

# Aunt Cathy's Guide to Nutrition:

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## What We Know Now about Diet and Cancer of the Prostate, Colon, Breast and Pancreas

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### Some background:

When I first wrote this paper it was 1989 and I had just completed treatment for breast cancer. I have up-dated it annually since then. During my cancer treatment I began to search the legitimate scientific literature for anything that I could contribute to the fight from my own professional field of nutrition. Even way back then I found a number of useful things in the cancer research journals and my oncologist and I tried several promising nutrition-related adjustments. We chose those that were reported to possibly improve the effectiveness of the cancer-killing agents, and in addition minimize some of the expected unpleasant side effects.

It became clear that something about our plan helped me to get through surgery, a stem-cell transplant, high dose chemotherapy and then radiation with fewer of the expected discomforts (although there were still plenty left!) I was able to produce enough stem cells for the transplant in just one day instead of the expected three. After the actual transplant (getting my stem cells back when the chemo was over,) my immune system recovered much faster than expected . . . my bone marrow “re-engrafted” in just half the time it usually took. Strength and energy recovery was also faster than expected for people in my situation. My length of hospital stay was shorter. And . . . oh, yes . . . the BIG ONE: I am still here even though at diagnosis the cancer had already spread to 19 lymph nodes and my original prognosis was very poor.

**It is important to reiterate that I did not “cure myself” with nutrition.** My oncologist saved my life with an aggressive treatment plan. My tinkering with nutrition adjustments just gave me a more level playing field . . . and helped me survive the treatment. That was years ago and the things we did were specific to the chemotherapy they were using at the time. The treatment protocols are all different now, so in terms of a nutrition regimen “one size does not fit all.” However, there is a lot more exciting research out there now in the scientific journals (not the “National Enquirer” type.)

What I have here is an outline of my current best guess about simple, inexpensive and safe nutrition suggestions that appear to decrease risk of developing certain cancers . . . “subject to change at any moment!” ☺ In some cases, there are applications that also show benefit in cancer treatment in conjunction with chemotherapy. Please note that I do not sell anything (and I never will) and of course, nothing here is intended to take the place of the advice of your health care professionals. Please feel free to share this paper with anyone. For most of this I have not listed the references because there are just too many. However, some of the newest references are included here, and an example of more is at the end. Others are available by request.

## 1. A PLANT-BASED DIET

**Increasing fruits, vegetables and grains reduces risk of many cancers.** They provide an amazing assortment of cancer-fighters, including vitamins and phytochemicals (plant chemicals). A primarily plant-based diet also decreases meat intake, a source of saturated fat. Curing meats or cooking meat to “well done” produces substances that increase risk. **Adequacy of folic acid (a B vitamin) and lutein in kale, spinach, broccoli and greens** decrease risk of breast cancer. **Interestingly, the factors that decrease risk of breast cancer are often shown to also be protective against cancer of the prostate and colon, (and now it looks like pancreatic cancer as well,) so for these types of cancer the same recommendations apply.** The research questions now are about figuring out HOW and WHY various plant substances appear to be protective, not IF there is a role for any of them.

A variety of plant substances that look promising are found in “cruciferous” vegetables like cauliflower, Brussels sprouts, cabbage, and broccoli. **Sulforaphane** in broccoli in particular is associated with decreased risk of colon cancer and more recently, bladder cancer. [Int J Oncol. 2006 Oct;29(4):883-8; Vascul Pharmacol. 2006 Jul 14] **Polyphenols** in green and black tea, **anthocyanins** in red grapes, beets, blueberries, cherries, strawberries, raspberries, and cranberries, are looking very promising in these types of cancer (e.g. Cancer Epidemiol Biomarkers Prev. 2006 Aug;15(8):1555-8.)

**Lycopene** is the red pigment in **tomatoes** and watermelon. This may be the substance that appears to provide some protection against prostate, breast and ovarian cancer, and cardiovascular disease, but it may also be some other properties of tomatoes, so eating the tomatoes themselves is more likely to be helpful than taking isolated lycopene in capsules. Lycopene is very heat stable and it is actually more absorbable when the tomatoes are cooked, especially with a bit of **olive oil**. Another plant substance that is in the news is **quercetin**, a flavonoid found in onion, grapes, and green vegetables. It has been reported to have potent antiproliferative effects that limit the growth and multiplication of prostate cancer cells. [Oncol Res. 2006;16(2):67-74.]

**It is unlikely that any of these foods or the “phytochemicals” (a term that just means “plant chemicals”) they provide work independently,** which is why a diet rich in many colorful vegetables and fruits is the way to go. It is also one of the things that makes it difficult to tease out the factors of importance. (Please see my handouts on folic acid and on eye health for more detail.) In addition, it is not just what one eats, but the **relative balance** of many diet elements. For example, one could follow a vegetarian diet but still eat way too much nutrient-poor (empty calorie) food. After all, french fries, soda and candy are vegetarian. In the U.S., the french fry is THE most commonly eaten vegetable! Recently, a ratio of vegetables-to-meat consumption as well as the ratio of the amount of energy-from-vegetables to energy-from-animal-products can be used successfully to evaluate the dietary pattern related to cancer risk. [Forum Nutr. 2006;59:130-53.] The research into many “phytochemicals” is absolutely spilling over with new exciting findings.

**Soy milks, soy nuts, tofu,** etc., are rich in a number of **isoflavones** including genestein that may lower risk of many cancers, osteoporosis, and heart disease. Recent studies have not found consistent relationships, however. Much of the data comes from animal models. [Mol Cell Biochem. 2006 Sep 28.] Large human studies are underway, and some have reported conflicting results. It appears that there are certain genetic factors that affect whether soy intake has a role in various cancers. [Cancer Res. 2006;66(18):8980-3; J Natl Cancer Inst. 2006;98(18):1275-84; Oncol Rep. 2006;16(4):885-91; + many others.] It was first

considered to be of use several years ago when it was noted that the incidence of breast cancer and prostate cancer is about 6 times lower in parts of the world where soy is a regular part of the diet. However, there are also many other differences in the diets and lifestyles besides soy intake.

Soy nuts provide the most soy isoflavones found naturally in a small serving of food. However, many other substances besides isoflavones in soybeans appear to be important as well, including fiber, vitamins, and minerals. One of the most recently identified players on this team is the mineral magnesium. Large national studies indicate that the majority of Americans take in at less than 2/3 of the recommended amount of magnesium. Recently published studies of over 35,000 women in Iowa suggest that there is an inverse association of dietary magnesium intake with incidence of colorectal cancer. **That is, the highest intakes of magnesium were associated with the lowest incidence of colon cancer.** [Am J Epidemiol. 2006;163(3):232-5. JAMA. 2005;293(1):86-9.] As improving magnesium intake has the potential to improve cardiovascular, health, diabetes incidence and management, and many more benefits, there is clearly no reason NOT to be sure that you get the recommended amount. (Please see my magnesium handout for all the details and specific recommendations.)

In any case, soy foods are fine, certainly nutritious, and possibly helpful in decreasing risk of cancer, but it is not clear that taking concentrated isoflavone supplements (instead of just eating soy foods) is safe. In fact, some research suggests that taking one type of concentrated soy isoflavone (genestein) may actually interfere with the protective effects of the drug tamoxifen, but another soy isoflavone (daidzein) may enhance the cancer-preventive properties of tamoxifen. [Eur J Cancer. 2005;41(4):647-54.] At this time the best advice is to include soy FOODS as desired, but to avoid supplements that feature concentrated isoflavones until these issues are sorted out.

## 2. AMOUNTS AND TYPES OF FATS

Reducing total dietary fat is less important than previously believed, but **lowering the proportion of omega-6 fatty acids** (predominant in corn and safflower oil) and **increasing omega-3 fatty acids** (in flaxseed, olive, and canola oil, and in fish and fish oil supplements) decreases risk of breast cancer. **The fish-oil omega-3 fats (EPA and DHA) appear to have important anti-cancer properties that are not available from the vegetable sources**, especially among people who have been found to be less able to convert the plant-forms to these longer forms. Both EPA and DHA appear to be beneficial, and they appear to have benefits in a wide variety of health concerns from heart disease to MS, diabetes, depression and dementia, so this seems like a prudent direction to go. [e.g. Int J Biochem Cell Biol. 2006;38(12):2173-82.]

**Monounsaturated fats seem to be protective** (olive oil, canola oil, avocados, walnuts), although some of the protection may also be related to phytochemicals in those foods. [Clin Transl Oncol. 2006;8(1):15-2.] For example, olive oil is recognized as a source a cancer-fighting phytochemical. **Decreasing saturated fat** (animal fat, coconut oil) and trans-fatty acids (shortening, margarine) is beneficial. In animals, a high omega-6 intake (e.g. corn oil) during pregnancy increases breast cancer risk in offspring. If this is found to be true for women, cancer prevention in daughters may include adjusting mother's pregnancy fat intake. Since 2006, trans-fats in foods have to be listed on the food labels, but looking for the words “partially hydrogenated” in the ingredient list is a good indication that the food contains trans fat. This is useful because by law amounts under 1 gram can be reported as zero trans fat on the label. Many foods are now being advertised that they are “trans free.”

**Omega-3 fatty acids also may increase the effectiveness of certain cancer treatments.** [e.g. Prostaglandins Leukot Essent Fatty Acids. 2006 Aug 22.] Certain types of chemotherapy seem to work better when omega-3 fatty acids are provided in the diet. Increasing the ratio of omega-3 fatty acids relative to omega-6 fatty acids also seems to be beneficial in cardiovascular disease, diabetes and in autoimmune disorders like MS and arthritis. Most Americans eat a diet that provides 10 grams of omega-6 fat for every 1 gram of omega-3 fat. For most people it is recommended that we try to change the ratio to be closer to 4 to 1, and if a person has an inflammatory disease, a ratio of 2 to 1 might be best. (Please see my handout on oils and fats and omega-6:omega-3 ratios for more information on this, including many references.)

**Another piece of the puzzle is that dairy fat appears to be less cancer-promoting than other animal fats, possibly because it contains a special form of fat called conjugated linoleic acid.** High-fat dairy food and conjugated linoleic acid intakes were found to be associated with a lower incidence of colorectal cancer in Swedish men and women. [Am J Clin Nutr. 2005;82(4):894-900. Am J Clin Nutr. 2006 Mar;83(3):667-73; quiz 728-9.] **Conjugated linoleic acid** is currently receiving a lot of attention as a possible anti-cancer substance. [Lipids. 2006;41(5):437-44; J Nutr Biochem. 2006; J Med Food. 2006;9(3): 293-9.] As always, the dairy fat piece, the calcium intake piece and the vitamin D piece are very hard to separate in studies with humans, but it appears that all three of these substances may contribute to decreased risk. (More on vitamin D later.)

### 3. ANTIOXIDANTS

A tremendous amount of research suggests that various antioxidants may provide some protection against breast cancer, prostate cancer, and also against other diseases such as heart disease, Parkinson's, dementia, diabetes complications and many neurologic diseases such as MS. All the studies have not consistently shown a protective effect. However, at this point the study designs and the outcomes measured have been quite different and hard to interpret so there is much that remains to be evaluated in this area.

For example, it appears that many of dietary antioxidants work in conjunction with each other, so studies that examine the effects of a substance in isolation are less likely to demonstrate any effect that might potentially be present. The effects of **lycopene, anthocyanins, lutein, vitamins C and E, selenium, and coenzyme Q** are likely related in part to their antioxidant properties. Lycopene is about 200 times as potent an antioxidant as vitamin E. A very low-fat diet may actually provide inadequate vitamin E because the major natural food source is polyunsaturated oils. (Saturated fats like fat in meat or milk are not very good sources of vitamin E.) New recommendations include at least 200 iu vitamin E, 200-500 mg vitamin C and 70-150 mcg selenium daily, plus a diet rich in fruits, vegetables and whole grains.

The mineral **selenium** has several roles in the body as an antioxidant and in the function of the immune system. Inadequacy causes serious health problems. There is a large amount of promising research into the role of selenium adequacy in prostate cancer specifically. There is also data that suggests that assuring selenium adequacy may help in the effectiveness of certain chemotherapy medications. The toxic level of selenium has been shown to be about 800 mcg/day over a long period of time, and experts have suggested an upper limit of safety to be 600 mcg/day. The selenium content of foods varies with where the food was grown, so it is hard to assess the amount in a particular

person's diet. However, a supplemental amount of 50-70 mcg is safe. Even if a person lives in a "high selenium" region, that amount is unlikely to contribute significantly to toxicity problems. The amount in supplements varies from none to about 200 mcg, so check the label. Your State Extension Service Agent can tell you about the selenium level in the soil where you live. (Please see my handout on eye health for more detail on antioxidants.)

#### 4. ADEQUATE LEVELS OF ALL VITAMINS AND MINERALS

The body's defenses against cancer depend on adequacy of all the tools needed by the immune system. Many nutrients have been shown to be important for fighting cancer. For example, as described earlier, assuring adequacy of the mineral **magnesium** has been found to reduce risk of colon cancer. Several B-vitamins are looking like they are important as well. In one report, older women with the **lowest vitamin B-12 levels were at greatest risk of breast cancer**. Vitamin B-12 is also important for nerve health, and prevention of anemia and hearing loss. **Vitamin B6 and folic acid** have been found to be important in lowering risk of breast and/or colon cancer, especially among women who drink alcohol regularly. (Please see my handouts "Magnesium," "Folic Acid" and "Vitamin B-12" for more details, suggestions and references.)

**Vitamin D adequacy reduces the risk of breast cancer, colon cancer, prostate cancer and pancreatic cancer**, which is particularly significant in the north where vitamin D levels are very often not adequate. [Suboptimal vitamin D status is a highly prevalent but treatable condition in both hospitalized patients and the general population. J Am Acad Nurse Pract. 2007 Dec;19(12):642-651. Molecular basis of the potential of vitamin D to prevent cancer. Curr Med Res Opin. 2007 Nov 21.] A recent very large study followed over 122,000 Americans for 16 years. The authors reported that higher intakes of vitamin D were associated with lower risks for pancreatic cancer. **Vitamin D intakes of 300 to 600 iu/day decreased the relative risk of developing pancreatic cancer by 1/3 to 1/2.** This is a very large and important effect. [Vitamin D intake and the risk for pancreatic cancer in two cohort studies. Cancer Epidemiol Biomarkers Prev. 2006;15(9):1688-95.]

Vitamin D adequacy is now beginning to be examined as a factor in the incidence of lung cancer. [Could ultraviolet B irradiance and vitamin D be associated with lower incidence rates of lung cancer? J Epidemiol Community Health. 2008 Jan;62(1):69-74.] Other forms of cancer are being examined in terms of a connection with vitamin D status.

Four cups of vitamin-D fortified milk or taking cod liver oil or a multivitamin provides the 400 iu/day RDA, but **1000-2000 iu appear to be needed up in the north, and among the elderly, people with dark skin, and those who do not go out into the sun often.** Cheese and ice cream have no vitamin D, although recently some brands of yogurt have begun to have it added. Salmon and tuna contribute some vitamin D. Supplementation to achieve the most protective levels of intake (1000-2000 iu) will clearly be needed. So, besides the 400 iu in your multivitamin, 2 to 3 additional 400 iu vitamin D supplements may be needed. They are easy to get and very inexpensive.

**Besides prevention, adequate vitamin D and folic acid may slow the growth rate of several types of cancer. Vitamin D is also being used to increase the effectiveness of certain types of chemotherapy and to decrease side effects.** [e.g. Aromatase inhibitor-associated arthralgia syndrome. Breast. 2007 Jun;16(3):223-34.] As assuring adequacy of vitamin D also appears to be important in the prevention of MS, diabetes, osteoporosis, muscle weakness, muscle pain, osteoarthritis and rheumatoid arthritis, a very close look at one's vitamin D intake is important for many reasons. [e.g. Vitamin D deficiency (in adults). Main symptoms: bone pain. Schweiz Rundsch Med Prax. 2006 Dec 13;95(50):1953-9.]

As a rule, it is now well recognized that most people would benefit from taking a general multivitamin with minerals every day in addition to "eating right." [JAMA 6/19/02] These products provide 400 iu of vitamin D and also improve intakes of the other nutrients described above. For many years, the toxic level of vitamin D has been thought to be 2000 iu, but new research suggests that the upper limit of safety should be a chronic intake of 10,000 iu. For this reason, one can certainly be comfortable with 1000-2000 iu. (See my Vitamin D handout for more information.)

New research into the role of **vitamin K inadequacy and risk of cancer of the liver and colon** was published in 2007. Additionally it may be beneficial as an adjunct to certain chemotherapy regimens. This is of interest because many Americans have a very poor vitamin K intake. Additionally, some folks take medications like Coumadin (an anti-blood clot medicine) and they erroneously think they must aim for the lowest amount of vitamin K possible. Overt vitamin K deficiency is, unfortunately, quite common in this situation. (Please see my vitamin K handout for details and references.)

**Bottom line:**

- Micronutrient inadequacy benefits no one and it contributes to many significant health problems.
- Micronutrient inadequacy is very common, even in the United States.
- Micronutrient inadequacy often goes unrecognized.
- Micronutrient inadequacy is often easy and inexpensive to prevent and/or correct.

**5. ALCOHOL**

Reducing alcohol consumption is associated with a reduced risk of breast cancer. In 1999 the Journal of the American Medical Association reported that the extra risk of breast cancer due to alcohol use may be reduced by assuring adequate **folic acid** intake. Absorption of folic acid and some other **B-vitamins** is also impaired by alcohol. Folic acid and **vitamin B-6** are known to be associated with decreased risk of colon cancer.

**6. BODY WEIGHT AND EXERCISE**

Being overweight and a lack of exercise both increase the risk cancer in general, and of breast cancer in particular. Interestingly, being overweight is not an indication that a person is “well nourished.” In fact, poor intake of essential nutrients needed for energy metabolism can actually contribute to obesity. An example of the paradox of malnutrition in obese individuals: in a recent study the nutritional status of individuals was evaluated before having weight reduction surgery. Malnutrition of a number of nutrients was found to be very common. [e.g. Preoperative Nutritional Status of Patients Undergoing Roux-en-Y Gastric Bypass for Morbid Obesity. J Gastrointest Surg. 2006;10(7):1033-7.]

**OTHER INFORMATION:**

This handout and others are available on line for free. Go to [www.meritcare.com](http://www.meritcare.com) In the upper right corner there will be a search box. Type my name (Cathy Breedon) and a page will come up that says “Cathy Breedon’s Handouts.” If you click it you will find all these articles and others.

As always, my summaries of the most recent findings in nutrition are not ever intended to take the place of your physician in identifying issues important for your personal health. Check back later to be sure you have the most recent version of the handouts – they are often updated.

