

The therapeutic potential of curcumin in alleviating N-diethylnitrosamine and iron nitrilotriacetate induced renal cell tumours in mice via inhibition of oxidative stress: Implications for cancer chemoprevention

ABSTRACT

This study was designed to reveal the protective effects of dietary supplementation of curcumin against renal cell tumours and oxidative stress induced by renal carcinogen iron nitrilotriacetate (Fe-NTA) in ddY male mice. The results showed that mice treated with a renal carcinogen, Fe-NTA, a 35% renal cell tumour incidence was noticed, whereas renal cell tumour occurrence was elevated to 80% in Fe-NTA promoted and N-diethylnitrosamine (DEN)-initiated mice as compared with saline- treated mice. No incidence of tumours has been observed in DEN-initiated non-promoted mice. Diet complemented with 0.5% and 1.0% curcumin fed prior to, during and after treatment with Fe-NTA in DEN-initiated animals, tumour incidence was reduced dose-dependently to about 45% and 30% respectively. Immunohistochemical studies also revealed the increased formation of 4-hydroxy-2-nonenal (HNE)-modified protein adducts and 8-hydroxy-2'-deoxyguanosine (8-OHdG) in kidney tissue of mice treated with an intraperitoneal injection of Fe-NTA (6.0 mg Fe/kg body weight.). Furthermore, Fe-NTA treatment of mice also resulted in significant elevation of malondialdehyde (MDA), serum urea, and creatinine and decreases renal glutathione. However, the changes in most of these parameters were attenuated dose-dependently by prophylactic treatment of animals with 0.5% and 1% curcumin diet, this may be due to its antioxidative impact of curcumin. These results suggest that intake of curcumin is beneficial for the prevention of renal cell tumours and oxidative stress damage mediated by renal carcinogen, Fe-NTA.