

The Role of Nutrition and Exercise in Cancer Prevention

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Cancer affects one of every three Americans during their lifetime. The number of new cancer cases has steadily increased over the past nine decades. The National Academy of Sciences, the U.S. Department of Health and Human Services, the National Cancer Institute, and the American Cancer Society have all indicated that 80-90 percent of all cancers are produced as a result of dietary and nutritional practices, lifestyle (smoking, alcohol consumption, etc.), chemicals, and other environmental factors.

Since nutrition, lifestyle and the environment are the most common risk factors for cancer, many of these cancers can be eliminated or substantially reduced through proactive preventive behaviors.¹

From a nutritional standpoint, several factors appear to affect cancer development. Excess dietary fat is associated with colorectal cancer and reproductive organ cancers.² Wynder suggested that up to 50 percent of all female cancer cases in the Western world are related to nutritional factors. This evidence is derived from cross-cultural epidemiological, migration and animal studies. The cancers that seem to be affected most involve the gastrointestinal tract and hormone-sensitive tumors.^{3,4,5}

For colon cancer, considerable evidence suggests that a high-fat diet stimulates the secretion of bile acids, which in turn can be converted into carcinogens (deoxycholic acid and lithocholic acid) in the large bowel.⁶ For reproductive organ cancers, a high-fat diet or obesity itself is associated with higher circulating levels of estrone hormone, which is considered a strong cancer-permissive estrogen. Estrone is formed primarily in adipose tissue from the precursor androstenedione. Vegetarians and individuals on lower fat diets have improved intestinal excretion of estrogens and lower circulating blood levels of these hormones. Their risk of reproductive organ cancers has been shown to be significantly lower.⁷

Dietary fiber is also a nutritional factor associated with cancer risk. Epidemiological and experimental studies indicate that high-fiber diets are associated with lower rates of colon carcinogenesis. It has been suggested that the bulking effect of insoluble fiber dilutes the effects of intestinal carcinogens and helps to decrease exposure by reducing intestinal transit time.⁸

More recently, a large body of evidence has been presented that suggests a further cancer-protective effect of antioxidant nutrients. Orange-yellow fruits and vegetables and dark green vegetables contain beta-carotene and other carotenoids. As reported by Ziegler, a number of studies have demonstrated a strong inverse association between carotenoid intake and risk of cancer of the lung, stomach, breast, bladder, and colon, as well as other sites.⁹ Other longitudinal studies have established an inverse association between blood beta-carotene levels and subsequent cancer development.^{10,11}

As reported by Block, approximately 90 epidemiological studies have examined the role of vitamin

C or vitamin C-rich foods in cancer prevention. Evidence is strong for cancers of the esophagus, oral cavity, stomach and pancreas, and substantial for cancer of the cervix, rectum, breast and lung.¹² For an updated review of the anticancer properties provided by vitamin C, consult the American Journal of Clinical Nutrition supplement to volume 54, December 1991.

As for vitamin E, the association between serum vitamin E levels and subsequent cancer risk has been examined in at least 12 longitudinal studies. Overall, the studies showed, on average, a 3 percent lower mean alpha-tocopherol level among individuals who later developed cancer. In particular, vitamin E appears to be protective against cancer of the stomach, pancreas, colon and rectum, and with selenium, may reduce risk of reproductive organ cancers in women.¹³

A number of preliminary intervention trials have demonstrated a reversal of a number of precancerous states and improved immune system function following antioxidant vitamin supplementation.¹⁴ Presently, the National Cancer Institute is conducting 21 intervention trials; a large number of these are using supplemented levels of antioxidants.¹⁵

A more optimal intake of antioxidant nutrients and calcium may be a prudent approach to cancer prevention. Calcium appears to affect colon cancer risk in a favorable way. Because calcium binds to bile acids, it prevents their conversion to carcinogens by large bowel bacteria. Calcium is also known to slow down the proliferation rate of large bowel epithelial cells; an effect that is also associated with decreased cancer risk.¹⁶ A number of retrospective studies have identified an inverse relationship between physical activity or exercise and risk of large bowel cancer and female reproductive organ cancers.^{17,18,19} It now appears that exercise can reduce the risk of cardiovascular disease and certain cancers.

In conclusion, a number of practical avenues are now thought to be available to the general public that may reduce the risk of cancer. Educating individuals as to the importance of avoiding or minimizing exposure to known carcinogens is primary to cancer prevention. However, it would also appear that a lifestyle program which provides a practical approach to dietary fat reduction, more optimal intake of fiber, antioxidant vitamins and calcium, and includes a reasonable plan for more physical activity, can substantially impact cancer incidence and associated health care costs.

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