

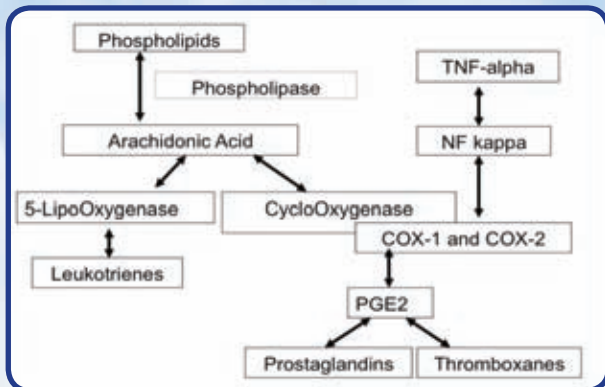
Curcumin

Curcumin is the main active constituent of turmeric, and is what gives turmeric its yellow colour. It has anti-inflammatory and antioxidant action. It may also possess hepatoprotective activity and support healthy cholesterol levels.

Anti-inflammatory

Curcumin has been shown to down regulate inflammatory transcription factors such as NF-kappa B (NF-κB), cytokines, cyclooxygenases and lipoxygenases.

Pathways of Inflammation



The NF-κB transcription factor is a master regulator of the inflammatory process which activates the expression of many pro-inflammatory cytokines, such as TNF-α, IL-1β and IL-6. Some of the NF-κB-induced proteins, like TNF-α, are also its activators, which is particularly important in the chronic inflammatory state. Curcumin is an inhibitor of the activity of the transcription factor NF-κB. ⁽¹⁾

Cyclooxygenase-2 (COX-2) and lipoxygenase (LOX) have also been found to be inhibited by curcumin through NF-κB dependent or independent pathways. Animal studies have also found curcumin induced a reduction in Prostaglandin E2 in irritable bowel syndrome. ⁽²⁾

Antioxidant

The Nrf2/antioxidant response element (ARE) signalling pathway plays a key role in activating cellular antioxidants, including heme oxygenase-1, NADPH quinone oxidoreductase-1, and glutathione. In vitro studies indicate protein kinase C (PKC) may also regulate these antioxidants. A study examining the role of PKC in ARE-mediated gene regulation in human monocytes by curcumin, a potent inducer of the Nrf2/ARE pathway found that curcumin activates ARE-mediated gene expression in human monocytes. ⁽³⁾

Hepatoprotection

An in vitro study to demonstrate the hepatoprotective activity of curcumin, using ethanol as a hepatotoxin, was conducted. The cytotoxicity of ethanol is estimated by

quantitating the release of LDH. Ethanol induces 3.5 times more release of LDH from the liver cells and twice the amount of lipid peroxidation as compared to the control cells and this was significantly reduced in presence of curcumin.

Animal studies have shown a hepatoprotective effect of curcumin. A study was designed to investigate the effects of oral curcumin pre-treatment on liver oxidative damage and trace element changes caused by cadmium chloride administration.

In rats, the level of cadmium (Cd) induced lipid peroxidation (320% of controls) was significantly lowered by curcumin pre-treatment (165% of controls). In mice, the Cd-induced lipid peroxidation (125% of controls) was abolished by curcumin treatment. Concurrently, a depletion of GSH was found in the liver of both Cd-treated (67% of controls) and Cd plus curcumin-treated mice (54% of controls).

Cholesterol

In order to understand the mechanism of hypocholesterolemic action of dietary curcumin, activities of hepatic cholesterol-7α-hydroxylase (the enzyme that breaks down cholesterol) and HMG CoA reductase (the enzyme that controls the production of cholesterol) were measured. Hepatic cholesterol-7α-hydroxylase activity was markedly higher in curcumin fed diabetic animals suggesting a higher rate of cholesterol catabolism.

A study evaluated the effects of curcumin on total cholesterol, LDL cholesterol, HDL cholesterol, and triglyceride in acute coronary syndrome (ACS) patients. The administration of low-dose curcumin showed a trend of reduction in total cholesterol level and LDL cholesterol level in ACS patients.

Curcumin has been shown in human and animal studies to have anti-inflammatory and antioxidant effects. It may also be protective of the liver and assist with cholesterol metabolism.

References available on request

