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Effects of berberine on tumor growth and intestinal permeability in HCT116 tumor-bearing mice using polyamines as targets.

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Abstract

The prognosis of colorectal cancer (CRC) is seriously affected by high intestinal mucosal permeability accompanied by increasing tumor load. Berberine, a natural plant-derived product, can protect the intestinal mucosal barrier and suppress tumor growth, but its effects on the intestinal mucosal barrier dysfunction of CRC have not yet been evaluated. Herein, we assessed the effects of berberine on the intestinal mucosal permeability of HCT116 tumor-bearing mice and the underlying mechanism. Berberine (6.25, 12.5, 25 mg/kg) was administered to tumor-bearing mice for 3 weeks by intraperitoneal injection, and saline was given to controls and models. Compared with the control group, tumor-bearing mice had increased intestinal mucosal permeability in the third week. Meanwhile, the body weight decreased by 4%-7%, the concentration of D-lactic acid in plasma increased, and the expressions of ZO1 and Occludin were down-regulated. The intestinal mucosa was impaired. Compared with the model group, berberine inhibited tumor growth in a dose-dependent manner (6.25, 12.5, 25 mg/kg), reduced the permeability of intestinal mucosa, and alleviated intestinal mucosal damage. HPLC showed that berberine decreased the content of polyamines in tumor tissue, whereas increased that in intestinal mucosa tissue. Western blot showed that berberine inhibited the expressions of ODC, C-MYC and HIF-1α, but up-regulated those of OAZ1 and SSAT. In short, berberine may exert antitumor effects by suppressing tumor growth and elevating the intestinal mucosal permeability.

KEYWORDS: Berberine; HPLC; Intestinal permeability; Polyamines

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