



# Foods for Cancer Prevention

PhysiciansCommittee  
for Responsible Medicine

Despite a wealth of scientific data, most people remain unaware of how they can reduce their risk of developing cancer. According to a study released in 2008, only 5-10 percent of cancer cases are linked to genetics; the remaining 90-95 percent stem from environment and lifestyle factors and are potentially preventable. Twenty-five to 30 percent of cancer cases are due to tobacco use, and about 1 in 3 cases are due to food choices.<sup>1</sup> These numbers continue to rise. In 2014, the Centers for Disease Control and Prevention and the National Cancer Institute compared cancer rates and deaths linked to risk factors such as red and processed meat intake, overweight, and low intake of fruits, vegetables, and dietary fiber. During that year in the United States, 42 percent of cancer cases and 45 percent of cancer deaths were linked to avoidable risk factors such as excess body weight. Factors within our control, like diet and exercise, are largely accountable for cancer outcomes.<sup>2</sup>

## What Is Cancer?

Cancer begins as a single abnormal cell that multiplies out of control. Groups of such cells form into masses called tumors and invade healthy tissue, often spreading to other parts of the body. Carcinogens are substances that help facilitate the development of cancerous cells. They may come from foods, from the air, or even from within the body. Most carcinogens are neutralized before they are able to cause any damage to the body, but sometimes they go on to attack the cell's genetic material (DNA) and alter it. It takes years for a noticeable tumor to develop. During this time, compounds known as inhibitors can keep the abnormal cells from growing. Some vitamins in plant foods are known to be inhibitors. Excess dietary fat, on the other hand, is known to be a promoter that helps the abnormal cells grow quickly.

## Fiber Fights Cancer

In 1970, British physician Dennis Burkitt observed that a high-fiber diet reduced the occurrence of diseases in the digestive tract. He observed that in countries where diets are high in fiber (that is, plant-based diets), there were fewer cases of colon cancer.<sup>3</sup> The highest fiber intakes are found in nonindustrialized nations where meat is scarce and plant foods fill the menu. Animal products like meat, eggs, and dairy do not contain fiber. This is why we see the highest rates of colon cancer in the United States and other

nations with diets high in these foods.

There are several ways fiber helps prevent cancer of the digestive tract. By definition, fiber cannot be digested. It draws water into the digestive tract. The water and fiber make fecal matter bulkier, so carcinogens are diluted and have less contact with the walls of the intestines. It then moves food quickly through the intestinal tract, helping to eliminate carcinogens as waste.

Another way fiber helps reduce risk of colon cancer is in relation to bile. Bile acids enter the intestine to help digest fat from the foods we eat. However, bacteria in the gut can turn the bile acids into chemicals which promote colon cancer. Fiber can act like a security guard and bind with these bile acids to remove them from the intestines.<sup>4</sup> Also, bacteria in the colon ferment the fiber creating a more acidic environment, which may make bile acids less toxic. Research confirms that high fiber diets protect against colon cancer and can even increase survival of those already diagnosed with the disease.<sup>5-8</sup>

Fiber is also protective against other forms of cancer. Research shows that stomach cancer and breast cancer are less common with high-fiber diets.<sup>9-11</sup> In the case of breast cancer, fiber helps regulate levels of the hormone estrogen in the body. Excess estrogen is normally secreted into the intestine where fiber then binds with the hormone and moves it out of the body.<sup>12</sup> Without fiber, estrogen can be reabsorbed from the intestine back into the bloodstream and increase the risk of breast cancer.

In the United States, the average daily fiber intake is 10-20 grams per day, but experts recommend at least 30-40 grams per day. The best sources of fiber are minimally processed whole grains, beans, peas, lentils, vegetables, and fruits. Foods that are closest to their natural state, unrefined and unpeeled, are highest in fiber.

## Excess Fat Raises Cancer Risk

Cross-cultural studies show that populations with the highest levels of fat consumption also have the highest death rates from breast and colon cancer. The lowest rates are in groups with the lowest consumption of fats.<sup>13</sup> Research from *The China Study* rules out genetics as a major contributing factor. Results showed that individuals living in larger cities where the food tends to be richer and higher in animal fat have higher cancer rates than their counterparts living in more rural areas where plant-based foods are the center of the plate.<sup>14</sup>

Many studies indicate that fat in foods increases one's risk for cancer and may lower breast cancer survival rates for those who have cancer.<sup>15,16</sup> In addition, consumption of fat earlier in life can have a long-term effect on breast cancer rates both pre- and post-menopause.<sup>17</sup>

Although the total amount of fat one eats is of concern, there is evidence that animal fat, which often contains more saturated fat specifically, is much more harmful than fat from vegetables or other plants. One study noted a 200 percent increase in breast cancer rates among those who consume beef or pork five to six times per week. Dr. Sheila Bingham, a prominent cancer researcher from the University of Cambridge, notes that meat is more closely associated with colon cancer than any other factor.<sup>18</sup>

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Meat and milk are also linked to both prostate and ovarian cancers.<sup>19</sup> Most of the fat found in meat and dairy products is saturated fat; these foods also contain cholesterol. Both of these are harmful nutrients for many health conditions and have specifically been found to increase risk for prostate cancer.<sup>20</sup>

Fat has many effects within the body. It increases hormone production and thus raises breast cancer risk. It also stimulates the production of bile acids linked to colon cancer. Research also suggests that inflammation plays a role in cancer development. In a study of 10,525 men and women, those who ate diets higher in fat and sugar were four times more likely to develop and 53 percent more likely to die from stomach and esophageal cancer, compared with those who consumed plant-based diets.<sup>21</sup>

The average diet in the United States is about 37 percent fat. The recommended daily intake of fat, according to the USDA, is around 30 percent of one's calories. Some studies suggest that fat intake should be well below 30 percent to have an anticancer affect; closer to 15 percent may be optimal.<sup>14</sup>



It's not only the saturated fat from animal products that contributes to cancer development. In 2015, the World Health Organization classified both red and processed meats (e.g., bacon) as carcinogens. The World Health Organization and American Cancer Society recommend limiting consumption of processed meat and red meat for cancer prevention. Research links these types of meat with colon, stomach, pancreatic, and prostate cancers.<sup>22</sup> In addition, research on red meat shows its link to breast cancer and bladder cancer.<sup>23-27</sup> Suggested mechanisms for this link, in addition to the saturated fat, include heme iron, animal protein, and carcinogenic compounds like nitrates, nitrites, and heterocyclic amines.

In an analysis of 21 different types of cancer in 157 countries, researchers found that consumption of animal products was linked as strongly to smoking tobacco as the development of cancer. In addition to the high iron and fat content, there may be a relationship between eating animal products and increased insulin and growth factors (like IGF-1) in the body. Too much insulin in the blood stream can stimulate growth of cancer cells.<sup>28</sup>

## Milk and Cancer Risk

Research also suggests a link between dairy and cancer. The growth hormone IGF-1 (insulin-like growth factor) is most commonly found in cow's milk and encourages rapid cancer cell growth. Those who drink more milk and eat milk products such as cheese have higher rates of breast cancer, prostate cancer, and ovarian cancer.<sup>29-31</sup>

In the case of ovarian cancer, the culprit is not necessarily milk fat or IGF-1, but milk sugar. When lactose (the sugar naturally found in milk) is broken down in the body, it turns into a smaller sugar called galactose, which is then further broken down by enzymes. When consumption of lactose increases to the point that the body does not have enough enzymes to break down galactose, the resulting build-up of galactose in the blood stream damages a woman's ovaries. This explains the findings from the Iowa Women's Health study showing that women who consume more than one glass of milk per day had a 73 percent greater chance of developing ovarian cancer than women who drank less than one glass per day.<sup>32</sup>

In a study of men who were already diagnosed with prostate cancer, drinking whole milk was associated with an increased risk of cancer recurrence, especially in men who were overweight or obese. Drinking more than 4 servings of whole milk per week increased risk by 73 percent when compared to those who consumed fewer or no servings of milk.<sup>31</sup>

Lastly, lactose intolerance occurs in people who lack the enzyme to break down lactose in milk. Those who are lactose intolerant tend to minimize or avoid dairy products so as to avoid digestive distress from not being able to digest lactose. Research shows that people with lactose intolerance who avoid milk products altogether tend to have lower rates of breast, lung, and ovarian cancers. This benefit was not found in their family members who

consume dairy, suggesting that a dairy-free diet is protective against these cancers.<sup>29</sup>

## Alcohol and Tobacco

Both alcohol and tobacco have extensively been shown to be carcinogenic and can increase a person's risk for various cancers such as lung, stomach, liver, and pancreatic.<sup>33</sup>

## The Importance of Plant-Based Foods

Not only are most vegetables low in fat and high in fiber, they also contain many cancer-fighting substances. Carotenoids, the pigment that gives fruits and vegetables their dark colors, have been shown to help prevent cancer. Beta-carotene, present in dark green, yellow, and orange vegetables, helps protect against lung cancer and may help prevent cancers of the bladder, mouth, larynx, esophagus, breast, and other sites.<sup>34-37</sup>

Cruciferous vegetables such as cabbage, broccoli, kale, turnips, cauliflower, and Brussels sprouts contain plant nutrients called flavones and indoles which are thought to have anticancer activities.

Vitamin C, found in citrus fruits and many vegetables, may lower risks for cancers of the esophagus and stomach. Vitamin C acts as an antioxidant, neutralizing cancer-causing chemicals that form in the body. It also stops the conversion of nitrates into cancer-causing nitrosamines in the stomach. Vitamin C and carotenoids have been found to be especially powerful in reducing risk for breast cancer as well.<sup>38</sup>

Selenium is found in whole grains and has the same antioxidant effects as vitamin C and beta-carotene. Vitamin E also has this effect. Caution is advised in supplementing selenium, which is toxic in large doses. Researchers continue to discover more antioxidants in plant-based foods as well as the role they play in fighting inflammation and cancer.

## Vegetarians Are Better Off

Evidence suggests that low-fat, high-fiber diets rich in fruits, vegetables, whole grains, and beans best protect against cancer. Not surprisingly, vegetarians, whose diets are full of these plant foods, are at the lowest risk for cancer compared to those who

eat meat.<sup>39</sup>

Some explanations for this may be that vegetarians have higher levels of beta-carotene in their blood. They also consume more antioxidants like vitamin C, beta-carotene, indoles, and more fiber than meat-eaters.<sup>40</sup> German researchers discovered that vegetarians have stronger immune systems with more than twice the natural killer cell activity of meat-eaters. These cells are specialized immune cells that attack and neutralize cancer cells, so their increased activity can protect the body against cancer. Also, vegetarians tend to eat more soy products (e.g., tofu, edamame, tempeh, etc.) than meat-eaters. Soybeans contain many anti-carcinogenic substances, including lignans and phytoestrogens. A diet that is rich in soybeans may be one reason for the lower incidence of breast cancer in Asia.

Many studies of people who avoid meat in favor of plants show that they have less risk of prostate, colorectal, and breast cancer.<sup>41-44</sup> A research study that combined many large-scale studies found that vegetarians not only have lower body mass index, cholesterol and blood glucose, but also have a lower incidence of any kind of cancer. The relationship was strongest for those following a vegan diet, entirely based on plants.<sup>45</sup>

## Conclusion

Modifiable lifestyle factors like diet and exercise contribute to the majority of cancer cases. Due to its high-fiber, high-antioxidant, and low-fat content, the best diet for cancer prevention is a plant-based diet. By avoiding alcohol and tobacco and eating plenty of fruits, vegetables, whole grains, peas, beans, and lentils, a person can significantly decrease their risk of developing cancer.



## References

1. Anand P, Kunnumakara AB, Sundaram C, et al. Cancer is a preventable disease that requires major lifestyle changes. *Pharm Res*. 2008;25:2097–2116.
2. Islami F, Goding Sauer A, Miller KD, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States. *CA Cancer J Clin*. 2018;68:31-54.
3. Burkitt DP. The etiological significance of related diseases. *Can Fam Physician*. 1976;22:63-71.
4. Kritchevsky D. Diet, nutrition, and cancer: the role of fiber. *Cancer*. 1986;58:1830-1836.
5. Song M, Wu K, Meyerhardt JA. Fiber intake and survival after colorectal cancer diagnosis. *JAMA Oncol*. 2018;4:71-79.
6. Ben Q, Sun Y, Chai R, Qian A, Xu B, Yuan Y. Dietary fiber intake reduces risk of colorectal adenoma: a meta-analysis. *Gastroenterology*. 2014;146:689-699.
7. O'Keefe SJ, Li JV, Lahti L, et al. Fat, fibre and cancer risk in African Americans and rural Africans. *Nat Commun*. 2015;6:6342-6356.
8. Zhu B, Sun Y, Qi L, Zhong R, Miao X. Dietary legume consumption reduces risk of colorectal cancer: evidence from a meta-analysis of cohort studies. *Sci Rep*. 2015;5:8797-8804.

9. Risch HA, Jain M, Choi NW, et al. Dietary factors and the incidence of cancer of the stomach. *Am J Epidemiol*. 1985;122:947-959.
10. Lubin F, Wax Y, Modan B, et al. Role of fat, animal protein and dietary fiber in breast cancer etiology: a case control study. *J Natl Cancer Inst*. 1986;77:605-612.
11. Farvid MS, Eliassen AH, Cho E, Liao X, Chen WY, Willett WC. Dietary fiber intake in young adults and breast cancer risk. *Pediatrics*. 2016;137:e20151226-e20151239.
12. Goldin BR, Adlercreutz H, Gorbach SL, et al. Estrogen excretion patterns and plasma levels in vegetarian and omnivorous women. *N Engl J Med*. 1982;307:1542-1547.
13. Lan HW, Carpenter JT. Breast cancer: incidence, nutritional concerns, and treatment approaches. *J Am Diet Assoc*. 1987;87:765-769.
14. Campbell TC, Campbell TM. *The China Study: the Most Comprehensive Study of Nutrition Ever Conducted and the Startling Implications for Diet, Weight Loss and Long-Term Health*. Dallas, TX: BenBella Books; 2007.
15. Wynder EL, Rose DP, Cohen LA. Diet and breast cancer in causation and therapy. *Cancer*. 1986;58:1804-1813.
16. Sieri S, Chiodini P, Agnoli C, et al. Dietary fat intake and development of specific breast cancer subtypes. *J Natl Cancer Inst*. 2014;106:dju068-dju074.
17. Farvid MS, Cho E, Chen WY, Eliassen AH, Willett WC. Premenopausal dietary fat in relation to pre- and post-menopausal breast cancer. *Breast Cancer Res Treat*. 2014;145:255-265.
18. Bingham S. Meat, starch and non-starch polysaccharides, are epidemiological and experimental findings consistent with acquired genetic alterations in sporadic colorectal cancer? *Cancer Lett*. 1997;114:25-34.
19. Rose DP, Boyar AP, Wynder EL. International comparisons of mortality rates for cancer of the breast, ovary, prostate, and colon, and per capita food consumption. *Cancer*. 1986;58:2363-2371.
20. Allott EH, Arab L, Su LJ, et al. Saturated fat intake and prostate cancer aggressiveness: results from the population-based North Carolina-Louisiana Prostate Cancer Project. *Prostate Cancer Prostatic Dis*. 2017;20:48-54.
21. Tabung FK, Steck SE, Zhang J. Dietary inflammatory index and risk of mortality: findings from the Aerobics Center Longitudinal Study. Poster presented at: American Institute for Cancer Research (AICR) Annual Research Conference; November 7, 2013; Bethesda, MD.
22. Bouvard V, Loomis D, Guyton KZ, et al. Carcinogenicity of consumption of red and processed meat. *Lancet Oncol*. 2015;16:1599-1600.
23. Bradbury K, Key T. The association of red and processed meat, and dietary fibre with colorectal cancer in UK Biobank. Poster presented at: National Cancer Research Institute Cancer Conference; November 3, 2015; Liverpool, UK.
24. Rada-Fernandez de Jauregui D, Evans CEL, Jones P, Greenwood DC, Hancock N, Cade JE. Common dietary patterns and risk of cancers of the colon and rectum: Analysis from the United Kingdom Women's Cohort Study (UKWCS). *Int J Cancer*. 2018;143:773-781.
25. Anderson JJ, Darwis NDM, Mackay DF, et al. Red and processed meat consumption and breast cancer: UK Biobank cohort study and meta-analysis. *Eur J Cancer*. 2017;90:73-82.
26. Li F, An S, Hou L, Chen P, Lei C, Tan W. Red and processed meat intake and risk of bladder cancer: a meta-analysis. *Int J Clin Exp Med*. 2014;7:2100-2110.
27. Farvid MS, Cho E, Chen WY, Eliassen AH, Willett WC. Dietary protein sources in early adulthood and breast cancer incidence: prospective cohort study. *BMJ*. 2014;348:g3437-g3448.
28. Grant W. A multicountry ecological study of cancer incidence rates in 2008 with respect to various risk-modifying factors. *Nutrients*. 2014;6:163-189.
29. Ji J, Sundquist J, Sundquist K. Lactose intolerance and risk of lung, breast and ovarian cancers: aetiological clues from a population-based study in Sweden. *Br J Cancer*. 2015;112:149-152.
30. McCann SE, Hays J, Baumgart CW, et al. Usual consumption of specific dairy foods is associated with breast cancer in the Roswell Park Cancer Institute Databank and BioRepository. *Curr Dev Nutr*. 2017;1:e000422-e000428.
31. Tat D, Kenfield SA, Cowan JE, et al. Milk and other dairy foods in relation to prostate cancer recurrence: Data from the cancer of the prostate strategic urologic research endeavor (CaPSURE™). *Prostate*. 2018;78:32-39.
32. Kushi LH, Mink PJ, Folsom AR, et al. Prospective study of diet and ovarian cancer. *Am J Epidemiol*. 1999;149:21-31.
33. Cho CH, Purohit V, eds. *Alcohol, Tobacco and Cancer*. Bethesda, MD: Basel, Karger; 2006:13-28.
34. Ruano-Ravina A, Figueiras A, Barros-Dios JM. Diet and lung cancer: a new approach. *Eur J Cancer Prev*. 2000;9:395-400.
35. DiGiovanna JJ. Retinoid chemoprevention in patients at high risk for skin cancer. *Med Pediatr Oncol*. 2001;36:564-567.
36. Zhang S, Hunger DJ, Forman MR, et al. Dietary carotenoids and vitamins A, C, and E and risk of breast cancer. *J Natl Cancer Inst*. 1999;91:547-556.
37. Cook N, Stampfer MJ, Ma J, et al. Beta-carotene supplementation for patients with low baseline levels and decreased risks of total and prostate carcinoma. *Cancer*. 1999;86:1783-1792.
38. Boggs DA, Palmer JR, Wise LA, et al. Fruit and vegetable intake in relation to risk of breast cancer in the Black Women's Health Study. *Am J Epidemiol*. 2010;172:1268-1279.
39. Orlich MJ, Fraser GE. Vegetarian diets in the Adventist Health Study 2: a review of initial published findings. *Am J Clin Nutr*. 2014;100:353S-358S.
40. Malter M. Natural killer cells, vitamins, and other blood components of vegetarian and omnivorous men. *Nutr and Cancer*. 1989;12:271-278.
41. Tantamango-Bartley Y, Knutsen SF, Knutsen R, et al. Are strict vegetarians protected against prostate cancer? *Am J Clin Nutr*. 2016;103:153-160.
42. Orlich MJ, Singh PN, Sabaté J, et al. Vegetarian dietary patterns and the risk of colorectal cancers. *JAMA Intern Med*. 2015;175:767-776.
43. Bodai BI, Tuso P. Breast cancer survivorship: a comprehensive review of long-term medical issues and lifestyle recommendations. *Perm J*. 2015;19:48-79.
44. Er A, Lane JA, Martin RM, et al. Adherence to dietary and lifestyle recommendations and prostate cancer risk in the Prostate Testing for Cancer and Treatment ( ProtecT ) Trial. *Cancer Epidemiol Biomarkers Prev*. 2014;23:2066-2077.
45. Dinu M, Abbate R, Gensini GF, Casini A, Sofi F. Vegetarian, vegan diets and multiple health outcomes: a systematic review with meta-analysis of observational studies. *Crit Rev Food Sci Nutr*. 2017;57:3640-3649.

