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Protective role of aspirin, vitamin C, and zinc and their effects on zinc status in the DMH-induced colon carcinoma model.

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Abstract

Chemoprotection refers to the use of specific natural or synthetic chemical agents to suppress or prevent the progression to cancer. The purpose of this study is to assess the protective effect of aspirin, vitamin C or zinc in a dimethyl hydrazine (DMH) colon carcinoma model in rats and to investigate the effect of these supplements on changes associated with colonic zinc status. Rats were randomly divided into three groups, group 1 (aspirin), group 2 (vitamin C) and group 3 (zinc), each being subdivided into two groups and given subcutaneous injection of DMH (30 mg/kg body wt) twice a week for 3 months and sacrificed at 4 months (A-precancer model) and 6 months (B-cancer model). Groups 1, 2, 3 were simultaneously given aspirin, vitamin C, or zinc supplement respectively from the beginning till the end of the study. It was observed that 87.5% of rats co-treated with aspirin or vitamin C showed normal colonic histology, along with a significant decrease in colonic tissue zinc at both time points. Rats co-treated with zinc showed 100% reduction in tumor incidence with no significant change in colonic tissue zinc. Plasma zinc, colonic CuZnSOD (copper-zinc superoxide dismutase) and alkaline phosphatase activity showed no significant changes in all 3 cotreated groups. These results suggest that aspirin, vitamin C or zinc given separately, exert a chemoprotective effect against chemically induced DMH colonic preneoplastic progression and colonic carcinogenesis in rats. The inhibitory effects are associated with maintaining the colonic tissue zinc levels and zinc enzymes at near normal without significant changes.