Fiber Consumption Reduces The Risk Of Colorectal Cancer

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Gastrointestinal cancers are the second leading cause of death among all cancer patients. The death rate for cancer of the colon and rectum has remained virtually the same since 1930, which means there has been essentially no progress in the treatment of these cancers. The new colorectal cancer cases for 200 were approximately 130,200. The estimated number of deaths from colorectal cancer is 56,600. A person has a one-in-18 chance of developing colorectal cancer[1]over his or her lifetime.

Major differences in death rates from colorectal cancer occur in different parts of the world, the epidemiological studies show that dietary factors account for the difference incidence rates.[2] The more industrialized a country, the higher the rate of colorectal cancer because the people generally eat less fiber and more animal fat. The highest colorectal cancer rates are found in Western Europe and English-speaking countries. The lowest rates are found in Africa and Asia, but that is changing rapidly for Asians who have adopted a Westernized diet.

In countries with a high incidence of colorectal cancer, most of the cancers are located in the left colon and rectum, whereas in countries with a low incidence most of the cancers are in the right colon. Carcinogens become progressively more concentrated at the end of the gastrointestinal tract (left colon and rectum). Dr. Denis Burkitt shares the following analogy for this distribution of cancer: “While a man proceeds down a path carrying a leaky pot of water containing a tablet of dye that is gradually dissolving, the water becomes more deeply colored because the volume will be progressively reduced and the dye more concentrated, and more dye will be progressively dissolved.”

Role Of Fiber

Fiber is a complex carbohydrate consisting of a polysaccharide and a lignin substance that provides the structure of a plant cell. It is undigested residue that reaches the end of the small intestine. The three groups of dietary fiber types are vegetable fibers, which are highly fermentable and have a low undigested content; bran, which is less fermentable; and purified fibers, such as cellulose, which are much less fermentable and have a high undigested content.

Dietary fiber acts as a “glue” for certain chemicals. For instance, unconjugated bile acids, which the body produces, can be absorbed to fiber in the colon and passed out in the stool without intestinal bacteria forming carcinogens from those bile acids. In addition, some fiber finds to cholesterol, lipids, nitrogen, and certain minerals, and eliminates them in the stool. This action lowers the blood concentration of cholesterol and certain other lipids.

Drs. Higginson and Oettle were the first to report in 1960 that dietary fiber consumption was associated with a low risk of developing colon cancer.[3] They noted that the Bantu tribal people in South Africa had a low incidence of colorectal cancer. They also excreted large piles of feces that were related to the large amount of dietary fiber they ate. Dr. Denis Burkitt continued the research and concluded that the high-fiber diet resulted in a rapid transit time for solid material to pass through the gastrointestinal tract and also increased the amount of stool. These two variables are associated with a decreased incidence of colorectal cancer.[4]

Diet in rural Africa and in other similar locations provides about 25 grams of crude fiber daily, whereas Western diets provide only 8-15 grams of fiber daily. With a more rapid transit time, bile acids and other carcinogens produced by anaerobic bacteria move out of the

gastrointestinal tract more quickly. Furthermore, since the volume of feces is increased, carcinogens that are produced pass through the gut more diluted. Hence, if more dietary fiber is eaten, carcinogens pass out of the gut more quickly and there are fewer carcinogens per square inch.

Risk/Benefit Of Daily Consumption Of Fiber

According to the National Academy of Science, over 40% of North Americans are likely to develop cancer and at least half of them will die from it. The cancer incidence worldwide is increasing. The majority of health budgets will be spent on treating cancer in most developing countries.

Cancer is largely preventable. Fewer than 5% of cancer cases are linked to genetics.

Overwhelming evidence supports the statement that "the consumption of fiber may reduce the risk of colorectal cancer." In fact, based on the volume, credibility, and reliability of the scientific facts, we are convinced that fiber **can**, not may but **can** reduce the risk of colorectal cancer.

Amount Of Fiber

Depending on the study, North Americans typically consume only about 8-15 grams of fiber each day. Most of the consensus reports recommend 25 to 35 grams of fiber each day to protect against colorectal cancer. Unless North Americans have the time or inclination to become a grazing animal, it would be difficult to attain the protective level of fiber each day without taking a supplement.

Conclusion

- Dietary fiber is safe.
- Hundreds of studies, involving tens of thousands of subjects, demonstrate that 25 to 35 grams of dietary fiber daily can reduce the risk of colorectal cancer.
- Decreased risk is most convincingly linked to fiber from vegetables, followed by fibers from non-soluble polysaccharides, starches, and fiber foods with carotenoids.
- Supplemental wheat bran in the amount of 13.5 grams per day can decrease the recurrence rate of adenomatous colon polyps.
- Since North Americans typically consume an average of only 8 to 15 grams of fiber per day, a dietary fiber supplement may be warranted.
- Currently 40% of North Americans will develop cancer and the incidence is rising. If preventive measures are not instituted, the cost to the United States and its people will be enormous in terms of dollars, lost productivity, and lives lost.

Evaluating The Data

In 1982, the National Academy of Sciences found that, according to strict epidemiological criteria, there was "no conclusive evidence to indicate that dietary fiber exerts a protective effect against colorectal cancer in humans." Nevertheless, the U.S. National Academy of Sciences did

issue dietary guidelines because the data were "highly suggestive that reduced fat consumption and increased consumption of cereals, fruit, and vegetables represent the current state of knowledge and form the basis of a diet that is unlikely to do harm and may have the potential for reducing cancer rates in North America."

Because the evidence from epidemiological and laboratory studies was sufficiently consistent that high-fiber, low-fat diets could lower cancer risk, other U.S. agencies, organizations, and other governments issued interim dietary guidelines in the mid 1980s. These included the United States National Cancer Institute, National Institutes of Health, United States Department of Agriculture, department of Health and Human Services, American Cancer Society, Australia, Canada, the Joint European Organization for Cooperation in Cancer Prevention, Norway, Sweden, and Japan. They all independently agreed that to reduce cancer risk, people should increase their consumption of green, yellow, and cruciferous vegetables, citrus fruits, and whole-grain cereal products; and reduce their intake of fats to about 30 percent.

In 1984, the United States National Cancer Institute recommended an intake of 25-35 grams of fiber daily to decrease the risk of cancer. However, the American public consumes only about 8-15 grams of fiber per day.

During the last 25 years, thousands of in vitro and animal studies have been published demonstrating that fiber can decrease the risk of colorectal cancer. These papers have not been included in this review. Since 1980, hundreds of published papers demonstrate that high fiber intake can reduce the incidence of colorectal cancer in humans. Some have been included in this review. [5-108]

Reports On Fiber Form The Nci

Reports from the United States National Cancer Institute are consistent that dietary fiber can decrease the risk of colorectal cancer:

- "This evaluation clearly suggests a relationship between colon cancer and a diet low in fiber." From 40 epidemiological studies in 55 reports (Greenwald P, et al: Dietary fiber in the reduction of colon cancer risk. J Am Diet Assoc 87[9];1178-1188,1987).
- "The analysis of these studies gives support for a protective effect [against colorectal cancer] associated with fiber-rich diets.' From 23 case-control studies, 7 international correlation studies, 8 within-country correlation studies, 2 cohort studies, and 3 time-trend studies (Trock, Lanza, Greenwald: Dietary fiber, vegetables, and colon cnacer: critical review and meta-analysis of epidemiological studies. JNCI 82:650-661, 1990).
- "Based on current knowledge, recommended nutrition guidelines for reducing the risk of colon cancer include decreased fat consumption, adequate amounts of fruits, vegetables, and calcium, and avoidance of overweight" (Shike, Winawer,Greenwald, et al: Primary prevention of colorectal cancer. Bull WHO 68:377-385, 1990).
- "Both prospective and retrospective studies suggest that vegetable and fruit intake may reduce the risk of cancers…including cancer of the colon and rectum" (Ziegler RG: Vegetables, fruits, and carotenoids and the risk of cancer. Environmental Epidemiology branch, National Cancer Institute, Bethesda, MD 20982. Am J Clin Nutr 53 [1 Suppl]:25IS-259S, January 1991).

Consensus Statements

Various organizations and governments around the world have issued consensus statements that high fiber consumption can reduces the risk of colorectal cancer.

- 1999 World Health Organization: "The consumption of foods rich in polysaccharides (e.g., dietary fiber or non-starch polysaccharides) is associated with a decreased risk of colorectal adenoma and colorectal cancer" (Eur J Canc Prev 3:57-62, 1999).
  Recommendation; Vegetables and whole-grain cereals should be consumed in high amounts and should be a major component of the diet.
- 1999 Colon Cancer Prevention Program Project; "13.5 grams of wheat bran per day decreases the recurrence rate of adenomatous colon polyps" (AM J Med 106[1A]:43S-45S,1999).
- 1999 The Seven Countries Study Conclusion (Croatia, Finland, Greece, Italy, Japan, Netherlands, Serbia, U.S.): "High fiber intake was strongly associated with low colorectal mortality. An increase of 10 grams in the daily intake of fiber was associated with a 33% lower risk of 25-year colorectal cancer mortality" (Int J Cancer 84:174-179, 1999)
  Recommendation: Increase the daily intake of fiber by 10 grams.
- 1998 European Cancer Prevention Consensus Panel: "A diet rich in high-fiber cereal is associated with a reduced risk of colorectal cancer." (Eur J Canc Prev 7 [suppl 2':S1-S3,1998).
- 1997 American Dietetic Association Position: "Results of all studies provide substantive evidence that intake of fiber-rich foods is inversely related to risks of both colon and rectal cancers. It is estimated that the risk of colorectal cancer in the U.S. populations could be reduced by about 31 percent if fiber intake from food sources were increased by an average of about 13 grams per day" (J Am Diet Assoc 97[10]:1157-1159, 1997).
  Recommendation: Promote food intake patterns consistent with the Food Guide Pyramid. This recommends a wide variety of plant foods to achieve adequate fiber intakes in healthy children and adults. Include at least 2 to 3 servings of whole grains as part of the daily 6 to 11 servings of grains, 2 to 4 servings of frits and 3 to 5 servings of vegetables daily, and legumes at least once or twice a week.
- 1995 Australia: "Reduction in the incidence in large adenomas was observed when a low-fat diet was combined with high-fiber wheat bran supplementation of 25 grams per day" (JNCI 87:1760-1766, 1995).
  Recommendation: 25 grams of fiber daily.
- 1994 United Nations Food and Agriculture Organization: "High fiber intake consisting of vegetables and cereals was protective against colorectal cnacer." (Eur J Canc Prev 7 [suppl 2];S11-S17, 1998).

References:

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[2] SimoneCB: Cancer and Nutrition. Garden City Park: Avery Publishing 1995.

[3] Higginson J, Oettle AG: Cancer incidence in the Bantu and "Cape Colored" races of South Africa: report of a cancer survey in the Transvaal (1953-1955). JNCI 24:589-671, 1960.

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[5-108] Alabaster O, Tang Z, Shivapurkar N: Dietary fiber and the chemopreventive modulation of colon Carinogenesis. *Mutat Res* 350(1);185-197, February 19,1996