



Fiber Shields from Colon Cancer

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Colorectal cancer (CRC) is the third most common cause of mortality in the world, with majority of cases being reported from developed countries associated with the changes in dietary pattern and lifestyle. Colorectal cancer is a multifactorial disease that has been associated with severe alterations in gut microbiota metabolome implicating them as critical contributors of the disease initiation and progression. Gut microbial communities protect against CRC by multiple mechanisms. *Human papillomavirus* (HPV) and *Helicobacter pylori* are the well-established oncogenic gut pathogens. Gut dysbiosis involving thriving of commensal and opportunistic pathogens are the key factors linked with various diseased conditions including CRC. Colorectal tumors were reported to have augmented levels of *Fusobacterium nucleatum*, which produces hydrogen sulfide in response to the red meat consumption, and induce DNA damage and genomic instability in the colonic epithelium and developing tumors. Consumption of red meat cooked at elevated temperatures were earlier been reported to accelerate the risk of CRC. It also increases the cholesterol, which is used to produce primary bile acids in liver. Almost 5% of these escape the enterohepatic circulation and reach colon where specific bacteria deconjugate and convert them into secondary bile acids, deoxycholic acid, which also contribute to DNA damage through free radical production. Hence, it could be suggested that diet and gut microbiome conspire at-times to increase CRC risk. On one hand diet enhances the risk of CRC, and at the same time, dietary bioactive components inhibit CRC.

Diet and dietary bioactive components are known as critical determinants of human health that modulate gut microbial composition and their metabolism. Studies have revealed that fruits, vegetables and whole grains reduce the risk of CRC. The anticancer activity of these are attributed to the specific class of dietary bioactive components such as fibers, antioxidant compounds including polyphenols and other bioactive compounds. One of the most extensively studied dietary components are fibers (including prebiotics). These are classified into insoluble or soluble fractions based on their water solubility. Apart from terrestrial resources (cereal, fruits and vegetables), marine algae also form a readily available source of dietary fibers. Unlike terrestrial dietary fibers that are rich in cellulose, hemicellulose, pectins, gums, resistant starch, etc. comprising of various monomeric units, marine dietary fibers include agar, alginate, carrageenan, fucoidan, etc. comprising of single monomeric moiety. The sulfation of marine dietary fibers also contribute their unique physiochemical properties and health benefits. Dietary fibers modulate the molecular, and gut microbial and metabolome to prevent colon carcinogenesis. These are fermented in large intestine by resident microbiota into short chain fatty acids (SCFA) specifically butyrate that inhibit proliferation and promote apoptosis of transformed cells. Therefore, diet containing bioactive compounds specifically fibers could be a promising strategy for the prevention of colon cancer. A lacuna still exists in understanding the underlying mechanism of cancer prevention by the fibers; hence, it is indispensable to understand their role in preventing carcinogenesis and maintaining intestinal homeostasis [1-11].

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