

Chemopreventive Effect of Phytochemicals against Colon Cancer

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Editorial

Currently, the incidence of colorectal cancer (CRC) has been declining, even though it remains a major public health concern worldwide. Prevention is better option for this disease [1], because it is sensitive to dietary intervention. CRC is a preventable disease, which is mostly influenced by environmental, lifestyle and dietary factors. Epidemiological data suggest that high intake of fruits and vegetables may decrease CRC risk [2]. The risk of cancer is reported to be two fold higher in persons with a low intake of fruits and vegetables compared to those with a high intake of them. Various reports show that 75% of all the sporadic cases of CRC are directly affected by dietary intake. Which indicate that dietary modification is plausibly one of the best remedy for alleviating the risk of developing CRC [3].

Epidemiological studies have shown a remarkable consistency in finding a lower risk for a variety of chronic diseases in selected communities consuming large amounts of plant foods, mainly fruits and vegetables. Variety of naturally occurring nutritive and nonnutritive constituents present in vegetables, fruits and grain products have been shown to inhibit many chronic diseases like colon cancer [4]. There is a growing body of literature suggesting that several natural occurring compounds as phytochemicals in the form of dietary supplement can reduce cancer progression risk and have been reported to hold an important role in the development of chemo preventive agents.

Some of the phytochemicals such as curcumin from turmeric, epigallocatechin gallate from green tea, genistein from soybean, lycopene from tomato, resveratrol from grapes, sulforaphane from cruciferous vegetables, rosmarinic acid from rosemary, phenethyl isothiocyanate from cruciferous vegetable, kaempferol from tea, broccoli, grapefruit, gingerol from gingers, fisetin from strawberries, apples, Diindolylmethane/Indole-3-carbinol from brassica vegetables, cyanidins from grapes, crocetin from saffron and apigenin from parsley are currently being used as cancer chemo preventive and treatment agents. Modes of action of these phytochemicals which are responsible for preventing or delaying the progression of the colon cancer are quite different to each other. Some of the most common mechanisms are induction of apoptosis in cancer cells, increase detoxification by inhibition of cyclooxygenases, DNA methylation, modification of PI3 kinase pathway, and tumor angiogenesis inhibition, modification of microbial population, and regulation of inflammation, etc.

Chemoprevention is defined as the intake of foreign agents in order to restrain induction, to prevent or slow the progression of cancer, or reversal of carcinogenesis at a premalignant stage [5]. Chemo preventive agents are typically natural products or their synthetic

analogues that inhibit the transformation of normal cells to premalignant cells or the progression of premalignant cells to malignant cells by modulating processes associated with xenobiotic biotransformation, along with the protection of cellular elements from oxidative damage. The effect of any dietary compound is influenced by the active bioavailability rather than the amount ingested. Depending on the personal predisposition, including genetics and medication, a bioavailability dose may cause different magnitudes of effects in different people. Bioavailability In the human body is defined as substances obtained from ingested dietary materials that reach circulatory system for further delivery into designated tissues so that the beneficial compounds are biologically available for providing health benefits. The normal routes of biotransformation of dietary phytochemicals include ingestion, digestions, and transport across gastrointestinal epithelium prior to circulatory vessels [6]. The main issue about the role of phytochemicals in health is very poorly understand, due to lack of sufficient information on transport mechanisms for phytochemicals delivery into the target sites, its metabolism in human body, and biomarkers exerting the health benefits.

Dietary phytochemicals are widely used as pharmaceuticals beneficial for human health. In summary, the interactions between dietary phytochemicals and the intestinal microbiome in mediating colon cancer risk are now clearly evident. Even though, the exact mechanism of actions and bioavailability of phytochemicals are poorly understood. Thus, comprehensive and systematic investigations of phytochemicals should be carried out considering its bioavailability, because single or clustered of dietary phyto molecules are contributing to chemopreventive action and will be important for future assessment.

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