The Cancer Project
Food Choices for Health

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Eighty percent of cancers are due to factors that have been identified and can potentially be controlled, according to the National Cancer Institute. And not only can we potentially prevent most cancers, we can also improve the survival rates of people who have cancer. Cancers of the breast, prostate, and colon have received more research attention than other forms of the disease, but, as we will see, certain principles apply to many forms of cancer.

Cancer starts when one cell begins to multiply out of control. It begins to expand into a lump that can invade healthy tissues and spread to other parts of the body. But there is a lot we can do about it. Thirty percent of cancers are caused by tobacco. Lung cancer is the most obvious example, but by no means the only one. Cancers of the mouth, throat, kidney, and bladder are also caused by tobacco.

Dietary factors also play a significant role in cancer risk. At least one-third of annual cancer deaths in the U.S. are due to dietary factors.[1] A recent review on diet and cancer estimates that up to 80 percent of cancers of the large bowel, breast, and prostate are due to dietary factors.[2]

The link between diet and cancer is not new. In January 1892, *Scientific American* printed the observation that "cancer is most frequent among those branches of the human race where carnivorous habits prevail." Numerous research studies have shown that cancer is much more common in populations consuming diets rich in fatty foods, particularly meat, and much less common in countries eating diets rich in grains, vegetables, and fruits. One reason is that foods affect the action of hormones in the body. They also affect the strength of the immune system and other factors. While fruits and vegetables contain a variety of vitamins, minerals, antioxidants, and phytochemicals to protect the body, by contrast, recent research shows that animal products contain potentially carcinogenic compounds which may contribute to increased cancer risk.[3]

In addition to tobacco use and diet, other factors, including physical activity, reproductive and sexual behavior,[2] bacterial and viral infections, and exposure to radiation and chemicals, may also contribute to the risk of certain forms of cancer.[2,4]

Estimated Percentages of Cancer Due to Selected Factors[5,6]

Diet	35-60%
Tobacco	30%
Air and Water Pollution	5%
Alcohol	3%
Radiation	3%
Medications	2%

BUILDING YOUR STRENGTH AGAINST CANCER

Some dietary changes have a preventive effect for many types of cancer. Boosting your intake of vitamin-rich vegetables and fruits, for example, strengthens your immune system and helps knock out cancer cells. Let's first look at the steps we can take to build our general defenses. Then we'll look at dietary measures that have effects against specific types of cancer.

The Antioxidant Defenses

Oxygen is essential to life. But, as oxygen is used in the body, some of the oxygen molecules become very unstable. These unstable oxygen molecules, called free radicals, can attack cell membranes and even damage the DNA (genetic code) in the nucleus of the cell. Damage to DNA is the beginning of cancer.

Fortunately, the foods we eat can help protect our bodies. Antioxidants, including vitamin C, vitamin E, beta-carotene, selenium, and others, can neutralize the damaging effects of oxygen. These powerful, natural chemicals come to us in vegetables, fruits, grains, and beans (see table below). People who include fruits and vegetables in their daily diets have lower rates of many forms of cancer.

Smokers have provided dramatic demonstrations of the power of vegetables and fruits. A 55-year-old male smoker whose diet is low in vitamin C has a one-in-four risk of dying of lung cancer in the next 25 years. But if the smoker has a high

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intake of vitamin C, either through diet or supplements, his risk drops to 7 percent.[7] Effects of antioxidants have even been seen in childhood. When children with brain tumors were studied, it was found that their mothers consumed less vitamin C during pregnancy, compared to other women.[8]

Antioxidants in Foods

	Vit C (mg)	B-carotene (mg)	Vit E (mg)
Apple (1 medium)	8	0.04	0.44
Broccoli	116	1.30	1.32
Brown rice	0	0.00	4.00
Brussels sprouts	96	0.67	1.33
Carrot (1 medium)	7	12.00	0.28
Cauliflower	54	0.01	0.05
Chick peas	2	0.02	0.57
Corn	10	0.22	0.15
Grapefruit (pink, 1/2)	47	0.19	0.31
Navy beans	2	0.00	4.10
Orange (1 medium)	75	0.16	0.31
Orange juice	124	0.30	0.22
Pineapple	24	0.02	0.16
Soybeans	3	0.01	3.35
Fresh spinach	16	2.30	0.57
Strawberries	84	0.02	0.23
Sweet potato (1 medium with skin)	28	15.00	0.32

Serving sizes are one-cup (8 oz.) except as otherwise noted.

Sources: Pennington JAT. Bowes and Church's Food Values of Portions Commonly Used. New York, Lippincot, 1998. Messina M, Messina V. The Dietitian's Guide to Vegetarian Diets. Gaithersburg (Md.), Aspen, 1996. USDA Nutrient Database for Standard Reference, Release 12, last updated April 7, 1999.

Even with vegetables and fruits in the diet, damage to the cells' DNA will occasionally occur, so the body has built-in repair machinery. Fixing DNA requires a B vitamin called folic acid, which is found in dark green leafy vegetables, fruits, peas, and beans. The Recommended Dietary Allowance (RDA) of folic acid for adult women is 200 micrograms per day and increases to 400 micrograms per day for pregnant women. The RDA for adult men is 180 micrograms per day.[9] As the table below shows, beans and vegetables are rich in folic acid.

We are all exposed to cancer-causing chemicals, whether we like it or not. Some people are smokers, and, of course, quitting smoking is a vital step for them. But all of us are exposed to chemicals in the air, in water, in food, and in household products, not to mention the carcinogens produced within our bodies as a part of our metabolic processes. While trying to minimize our exposure to carcinogens, we can also shore up our defenses against these assaults by including generous amounts of vegetables and fruits in our diet. A plant-based diet rich in vegetables, fruits, legumes, and unprocessed cereals is associated with a decreased risk of cancer.[10]

Folic Acid in Foods
(micrograms per 1-cup cooked servings)

Asparagus	262
Vegetarian baked beans	61
Black beans	256
Black-eyed peas	254
Broccoli	78
Brussels sprouts	94
Chick peas	282
Great northern beans	181
Kidney beans	229
Lentils	358
Lima beans	156
Navy beans	255
Pinto beans	294
Soybeans	93
Spinach	262

Source: Pennington JAT. Bowes and Church's Food Values of Portions Commonly Used. New York, Lippincott, 1998.

Foods and Immunity

In spite of our best efforts, cancer cells will arise in the body from time to time. Luckily, we have white blood cells that roam our bloodstreams looking for these troublemakers. Some of them, called natural killer cells, seek out and destroy cancer cells and bacteria. They engulf and destroy aberrant cells before they can cause damage. The function of natural killer cells and other white blood cells is improved by as little as 30 milligrams of beta-carotene per day, the amount in two large carrots.[11,12]

Although beta-carotene is safe, even in fairly substantial amounts, the best way to get beta-carotene is not in pills, but in the carrots, spinach, kale, and other packages in which nature supplies it. Beta-carotene is only one of perhaps two dozen related substances called carotenoids which occur naturally in vegetables and fruits, and which have varying degrees of biological activity.

Vitamins C and E and selenium bolster immune function in addition to their antioxidant effects, but the importance of these effects against cancer is not yet clear.[13-15]

Fats impair immunity, and cutting fat out of the diet helps strengthen the immune defenses against cells that turn cancerous. Researchers in New York tested the effect of low-fat diets on immunity.[16] They put healthy volunteers on a diet that limited fat content to 20 percent, reducing all fats and oils—not just saturated or unsaturated fats. Three months later, the researchers took blood samples from the volunteers and examined their natural killer cells. The natural killer cell activity was greatly improved.

Although vegetable oils are far superior to animal fats for heart patients, when it comes to the immune system, vegetable oils are no better than animal fats. In experiments, researchers have found that when they infuse soybean oil intravenously into volunteers, their white blood cells no longer work as well,[17] and test-tube experiments show similar results.[18]

Likewise, omega 3 fatty acids, which are found in fish oils, green vegetables, and soybean, flax seed, and canola oils, also compromise immune function.[19-21] The bottom line on fats and oils is to greatly reduce your intake of all of them.

It should come as no surprise that vegetarians have stronger immune systems than do meat-eaters. Studies of white blood cell samples from vegetarians have shown them to have more than double the cancer cell-destroying ability of their non-vegetarian counterparts.[22] The immune-boosting power of vegetarian diets is partly due to their vitamin content, their low fat content, and perhaps other contributors, such as reduced exposure to toxic chemicals and animal proteins.

Iron: The Double-Edged Sword

Iron encourages the formation of cancer-causing free radicals. Of course, the body needs a certain amount of iron for healthy blood cells. But beyond this rather small amount, iron becomes a dangerous substance, acting as a catalyst for the formation of free radicals. Because of this, research studies have shown that higher amounts of iron in the blood mean higher cancer risk.[23]

Once iron is absorbed by the digestive tract, the body stores it. Most of us accumulate much more iron than we need. In spite of the advertising from iron supplement manufacturers, "iron overload" is much more common in America than iron deficiency. The reason is the daily diet of red meats, which contributes much more iron than most people can safely handle over the long run. A diet of grains, vegetables, fruits, and beans provides adequate iron, without the risk of overload.

It is easy to check whether your body has accumulated too much stored iron. The following set of tests will check for both iron deficiency and iron overload. The more general hemoglobin and hematocrit tests are not sufficient. Although general guidelines are given here, the tests should be interpreted by your doctor:

- Serum ferritin (normal values are 12-200 mcg/l of serum)
- Serum iron
- Total iron binding capacity (TIBC)

Doctors divide the serum-iron value by the TIBC. The result should be 16 to 50 percent for women and 16 to 62 percent for men. Results above these norms indicate excess iron. Results below these norms indicate iron deficiency. A further test sometimes used to check for iron deficiency is the red cell protoporphyrin test. A result greater than 70 units is considered abnormal. If two of these three values (serum ferritin, serum iron/TIBC, and red cell protoporphyrin) are normal, iron-deficiency anemia is not likely. Serum iron and TIBC should be measured after fasting overnight.

Unfortunately, the body has no way to rid itself of excess iron. Believe it or not, the only way to predictably reduce excessive iron stores is by donating blood. So this altruistic act can have health benefits for the donor as well.

Foods and Hormones

Several of the most common forms of cancer are linked to sex hormones. This is true of cancers of the breast, uterus, ovary, prostate, and perhaps other sites. The amount of hormones in our bodies and their actions are determined, in large part, by the foods we eat.

Breast Cancer

As long ago as 1982, the National Research Council published a report called *Diet, Nutrition, and Cancer*,[24] showing the evidence already available linking specific dietary factors to cancer of the breast and other organs.

Asian countries, such as Japan, have low rates of breast cancer, while Western countries have cancer rates that are many times higher.[25,26] However, when Japanese girls are raised on westernized diets, their rate of breast cancer increases dramatically.

The traditional Japanese diet is much lower in fat, especially animal fat, than the typical Western diet. In the late 1940s, when breast cancer was particularly rare, less than 10 percent of the calories in the Japanese diet came from fat.[27] The American diet, of course, is centered on animal products, which tend to be high in fat and low in other important nutrients. The fat content of the average American diet is in the range of 37 to 40 percent of calories.

Countries with a higher intake of fat, especially animal fat, have a higher incidence of breast cancer.[25,28,29] Even within Japan, affluent women who eat meat daily have an 8.5 times higher risk of breast cancer than poorer women who rarely or never eat meat.[26] The *Surgeon General's Report on Nutrition and Health*[30] stated: "Indeed, a comparison of populations indicates that death rates for cancers of the breast, colon, and prostate are directly proportional to estimated dietary fat intakes."

Fat and Hormonal Effects

Fatty foods affect the body in many ways and have a strong influence on hormonal activity in the body. First, high-fat diets increase the amount of estrogens, the female sex hormones, in the blood. It is known that many breast tumors are "fueled" by estrogens. Estrogens are normal and essential hormones for both women and men, but the more estrogen there is, the greater the driving force behind some kinds of breast cancer. On high-fat diets, estrogen levels increase. When women adopt low-fat diets, their estrogen levels drop

noticeably in a very short time.[31-33] Vegetarians have significantly lower estrogen levels than non-vegetarians, in part because of the lower fat content of their diet. In addition, they have more of certain carrier molecules, called sex hormone binding globulin, which circulate in the blood and have the job of holding onto sex hormones, keeping them inactive until they are needed. Fatty foods do the reverse: they increase estrogens and reduce the amount of the carrier molecule that is supposed to keep estrogens in check.

Animal fats are apparently a bigger problem than vegetable oils. Paulo Toniolo of the New York University Center compared the diets of 250 women with breast cancer to 499 women without cancer from the same province in northwestern Italy. The two groups ate about the same amount of olive oil and carbohydrates. But what made the cancer patients different was that they had eaten more meat, cheese, butter, and milk. Women who consumed more animal products had as much as three times the cancer risk of other women.[34]

Even though cross-cultural comparisons have pointed a finger at animal fat as the principal problem, vegetable oil is also under some suspicion. Vegetable oils can probably affect estrogen levels and, as we will see below, increase the production of cancer-causing free radicals. So it is no good just replacing fried chicken with fried onion rings. The best diet eliminates animal products and keeps vegetable oils to a minimum as well.

Certain foods have special benefits. Soybeans, for example, contain natural compounds, called phytoestrogens. These are very weak estrogens which can occupy the estrogen receptors on breast cells, displacing normal estrogens. The result is less estrogen stimulation of each cell. Soybeans are a mainstay of Asian diets and may be an additional reason why these countries have low cancer rates.[35]

How Much Fat Is Too Much?

The National Cancer Institute has long recommended that fat be limited to less than 30 percent of calories and that the fattiest meats be replaced by leaner meat, poultry, fish, and vegetables. These recommendations, however, are much too weak to prevent cancer or to increase survival for those who have already been diagnosed with the disease. A large study of American nurses showed that those who limited fat to 27 percent of their calories were not any better off against cancer than those consuming more fat.[36] Some have interpreted this to mean that diet has nothing to do with breast cancer. A more reasonable conclusion is that the diets these women followed were still high-risk diets. After all, a diet including regular consumption of animal products and drawing nearly 30 percent of calories from fat is nothing like the traditional Asian diets associated with low cancer risk.

As important as it is to get the fat off your plate, that is only the beginning. Other parts of the diet play important roles in cancer prevention. Vegetables, fruits, grains, and beans provide fiber, which helps the body to rid itself of excess estrogen.

One way the body rids itself of sex hormones is through the digestive tract. The liver pulls sex hormones from the blood, chemically alters them, and sends them down the bile ducts into the intestinal tract. There, the fiber from grains, vegetables, fruits, and beans escorts them through the intestine and finally out the door as wastes. At least that is how the system is supposed to work. But chicken breasts, beef, eggs, cheese, and all other animal products contain no fiber at all. As these products have assumed larger and larger portions of the American plate, they have pushed off the grains, vegetables, beans, and fruits. Without adequate fiber to hold them in the digestive tract, sex hormones are reabsorbed back into the bloodstream where they once again become biologically active. The hormones your body was trying to rid are then recruited back into circulation. Building your diet from grains, vegetables, fruits, and legumes assures plenty of fiber for the body's needs.

Heterocyclic Amines

Not only is meat devoid of fiber and other nutrients which have a protective effect, but it contains potentially carcinogenic compounds which can actually increase one's risk of developing breast and other cancers. The compounds in questions, heterocyclic amines, are produced during the cooking process of many animal products, including chicken, beef, pork, and fish. Meat that is cooked under normal conditions, which may involve grilling, frying, and oven-broiling, produce large quantities of these mutagens,[3,37] though the effect does not appear to be the same for soy-based foods, which produce little or no carcinogens upon cooking.[38]

Meat-based diets have been linked with breast cancer. Several recent studies show meat intake to be a risk factor for the development of breast cancer, even when confounding factors, such as total caloric intake and total fat intake, are controlled.[39,40]

Other Dietary Factors

The vitamin C and beta-carotene in vegetables and fruits are also linked to lower cancer risk. Numerous researchers have found that the more high-fiber, vitamin-packed vegetables and fruits women consume, the lower their risk of cancer.[41]

As we saw earlier, the mineral selenium is an element in the antioxidant system that works within the cells. It comes from grains, and women with higher amounts of selenium in the blood are less likely to develop breast cancer than women with lower amounts.[42]

Alcohol increases cancer risk. Even one drink per day can increase breast cancer risk by more than 50 percent, compared to non-drinkers.[43] That does not mean that your cancer risk is 50 percent. It means that it is half again higher than it was before. The effect of alcohol is mainly seen in younger women.

Aside from diet, other factors increasing risk of breast cancer include:

Hormones: Oral contraceptives appear to increase risk. Although newer birth control pills contain less estrogen and

progesterone than older versions, evidence suggests some increase in risk from oral contraceptives.[44] The same may be true of supplemental hormones given to women after menopause.[45] In both cases, it makes sense for women to discuss the risks and benefits with their personal physicians.

Overweight: Higher body weight increases the risk of breast cancer after menopause.[46] Before menopause, weight does not increase risk.

Radiation: Of all the different parts of the body, the breast is probably the most sensitive to X-ray damage, and there is no doubt that X-rays to the breast can cause cancer.[47]

This raises obvious concerns about mammograms, which, after all, are X-rays. Annual mammograms are clearly beneficial for women over 50. But women should schedule mammograms only at modern facilities which do them regularly and maintain new equipment, keeping radiation doses to a minimum. Below age 50, scientific studies do not show any clear benefit from routine mammograms. The reason is that many cancers are missed on mammograms, and women have sometimes been falsely reassured by a negative mammogram, leading to delays in diagnosis and treatment. Before age 50, routine mammograms do not improve on the power of physical (and self) examination.

Genetics: About 5 percent of breast cancer cases are purely attributable to genetics.[48] In such cases, cancer is passed from parent to child as a dominant trait, and the family tree is riddled with the disease. And for a larger group of individuals, genetics probably makes a contribution in subtle ways. For example, it may well be that different genes influence one's susceptibility to carcinogens, the strength of the immune system, body weight, and other factors. Each of these is also influenced by diet.

Toxic Chemicals: Locations near toxic waste sites tend to have higher than average rates of breast cancer.[49] That is true for other forms of cancer, too. And you don't have to live near a chemical waste site to be concerned about toxic exposures. Toxic chemicals are available at any grocery store in the form of pesticides. Fortunately, organic produce is now more widely available. Chemical contaminants also end up in meats, because pesticides are sprayed on grains that are fed to cows, chickens, pigs, and other livestock. In storage bins, feed grains are sprayed again. Animals concentrate these chemicals in their tissues.

Women who avoid eating animal products have much smaller concentrations of pesticides in their breast milk. Levels of the pesticides DDT, chlordane, hepatochlor, dieldrin, and PCBs have been measured at markedly lower levels in vegetarians than those of omnivores.[50] In a 1981 study, vegetarians had only 1 to 2 percent of the national average levels of certain pesticides and industrial chemicals compared to that of average Americans.[51] The exception was polychlorinated biphenyls (PCBs), for which the vegetarians had levels that were comparable to meat-eaters. PCBs in the body often reflect past fish consumption, and levels drop slowly after people adopt a vegetarian diet. Once PCBs are in the body tissues, avoiding contaminated fish will reduce PCB levels only very slowly.

Time between Puberty and First Pregnancy: The younger a girl is when puberty occurs, the higher her risk of breast cancer. Also, the later the age of her first pregnancy, the higher her risk. It may be that the early age of puberty simply indicates elevated hormone levels, as was described above. As high-fat, low-fiber diets have spread from the wealthy part of the population to, now, the entire population, the age of puberty has dropped dramatically from age 17 in 1840 to 12.5 today. Similarly, as Japan's diet has westernized since World War II, the age of puberty has dropped from 15 to 12.5. It may be that early puberty and cancer are both the result of a hormonal aberration.

The time period between puberty and the first pregnancy is one in which the body may be particularly sensitive to carcinogens, and the longer this time period is, the greater the risk.

Cancer of the Uterus and Ovary

The uterus and ovary, of course, are reproductive organs, and factors that affect hormone function can be expected to affect these organs as well. The risk of cancer of the uterus and ovary is higher in populations that have more breast cancer incidences, suggesting that they may be caused by similar factors. Uterine cancer is linked to fatty diets and obesity,[25,52,53] although other factors, including hormone supplements, also play an important role. Ovarian cancer is also more common where people eat higher-fat diets.[25,54]

Dr. Daniel Cramer of Harvard University[55] found that a higher intake of dairy products was linked to a higher risk of ovarian cancer. If this finding holds true, the culprit may be a breakdown product of the milk sugar lactose. Lactose is broken down in the body to another sugar called galactose, which appears to be able to damage the ovary. The problem is the milk *sugar*, not the milk *fat*, so it is not solved by using nonfat products.

Prostate Cancer

Just as women on high-fat Western diets have more estrogens circulating in their blood and a higher risk of cancer of reproductive organs, a similar process occurs in men. High-fat diets alter the amounts of testosterone, estrogen, and other hormones in both men and women.

The prostate gland is just below the bladder in men, where it produces semen to be mixed with sperm cells. Cancer of the prostate is the most common form of cancer in American men, occurring primarily in older individuals.

Cancer cells are found in the prostates of about 20 percent of men over the age of 45 years.[56] In most cases, these cancer cells do not develop into cancerous tumors that affect the overall health or life span of the individual. However, in many cases, the cancer does grow, invade surrounding tissues, and spread to other parts of the body. Although the disease varies greatly from one person to the next, the average patient loses nine years from his normal life span.[57] One in ten men will develop prostate cancer at some point in his life.

Just as countries differ markedly in the prevalence of

breast cancer, this hormone-related cancer also varies in exactly the same way. Asian and Latin American countries have a much lower prevalence of prostate cancer, while it is very common in Europe and America. Ten men die of prostate cancer in Western Europe for every one who dies in Asia.[56]

Cancer of the prostate is strongly linked to what men eat. Again, animal products are consistently indicted: milk, meat, eggs, cheese, cream, butter, and fats are found, in one research study after another, to be linked to prostate cancer.[58-67] And it is not just dairy products and meats. Some studies have also pointed a finger at vegetable oils.[25,59] Most recently, milk consumption has been linked to prostate cancer due to high levels of the compound insulin-like growth factor (IGF-I), both present in dairy products and in increased levels in the bodies of those who consume dairy on a regular basis. A recent study showed that men who had the highest levels of IGF-I had more than four times the risk of prostate cancer compared with those who had the lowest levels.[68]

Who has a lower risk? Countries with more rice,[58] soybean products,[65] or green or yellow vegetables[69,70] in the diet have far fewer prostate cancer deaths. It is not surprising that vegetarians have low rates of prostate cancer.[24,71] Becoming a vegetarian in adulthood is helpful, but those who are raised as vegetarians have the lowest risk.[72]

How does a Western diet cause cancer? Men who consume diets based on animal products tend to have higher levels of testosterone compared to men who eat plant-based diets. This increase may be due to overproduction of these hormones in the body. Also, fiber in the diet helps remove excess hormones with body wastes. Those who eat meats and dairy products miss out on a substantial amount of fiber, because animal products have no fiber at all. This hormonal boost can affect the prostate, and is likely the reason for increased cancer risk among those on meat-based diets.

Colon Cancer

The colon is another name for the large intestine, which makes up the second half of our digestive tract. Strong links have been found between the consumption of meats and other fatty foods and colon cancer.[73,74] When the past diets of cancer patients are studied, it is very clear that meat-based Western diets are linked to colon cancer. Comparisons of countries with different rates of colon cancer have supported this finding.

In order to absorb the fats we eat, our liver makes bile which it stores in the gallbladder. After a meal, the gallbladder squirts bile acids into the intestine, where they chemically modify the fats eaten so they can be absorbed. Unfortunately, bacteria in the intestine turn these bile acids into cancer-promoting substances called secondary bile acids. Meats not only contain a substantial amount of fat; they also foster the growth of bacteria that cause carcinogenic secondary bile acids to form. When meat is cooked, carcinogens can form on the surface of the food. As with breast cancer, frequent consumption of meat is associated with an increased risk of colon cancer,[75] particularly that of red meat.[76]

High-fiber diets offer a measure of protection.[77] Fiber greatly speeds the passage of food through the colon, effectively removing carcinogens. And fiber actually changes the type of bacteria that are present in the intestine, so there is reduced production of carcinogenic secondary bile acids. Fiber also absorbs and dilutes bile acids.

Even people who are at particular risk for cancer can be helped by high-fiber diets. Jerome J. DeCosse, M.D., a surgeon at Cornell Medical Center, gave bran to patients with recurrent polyps of the colon. These are small growths that have a tendency to become cancerous. Dr. DeCosse found that within six months, the polyps became smaller and fewer in number. He believes that pentose fiber, which is plentiful in wheat, is the key to bran's power.[78]

Vegetables, particularly cruciferous vegetables such as broccoli, cauliflower, Brussels sprouts, and cabbage, also lower the risk of colon cancer.[77]

Two themes consistently emerge from studies of cancer from many sites: vegetables and fruits help to reduce risk, while animal products and other fatty foods are frequently found to increase risk.

When the terms "fiber" and "fat" are used, it is easy to forget the foods from which they come. When you hear about the dangers of fat, think meat-and-dairy-based diets, aided and abetted by oily foods. Fiber is found in whole grains, vegetables, fruits, and beans. There is no fiber in any product from an animal.

Setting Blame Aside

Occasionally people who have cancer report feeling that, if food plays a role in cancer, then they are somehow to blame for their disease. As such, guilt and blame often become concerns for people dealing with cancer. However, these feelings are burdens that help no one. Besides, it makes no sense to blame anyone for things they had no way of knowing. Until major public education programs spread the word about the role of dietary factors and help people to change, cancer will remain an epidemic.

Steps to Cancer Prevention

- Do not use tobacco in any form.
- A varied menu of whole grains, vegetables, fruits, and beans, without added fats, supplies generous amounts of fiber, vitamins, and minerals, and less than 10 percent of its calories will be from fat.
- Have more than one vegetable at a meal and at least five fruits and vegetables each day.
- Avoid animal products and minimize added vegetable oils.
- Minimize alcohol intake.
- Engage in regular physical activity.
- Maintain your weight at or near your ideal weight.
- Avoid excessive sunlight and unnecessary X-rays.

SURVIVING CANCER

Foods are important, not only in preventing cancer, but also in improving survival for those who already have cancer.

Breast Cancer

Not all cancers are the same. Some have a relatively good prognosis, and others have a very poor prognosis. For example, a tumor that is small and has not spread to the lymph nodes or other organs is less dangerous than a tumor that is larger and has already spread. (Lymph nodes are pea-sized collections of cells near the breast and other organs which are important to immune function.) Hospital laboratories also determine whether a breast tumor has receptors for estrogen or progesterone hormones. If it does, the tumor is slightly less aggressive than if it lacks receptors.

These prognostic factors are not due to chance alone. Thirty years ago, Ernst Wynder of the American Health Foundation in New York observed that, aside from the fact that Japanese women are much less likely than American women to get breast cancer, when Japanese women do get the disease, they tend to survive longer.[79] Their improved survival is independent of age, tumor size, estrogen receptor status, the extent of spread to lymph nodes, and the microscopic appearance of the cancer cells.[80] And it is not that Japanese women have better health care, because the same pattern has been observed in Hawaii[81] and California,[82] where Japanese women live nearby other ethnic groups, and have essentially the same health care system.

Researchers have begun to look at whether diet plays a role in survival. It does. Our old enemy, fat in foods, rears its ugly head once again. The more fat there is in the diet, the shorter a cancer patient survives. In a Canadian research study, women with cancer were more likely to have lymph node involvement if they had a higher fat intake. This effect was found only for saturated fat and only for post-menopausal women.[83] Fat seems to have a measurable effect when cancer has spread to other parts of the body, and little or no effect when the disease is localized.[84]

Researchers in Buffalo, New York, calculated what they believe to be the degree of risk posed by fat in the diet: for a woman with metastatic breast cancer (cancer which has already spread at the time of diagnosis), her risk of dying from the disease at any point in time increases 40 percent for every 1,000 grams of fat consumed monthly.[80] In order to understand what this means, compare three different diets, each of which contains 1,200 calories per day:

- On a low-fat, vegetarian diet, about 10 percent of calories come from fat. This type of diet contributes about 13 grams of fat per day, or 400 grams per month.
- On a typical American diet, 37 percent of calories come from fat. This means about 49 grams of fat per day, or 1,380 grams per month.
- On a diet with more fat than average, say 50 percent of calories, fat intake would be 67 grams per day, or 2,000 grams per month.

If the researchers' finding holds, the typical American diet would lead to about a 40 percent higher risk of dying of breast cancer at any given point, compared to the low-fat, vegetarian diet, and the high-fat diet would lead to a more than 60 percent increase in risk of dying. These figures do not mean that a woman's risk of dying is 40 percent or 60 percent. They mean that the risk is 40 percent or 60 percent higher than it would otherwise have been, assuming the individual is comparable to those studied.

Other parts of the diet play important roles. Diets that are high in fiber, carbohydrate, and vitamin A seem to help the prognosis, while alcohol slightly worsens it.[85] Patients who have more estrogen receptors on their tumors (which indicates a better prognosis) tend to be those who had consumed more vitamin A.[85] (Beta-carotene becomes vitamin A in the body.) For reasons that are not entirely clear, vegetables and fruits, and the vitamins they contain, help keep the cells of the body in better working order—one sign of which, for breast cells, is the presence of estrogen receptors. So vegetables and fruits are not only important in helping to prevent cancer, but also in improving survival for those who have cancer.

Higher body weight increases the risk of dying of breast cancer.[84,86] Among postmenopausal women with breast cancer, slimmer women tend to have less lymph node involvement.[87] Heavier women have more lymph node involvement, higher rates of recurrence, and poorer survival.[83]

Cancers of the Uterus and Ovary

The uterus and ovary, like the breast, are strongly influenced by sex hormones, and a low-fat, vegetarian diet is the best prescription for preventing the hormonal elevations that encourage cancer. In addition, as mentioned earlier, galactose—a breakdown product of the milk sugar lactose—increases risk of ovarian cancer.

One might assume that the factors that improve survival in breast cancer might do the same for cancers of the uterus and ovary. Unfortunately, researchers have essentially ignored this issue. Until more information is available, it seems most prudent for those with ovarian or uterine cancer to follow the same diet that helps prevent cancer in these organs and which keeps the immune system in good working order: a low-fat, pure vegetarian diet, with an abundance of vegetables and fruits.

Prostate Cancer

Diet may help improve survival in prostate cancer as well. When pathologists conduct autopsies of men who die from accidents or other causes, they find cancer cells in the prostates of about 20 percent of them.[56] These men did not

know they had cancer and had no symptoms whatsoever. The prevalence of such "latent" cancers actually varies with location, the lowest rates being in Singapore (13 percent) and Hong Kong (15 percent), and the highest in Sweden (31 percent).[87] In most men, the cells never grow into a large tumor, never spread, and never affect life or health in any way. However, just as the prevalence of "latent" cancers varies from one country to another, the likelihood that they will turn into symptomatic cancer varies in precisely the same way, suggesting that the same factors that cause cancer cells to form in the first place also encourage them to grow and spread. So while a Swede is twice as likely as a man from Hong Kong to have cancerous cells in his prostate, he is more than eight times more likely to die of prostate cancer.[87]

A low-fat, high-fiber diet can help eliminate the hormonal aberrations that are known to be linked with prostate cancer, and may help improve survival among those who have the disease. Unfortunately, there has not been enough research in this area to know just how successful dietary change might be.

Anthony J. Sattilaro, M.D., was president of Methodist Hospital in Philadelphia when he was diagnosed with prostate cancer. He became perhaps the most famous advocate for the use of diet against cancer. In his bestselling book *Recalled by Life*, he told how he adopted a low-fat, vegetarian diet and far outlived the grave prognosis he had been given. The diet he followed is called "macrobiotic" which is drawn from the best elements of a traditional Asian diet, including generous amounts of rice and vegetables.

Colon Cancer

Colon cancer is encouraged by diets containing animal fat and discouraged by diets rich in vegetables. A low-fat, plant-based diet is important both for those seeking to prevent cancer and those who have already been treated for it.

Researchers at the University of Arizona found that people who have been treated for colon or rectal cancer have less risk of recurrence when their diets are rich in fiber. They found benefits from daily supplements of 13.5 grams of wheat bran fiber (the amount in a half-cup of bran cereal), but they speculate that other forms of fiber might have the same effect. A vegetarian diet can easily boost fiber intake by 10 to 29 grams per day. If you have bran cereal, topping it with soymilk rather than cow's milk allows you to avoid animal fat, cholesterol, lactose, and animal proteins.

Colon cancer typically develops from polyps in the colon wall. These polyps become smaller and fewer in number within six months on a high-fiber diet.[14]

It is clear that much more needs to be learned about the power of foods to prevent cancer or to improve cancer survival. The good news is that the diet that helps protect against cancer is the same one that keeps cholesterol low and waistlines slim. Keeping animal products out of the diet, keeping oils to a minimum, and including generous amounts of vegetables, grains, beans, and fruits is a powerful prescription.

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The Power of Choice

For many of us, illness means putting our fate in the hands of doctors and complying, more or less passively, with their recommendations. But it is more and more clear that some of the most vital steps in regaining health are those we take ourselves.

In May 1988, Polly Strand discovered a lump in her left breast. It was less than an inch in diameter. She had not noticed it before, and it was not on her last mammogram.

Polly Strand knew about cancer. Her mother had had it, and the experience was difficult, to say the least. Her mother had had a radical mastectomy, radiation, and chemotherapy, followed by prolonged use of tamoxifen. The treatments were debilitating. Unlike some women who seem to do well after the anticancer therapies, she was never herself again. At first, the cancer was thought to be in remission, but soon it was found to have spread to her brain, causing psychotic symptoms, including frightening hallucinations. Seven years after her mastectomy, Polly's mother died.

Polly was not eager to follow the same regimen. She scheduled a biopsy. It confirmed that she had cancer. She did a computer search of the medical literature on chemotherapy and radiation, and concluded that, while they may be helpful in some forms of cancer, they offered her no significant benefit. She opted to have only surgery to remove the cancer, and not to have chemotherapy or radiation.

At the same time, she worked to build her natural defenses. She restructured her diet. All sources of extra fat were eliminated: red meats, poultry, fish, dairy products, and added oils. She read vegetarian cookbooks and tried many new foods. This became an enjoyable process of exploring ethnic foods, and she grew particularly fond of the many varieties of pasta prepared with vegetables. She also kept up a vigorous exercise schedule.

Now age 67, Polly has seen 12 years pass since her diagnosis. She has experienced ipsilateral recurrences, but each time opted for surgery rather than chemotherapy, radiation, or drugs. She continues to use dietary factors to maintain her immune strength as much as ever. And she power walks one to two miles every other day. Her energy has remained high, and her weight has not changed.

She does not hold that her decision would necessarily be right for everyone. But she says, "I feel very strongly that it should be made clear to people who have had a cancer diagnosis that they truly have the option of saying "no" to chemo and radiation. A well-documented reference book which explores this option for early breast cancer patients is *Enough Already* by George Goldberg, J.D., a former Harvard Law School professor who carefully researched the literature with his wife after her diagnosis."