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Anticancer potential of β-Sitosterol in experimental colon cancer

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Asclepias curassavica Linn. is a traditional medicinal plant used by tribal people in the western ghats, India, to treat piles, gonorrhoea, roundworm infestation and abdominal tumours. We have determined the protective effect of β-sitosterol isolated from *A. curassavica* in colon cancer, using *in vitro* and *in vivo* models. The active molecule was isolated, based upon bioassay guided fractionation, and identified as β-sitosterol on spectral evidence. The ability to induce apoptosis was determined by its *in vitro* antiradical activity, cytotoxic studies using human colon adenocarcinoma and normal monkey kidney cell lines, and the expression of β-catenin and proliferating cell nuclear antigen (PCNA) in human colon cancer cell lines (COLO 320 DM). The chemopreventive potential of β-sitosterol in colon carcinogenesis was assessed by injecting 1,2-dimethylhydrazine (DMH, 20mg/kg b.w.) into male Wistar rats and supplementing this with β-sitosterol throughout the experimental period of 16 weeks at 5, 10, and 20 mg/kg b.w. β-sitosterol induced significant dose-dependent growth inhibition of COLO 320 DM cells (IC_{50} 266.2μM), induced apoptosis by scavenging reactive oxygen species, and suppressed the expression of β-catenin and PCNA antigens in human colon cancer cells. β-sitosterol supplementation reduced the number of aberrant crypt and crypt multiplicity in DMH-initiated rats in a dose-dependent manner with no toxic effects. We found doses of 10-20 mg/kg b.w. β-sitosterol to be effective for future *in vivo* studies. β-sitosterol had chemopreventive potential by virtue of its radical quenching ability *in vitro*, with minimal toxicity to normal cells. It also attenuated β-catenin and PCNA expression, making it a potential anticancer drug for colon carcinogenesis.