Role of Food Carotenoids in Cancer Prevention

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Editorial

Carcinogenesis is a multi-step process that occurs when several biological levels are damaged, including genetic and metabolic alterations inside cells. It is possible to intervene during the beginning and course of cancer to prevent, decrease, or stop the transition of healthy cells to malignancy. There are a number of non-modifiable risk variables for each disease, such as age, inheritance, or institutional screening guidelines (e.g. prostate specific antigen [PSA] tests, mammograms, colonoscopy) that are difficult to change. Despite these non-modifiable risk factors, 85-90% of cancers are caused by environmental variables, the majority of which are influenced by one's lifestyle. Dietary adjustments are one of the most promising lifestyle improvements, with the potential to reduce the risk of cancer by approximately 40%.

The relationship between diet and cancer has been extensively researched during the last two decades. Diet has been linked to cancer incidence and aggressiveness in epidemiological research. Several carotenoids have been linked to a preventive effect against cancer incidence in various kinds of cancer in these studies. Although these correlations do not necessarily suggest causation, they can help to uncover patterns linked to decreased cancer incidence. Carotenoids are a large and diversified category of natural pigments found in a wide range of fruits and vegetables. Carotenoids are powerful antioxidants and essential for the synthesis of nutrients like vitamin A, in addition to their aesthetic qualities. The primary methods via which carotenoids have been linked to cancer are related to cell development and death processes. Other pathways that are often altered by carotenoid intake include those that are connected to their antioxidant activity. The literature on the most common dietary carotenoids and their current correlations with cancer incidence and progression is summarised in this review.

In epidemiological studies, high intakes of plant foods, such as carotenoid-rich, cruciferous, and soy vegetables, have been linked to lower chances of various human malignancies. Certain phytochemicals included in these plant foods have been demonstrated to have anticancer action in animal and cell models, indicating that they may have a role in cancer prevention. Regardless of their physiological significance, phytochemicals may operate as biomarkers of dietary consumption of a wide range of vegetables and fruits, making them useful in disease risk and dietary intervention research. Traditional data collecting methods are prone to misclassification and other forms of bias in epidemiological studies assessing food consumption, and are especially troublesome in dietary intervention studies when neither the researcher nor the participant is blind to the intervention.

Carotenoids are widely dispersed phytochemicals in plant meals, and we've found that plasma levels of these substances discriminate between those who eat a lot of vegetables and fruits and those who don't. As a result, plasma carotenoids might serve as indicators for total vegetable and fruit consumption. Although the human diet contains around 40 carotenoids, little is known about their absorption, metabolism, and possible interactions in response to the consumption of certain plant foods. In controlled feeding experiments, plasma carotenoid concentrations were evaluated after administration of carotenoid supplements (3-carotene and canthaxanthin) and after intake of single vegetables or vegetable derivatives (broccoli, carrots, and carrot and tomato juices). Additional identification and evaluation of plasma carotenoid concentrations in humans in response to feeding specific vegetables and combinations of vegetables could help researchers better understand human carotenoid absorption and metabolism, as well as facilitate the development of objective exposure markers for chemoprevention studies.

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