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Effect of Pine Needle on AOM-induced colon aberrant crypt formation and antioxidant system in Fisher 344 male rats fed high fat diet

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Pine needle has been known as a traditional medicinal plant and as showing a physically beneficial function to a human being. We determined the effect of pine needle supplementation on the promotion/progression phase of colon carcinogenesis after induction of the neoplastic process by azoxymethane (AOM). 5 week aged male Fisher 344 rats were given AOM (15mg/kg) once a week for two weeks. After the second injection, 18 of the rats were divided evenly into two groups and fed casein-based high-fat diet (120g fat, 1g cholesterol/kg diet) without or with a 10% (w/w) of pine needle powder (PNP). After 4 weeks, rat receiving PNP showed 40% reduction in the number of colonic preneoplastic lesions (aberrant crypts) and 52% reduction in the aberrant crypt foci ($p < 0.01$). A significant increase of erythrocyte catalase activity was observed in the PNP supplement group (17.4 ± 1.1 vs. 24.5 ± 1.5 , $p < 0.01$). The other antioxidant system such as erythrocyte glutathione peroxidase or plasma total antioxidant potential (TRAP) showed no statistical differences between the two groups. Our data demonstrate that the pine needle supplementation increases catalase activity in erythrocytes and suppresses the formation of colonic preneoplastic lesions. This phenomenon suggest new insights into the mechanism of chemopreventive properties of pine needle.