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Sulforaphane Normalizes Intestinal Flora and Enhances Gut Barrier in Mice with BBN-Induced Bladder Cancer

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Abstract

Scope: Gut microbiota imbalance, inflammation, and gut barrier deficiency play an important role in carcinogenesis. Sulforaphane (SFN), an isothiocyanate found in cruciferous vegetables, has been proven to be highly effective in inhibiting cancer. The objective of this study is to investigate the potential roles of the gut microbiota in the inhibition of BBN-induced bladder cancer by SFN.

Methods and results: N-butyl-N-(4-hydroxybutyl)-nitrosamine is used to induce bladder cancer in male C57BL/6 mice, with or without SFN for 23 weeks. SFN ameliorates the histological changes characteristic of bladder cancer, resulting in fewer submucosal capillaries. SFN normalizes gut microbiota dysbiosis in mice with BBN-induced bladder cancer with a significant increase in Bacteroides fragilis and Clostridium cluster I. SFN also increases butyric acid levels in the mouse colon, and repairs the injury to the mucosal epithelium of the colon and cecum through the upregulation of the expression of tight junction proteins and GLP2. SFN greatly decreases the release of cytokines (IL-6) and secretory immunoglobulin A in the mice with bladder cancer.

Conclusion: These results suggest that SFN protects against chemical-induced bladder cancer through normalizing the composition of gut microbiota and repairing the physiological destruction of the gut barrier, as well as decreasing inflammation and the immune response.

Keywords: bladder cancer; gut microbiota; sulforaphane.

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