic effect of eugenol in human colon cancer cell lines.


Source

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Abstract

Eugenol, a natural compound available in honey and various plants extracts including cloves and Magnoliæ flos, is exploited for various medicinal applications. Since most of the drugs used in the cancer are apoptotic inducers, the apoptotic effect and anticancer mechanism of eugenol were investigated against colon cancer cells. Antiproliferative effect was estimated using MTT [3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyl tetrazolium bromide assay]. Earlier events like MMP (mitochondrial membrane potential), thiol depletion and lipid layer break were measured by using flow cytometry. Apoptosis was evaluated using PI (propidium iodide) staining, TUNEL (terminal deoxynucleotidyl transferase-mediated dUTP nick end labelling) assay and DNA fragmentation assay. MTT assay signified the antiproliferative nature of eugenol against the tested colon cancer cells. PI staining indicated increasing accumulation of cells at sub-G1-phase. Eugenol treatment resulted in reduction of intracellular non-protein thiols and increase in the earlier lipid layer break. Further events like dissipation of MMP and generation of ROS (reactive oxygen species) were accompanied in the eugenol-induced apoptosis. Augmented ROS generation resulted in the DNA fragmentation of treated cells as shown by DNA fragmentation and TUNEL assay. Further activation of PARP (polyadenosine diphosphate-ribose polymerase), p53 and caspase-3 were observed in Western blot analyses. Our results demonstrated molecular mechanism of eugenol-induced apoptosis in human colon cancer cells. This research will further enhance eugenol as a potential chemopreventive agent against colon cancer.

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