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Saffron: A possible target for a novel anti-cancer drug against hepatocellular carcinoma

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Background & Aims: Saffron has been proposed as promising candidate for cancer chemoprevention. The purpose of this investigation was to investigate the chemopreventive action and the possible mechanisms of ethanolic extract of saffron's stigmas against induced-liver cancer in rats. The hepatocarcinogenesis was initiated by diethylnitrosamine (DEN) and promoted by 2-acetyl aminofluorene. Administration of saffron at doses 75 mg/kg, 150 mg/kg and 300 mg/kg per day started two weeks prior to the DEN injection and continued for 22 weeks.

Results: Saffron attenuated the carcinogenic changes induced by DEN. It reduced the DEN-induced elevation of the number and the incidence of hepatic dyschromatic nodules. Saffron also decreased the number and the area of glutathione-S-transferase, placental form -positive foci in livers of DEN-treated rats. Furthermore, saffron counteracted DEN-induced oxidative stress in rats as assessed by restoration of superoxide dismutase, catalase, glutathione-S-transferase and glutathione levels and diminishing myeloperoxidase, malondialdehyde and protein carbonyl in liver. The results of immunohistochemical staining of rat liver showed that saffron inhibited the DEN-mediated elevations in numbers of cells positive for Ki-67, cyclooxygenase 2, inducible nitric oxide synthase and nuclear factor-kappa B-p 65. Saffron also blocked the depletion in the number of cells positive for TUNEL and caspase-3 in liver tissues of DEN-treated rats. **Conclusions:** The present study provides evidence that saffron exerts a significant chemopreventive effect against liver cancer through inhibition of cell proliferation and induction of apoptosis. This report also show some evidence that saffron protects rat liver from cancer via modulating oxidative damage and suppressing inflammatory response.