Abstract

Background: Selenium is a mineral that showed both pro- and anti-oxidant activities in various disease models. In this study, we evaluated the anti-tumor effect of selenium against 1,2-dimethylhydrazine (DMH)-induced colorectal cancer in BALB/C mice and its effect on apoptosis and angiogenesis.

Methods: Colorectal cancer was induced by subcutaneous injection of DMH (20 mg/kg body weight) in BALB/C mice once weekly for 20 weeks. Selenium (200 mg/L) was given to DMH plus selenium-treated group in the drinking water for the next 3 months.

Results: The DMH plus selenium-treated group exhibited significantly lower expression of cloned caudal-type homebox gene -2 (CDX-2) and vascular endothelial growth factor (VEGF) but higher caspase-3 expression level at $p<0.001$ compared to the DMH-treated group. Moreover, a decrease in the reduced glutathione content and glutathione peroxidase activity but an increase in the malondialdehyde content were observed at $p<0.001$. Both macroscopic and microscopic examination of the colorectal tissues confirmed the results.

Conclusions: The anti-tumor effect of selenium against an induced colorectal cancer in mice is attributed to its pro-oxidant, anti-angiogenic and apoptotic effects.

Keywords: Angiogenesis, Apoptosis, Cancer, Mineral, Oxidative Stress