

# Saffron shows promise in preventing liver cancer

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New research suggests that saffron provides a significant chemopreventive effect against liver cancer in animal models. When saffron was administered to rats with diethylnitrosamine (DEN)-induced liver cancer an inhibition of cell proliferation and stimulation of apoptosis was observed. Full findings appear in the September issue of *Hepatology*, a journal published by Wiley Blackwell on behalf of the American Association for the Study of Liver Diseases.

Hepatocellular carcinoma (HCC), or liver cancer, is the fifth most common cancer and the third leading cause of [cancer mortality](#) in the world. Medical evidence has shown that chronic infection with [hepatitis B](#) and C are major risk factors for HCC, and exposure to environmental carcinogens, [iron overload](#), [fatty liver disease](#) and alcohol abuse can also contribute to development of [liver cancer](#). DEN, an environmental carcinogen, is found in tobacco-smoke, cosmetics, gasoline, and processed foods including milk and meat products.

"In the fight against cancer, there has been much interest in chemopreventive properties of natural herbs and plants," said Prof. Amr Amin from United Arab Emirates University. "With limited treatment options, approaches that prevent cancer development are among the best strategies to protect against the disease." Prior studies have shown that saffron, a naturally derived plant product, possesses antioxidant, anti-cancer, and anti-inflammatory properties. Saffron is a commonly used spice, adding flavor and color to foods, and a possible cancer-fighting substance that is readily available.

In order to further explore the potential of saffron in preventing the development and progression of HCC, DEN was used to induce lesions in rats, mimicking benign and malignant tumors in humans. The research team administered saffron to the animals at 75mg/kg, 150 mg/kg, and 300 mg/kg per day two weeks prior to DEN injection and continued the regimen for 22 weeks.

Results show saffron significantly reduced the number and the incidence of liver nodules, with animals receiving the highest dose of saffron showing complete inhibition of hepatic nodules. Animals that received pre-treatment with saffron displayed a decrease in the elevation of gamma glutamyl transpeptidase, alanine aminotransferase and alpha-fetoprotein (GGT, ALT,  $\alpha$ FP)—proteins which indicate liver damage. Furthermore, saffron inhibited the elevation of cells positive for Ki-67, cyclooxygenase 2, inducible nitric oxide synthase, nuclear factor-kappa Bp-65 and the phosphorylated tumor necrosis factor receptor, all of which have respective roles in the development and progression of cancerous cells.

"Our findings suggest that saffron provides an anti-cancer protective effect by promoting cell death (apoptosis), inhibiting proliferation of cancerous cells, and blocking inflammation," concluded Prof. Amin. "Further investigation of saffron extract and its mechanism of action in HCC is currently underway."

**More information:** "Saffron: A Potential Candidate for a Novel Anti-Cancer Drug Against Hepatocellular Carcinoma." Amr Amin, Alaaeldin A. Hamza, Khuloud Bajbouj, S. Salman Ashraf, Sayel Daoud. *Hepatology*; Published Online: July 19, 2011 ([DOI: 10.1002/hep.24433](https://doi.org/10.1002/hep.24433)); Print Issue Date: September 2011.

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