

Hepatoprotective role of Cucurbitacin D on benzo[a]pyrene induced liver injury

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Abstract

Background: Epidemiological findings show the strong correlation of co-morbidity factors including smoking with the development and progression of liver cancer. Moreover, benzo[a]pyrene, a main component of tobacco smoke, is extremely carcinogenic and contributes to liver injury as well. Cucurbitacin, chemically classified as triterpenes, have shown diverse biological activities including potent antioxidant, anti-inflammatory and anti-cancer activities. However, their hepatoprotective activities are not completely understood.

Objective: In the present study, we investigated the cytoprotective activity of novel analog of cucurbitacin, cucurbitacin D, against benzo[a]pyrene-induced liver injury in human HepG2 cells.

Method: Proliferation, clonogenicity, migration, invasion, Western blotting and qPCR analysis were conducted to investigate the cytoprotective effect of cucurbitacin D against benzo[a]pyrene induced liver damage. DCFDA assay was performed to analyze intracellular reactive oxygen species (ROS) level in liver cells.

Results: Functional assays showed that cucurbitacin D exhibited cytoprotective effects against dose-dependent growth inhibition by benzo[a]pyrene in human HepG2 cells. This protective effect was likely associated with antioxidant potential of cucurbitacin D, as evidenced by the attenuation of ROS observed by fluorimeter and fluorescence microscopy. Further study is ongoing to examine the effect of cucurbitacin D on oxidative stress markers by employing western blotting and qPCR techniques. Collectively, these results exhibited that cucurbitacin D alleviate benzo[a]pyrene-induced liver injury through its antioxidant effects.

Conclusion: These results have demonstrated hepatoprotective effects of cucurbitacin D against benzo[a]pyrene-induced liver damage, rendering it as an effective potential ingredient in food supplements.