

ORIGINAL RESEARCH COMMUNICATION

# Dietary synbiotics reduce cancer risk factors in polypectomized and colon cancer patients<sup>1, 2, 3, 4</sup>

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**Background:** Animal studies suggest that prebiotics and probiotics exert protective effects against tumor development in the colon, but human data supporting this suggestion are weak.

**Objective:** The objective was to verify whether the prebiotic concept (selective interaction with colonic flora of nondigested carbohydrates) as induced by a synbiotic preparation—oligofructose-enriched inulin (SYN1) + *Lactobacillus rhamnosus* GG (LGG) and *Bifidobacterium lactis* Bb12 (BB12)—is able to reduce the risk of colon cancer in humans.

**Design:** The 12-wk randomized, double-blind, placebo-controlled trial of a synbiotic food composed of the prebiotic SYN1 and probiotics LGG and BB12 was conducted in 37 colon cancer patients and 43 polypectomized patients. Fecal and blood samples were obtained before, during, and after the intervention, and colorectal biopsy samples were obtained before and after the intervention. The effect of synbiotic consumption on a battery of intermediate bio-markers for colon cancer was examined.

**Results:** Synbiotic intervention resulted in significant changes in fecal flora: *Bifidobacterium* and *Lactobacillus* increased and *Clostridium perfringens* decreased. The intervention significantly reduced colorectal proliferation and the capacity of fecal water to induce necrosis in colonic cells and improve epithelial barrier function in polypectomized patients. Genotoxicity assays of colonic biopsy samples indicated a decreased exposure to genotoxins in polypectomized patients at the end of the intervention period. Synbiotic consumption prevented an increased secretion of interleukin 2 by peripheral blood mononuclear cells in the polypectomized patients and increased the production of interferon  $\gamma$  in the cancer patients.

**Conclusions:** Several colorectal cancer biomarkers can be altered favorably by synbiotic intervention.

**Key Words:** Prebiotic • probiotic • synbiotic • cancer • bio-markers • genotoxicity

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