



**Every Bite Counts!**

# Nutritional Tips for Breast Cancer Patients



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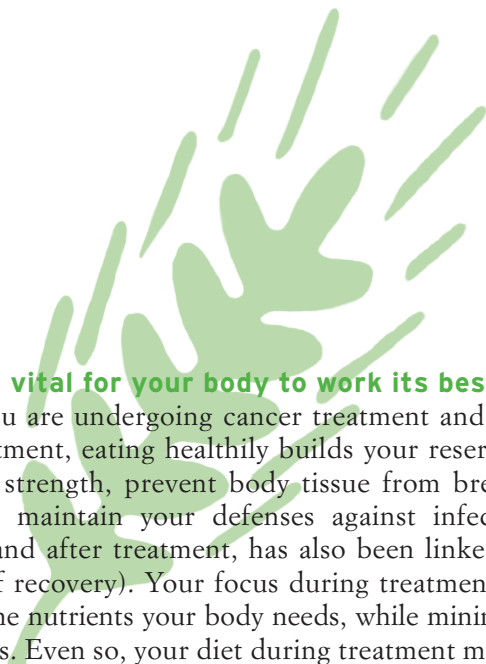


## Introduction

**Breast cancer is the most common type of non-skin cancer** among women in the United States. The number of new cases of breast cancer in this country in women was estimated to be about 212,600 in 2003 and each year, about 1,300 men are diagnosed with breast cancer. The survival rate seems to be similar in men and women. Although the breast cancer diagnosis rate has increased, the good news is that the overall breast cancer death rate has been dropping since the early 1990s. One stark exception to this trend is found among African-American women. Although fewer African-American women get breast cancer, they are twice as likely to die from it as Caucasian women, according to the American Cancer Society.

**Your diet is an important part of breast cancer treatment.** Eating the right kinds of foods before, during, and after treatment can help you feel better and stay stronger. To ensure proper nutrition, you have to eat and drink enough of the foods that contain key nutrients (vitamins, minerals, protein, carbohydrates, fat, and water). The side effects of cancer and cancer treatments, however, may make it difficult to eat well. Symptoms that interfere with eating include anorexia, nausea, vomiting, diarrhea, constipation, mouth sores, trouble with swallowing, and pain. Your treatment may also affect your appetite, taste, smell, and the ability to eat enough food or absorb the nutrients from your food. As a result, you may become malnourished from the lack of key nutrients. Malnutrition can make you feel weak, tired, and unable to resist infections or withstand cancer therapies. On the other hand, many people have mild or no side effects.

**A healthy diet  
is always vital  
for your body to  
work its best**



**A healthy diet is always vital for your body to work its best,** and this is even more true if you are undergoing cancer treatment and afterwards. As you go into treatment, eating healthily builds your reserves to help you to keep up your strength, prevent body tissue from breaking down, rebuild tissue, and maintain your defenses against infections. Healthy nutrition, during and after treatment, has also been linked to a better prognosis (chance of recovery). Your focus during treatment is to make sure that you get all the nutrients your body needs, while minimizing nutrition-related side effects. Even so, your diet during treatment may not necessarily conform to the nutrition recommendations for the general population. For example, you may need to eat higher amounts of calories and foods that emphasize protein. This is okay! **The most important thing is to make every bite count.**

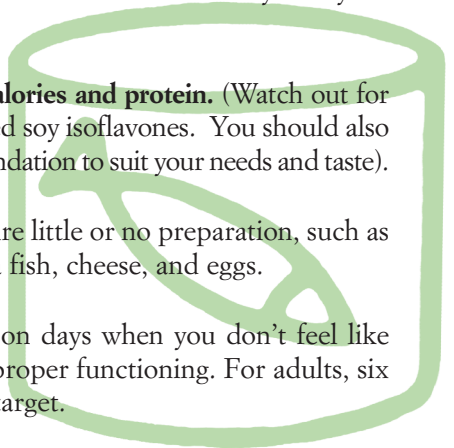
**You can easily create a healthy diet,** even though you may experience side effects from treatment. A registered dietitian, in conjunction with your physician, is your best source of information about nutrition and diet planning. A dietitian can also help you choose foods you like, based on your cultural and ethnic background. The information contained in this publication will add to what the dietitian and your physician can tell you. We have tried to highlight the specific nutrients and food sources that researchers are interested in for their potential to reduce the risk of breast cancer recurrence or metastasis. We hope this will assist you in better managing your disease and side effects, and introduce you to healthful eating habits that you can maintain not only during your cancer care, but also throughout your disease-free years.



## Managing treatment side effects

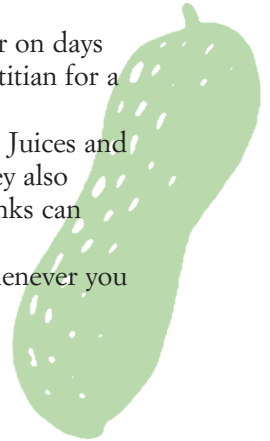
**During treatment, you may experience nutrition-related side effects** that prevent you from getting adequate nutrition. That's okay! Remember, there aren't any hard and fast nutrition rules during your treatment. Things to keep in mind:

- **When you can eat, try to have meals and snacks with sufficient calories and protein** – they will help you stay stronger, prevent body tissues from breaking down, and rebuild tissues that your cancer treatment may harm.
- **Stick to the foods you like** until you can introduce more variety into your diet. Stock up on your favorites.
- **Try a liquid meal replacement for extra calories and protein.** (Watch out for products that contain high levels of isolated soy isoflavones. You should also consult a registered dietitian for a recommendation to suit your needs and taste).
- **Keep foods stocked and handy** that require little or no preparation, such as peanut butter, pudding, applesauce, tuna fish, cheese, and eggs.
- **Try to drink plenty of fluids**, especially on days when you don't feel like eating. Water is essential to your body's proper functioning. For adults, six to eight cups of fluids per day is a good target.
- **If your symptoms persist or worsen, consult your physician immediately.** He or she will also be able to suggest prescription remedies that work well to control side effects. Below are nutrition tips that may help with specific symptoms.



## POOR APPETITE

- Eat foods that are high in protein and calories, such as peanut butter, cheese, and boiled eggs.
- Do not wait until you are hungry to eat – try eating small meals more frequently throughout the day.
- Try liquid meal supplements to increase your caloric intake or on days when you don't feel like eating food. Consult a registered dietitian for a recommendation that works for you.
- Make sure to drink at least six to eight cups of fluids per day. Juices and soups are a good source of fluids, along with fresh water. They also provide calories and nutrients, and milk- or yogurt-based drinks can provide protein.
- Keep snacks within easy reach so you can have something whenever you feel like it.



## ALTERED SENSE OF TASTE

- Stick to foods that taste and look good to you.
- If tolerated, use tart flavors when cooking, such as lemon, vinegars, or pickled foods.
- Season foods with onion, garlic, basil, oregano, or rosemary. Marinate meats in wines, fruit juices, or salad dressing to add flavor.
- Rinse your mouth with salt water or baking soda and water to help disguise any lingering, unpleasant tastes.

## NAUSEA/VOMITING

- Prior to each treatment, eat a small light meal to reduce nausea during treatment.
- Eat bland foods such as crackers, toast, boiled potatoes, rice, oatmeal, yogurt, skinless chicken that is baked or broiled, and clear broths.
- Sip clear liquids throughout the day to prevent dehydration.
- Avoid fried, high-fat, heavily spiced, and very sweet foods.

## DIARRHEA

- Increase your fluid intake to prevent dehydration.
- Consume foods high in sodium and potassium, such as broth, bananas, peach and apricot nectar, and boiled or mashed potatoes to replace these minerals.
- Avoid high-fiber foods, such as raw fruits and vegetables.
- Avoid caffeinated drinks, milk, milk products, alcohol, and sweets.

## CONSTIPATION

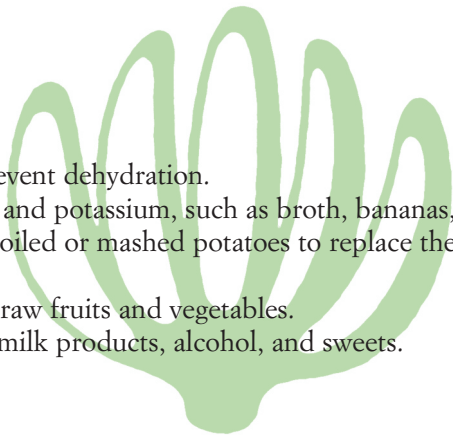
- Drink six to eight cups of fluid over the course of the day, including warm, non-caffeinated beverages.
- Increase your intake of high-fiber foods, such as whole grains and raw fruits and vegetables.

## GAS/BLOATING

- Avoid foods such as cabbage, cauliflower, and dried beans.
- Avoid carbonated beverages and chewing gum.

## TIPS FOR GETTING BACK INTO EATING AFTER YOUR TREATMENT ENDS:

- Start with simple meals and easy, familiar recipes.
- Cook enough for two to three meals, and freeze the remainder for later.
- Don't be afraid to call on friends and other supports for help with your cooking and shopping.





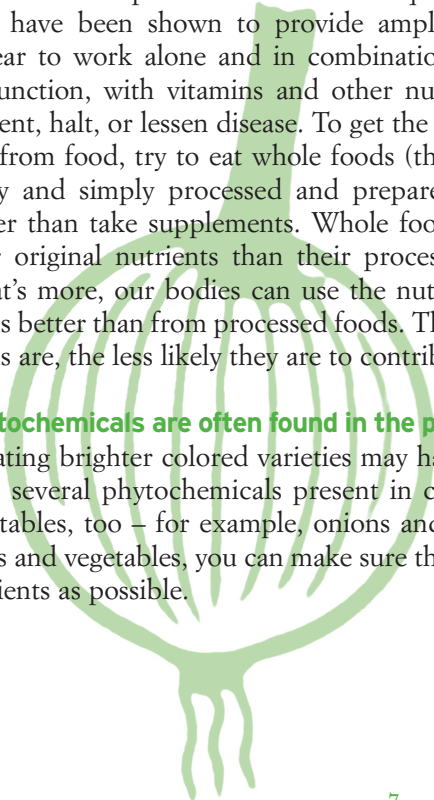


## Stick to a plant-based diet, and eat more whole foods and fewer refined foods

**Eating more fruits, vegetables, whole grains, legumes (beans and lentils), nuts, and seeds** provides a number of health benefits. These plant-based foods are rich in **phytochemicals** – naturally-occurring compounds that have numerous health-protecting actions. Phytochemicals are not considered **essential nutrients** (nutrients that must be supplied by the diet because they cannot be produced in sufficient quantities by the body). Nonetheless, they have been shown to provide ample health benefits. Phytochemicals appear to work alone and in combination, and perhaps in conjunction, with vitamins and other nutrients in food to prevent, halt, or lessen disease. To get the most phytochemicals from food, try to eat whole foods (those that are minimally and simply processed and prepared before eating), rather than take supplements. Whole foods retain more of their original nutrients than their processed counterparts. What's more, our bodies can use the nutrition from whole foods better than from processed foods. The more processed foods are, the less likely they are to contribute to our health.

**Whole foods  
retain more of  
their original  
nutrients**

**Phytochemicals are often found in the pigments of fruits and vegetables**, so eating brighter colored varieties may have more benefits. There are, however, several phytochemicals present in colorless or less colorful fruits and vegetables, too – for example, onions and corn. By eating a wide variety of fruits and vegetables, you can make sure that you are getting as many different nutrients as possible.





## Spotlight on Three Phytochemicals and Their Food Sources

**GLUCOSINOLATES** are sulfur-containing compounds found in cruciferous vegetables, such as Brussels sprouts, mustard greens, broccoli, Savoy cabbage, red cabbage, cauliflower, kale, and bok choy. Cruciferous vegetables, like many other vegetables, are high in a variety of nutrients and phytochemicals that may work together to help prevent cancer. What distinguishes cruciferous vegetables from other vegetables, however, is that they are rich in glucosinolates. These particular phytochemicals are responsible for the pungent aromas and characteristic spicy taste of cruciferous vegetables. When glucosinolates are broken down by your body, other phytochemicals, such as indoles and isothiocyanates, are formed. One challenge in studying the relationships between cruciferous vegetable intake and cancer risk in humans is separating the benefits of diets that are generally rich in vegetables from those that are specifically rich in cruciferous vegetables. Scientists are currently exploring the possibility that high intakes of cruciferous vegetables, as well as specific glucosinolate breakdown products, may help prevent cancer. Some glucosinolate breakdown products may alter the activity of hormones like estrogen in ways that inhibit the development of hormone-sensitive cancers. For example, indole-3-carbinol has received attention because it seems to deactivate estrogen, a hormone linked to breast cancer [1]. Other breakdown products may help prevent cancer by helping rid the body of carcinogens before they can damage DNA, or by altering the process that turns normal cells into cancerous cells. For example, a 2004 study found that isothiocyanates inhibited the growth of human breast cancer cells and human mammary epithelial cells (cells that line the inside of the milk ducts in the breast). This study hints that these compounds may have potential as chemotherapeutic agents for suppressing early-stage tumors [2].

**CAROTENOIDS** are responsible for the yellow, orange, and red pigments in plants. The most common carotenoids in North American diets are alpha-carotene, beta-carotene, beta-cryptoxanthin, lycopene, lutein and zeaxanthin. Foods rich in carotenoids include carrots, pumpkins, sweet potatoes, oranges, red peppers, tomatoes, and leafy dark greens such as spinach and kale. Carotenoids generally act as antioxidants, although researchers don't yet know whether their health benefits are related to their antioxidant activity or to other non-antioxidant activities. The results of large population studies suggest that diets high in carotenoid-rich fruits and vegetables are associated with reduced risk of

cardiovascular diseases and some cancers. That's why it is best to get carotenoids from food, rather than from supplements. A case in point: High dose beta-carotene supplements have not reduced the risk of cardiovascular diseases or cancers in large research studies. When you cook, adding some fat or oil to carotenoid-containing vegetables lets carotenoids be absorbed better by your body.

Alpha-carotene and beta-carotene have "provitamin A activity." This means that your body produces vitamin A (retinol) from them. Orange and yellow vegetables like carrots, pumpkins, winter squash, sweet potatoes, and plantains are rich sources of alpha- and beta-carotene. Spinach, collard greens and kale are also rich sources of beta-carotene, although the chlorophyll in their leaves hides the yellow-orange pigment. Beta-cryptoxanthin is also a provitamin A carotenoid. Orange and red fruits and vegetables like sweet red peppers, papayas, and oranges are particularly abundant in beta-cryptoxanthin.

Lycopene, lutein and zeaxanthin have no vitamin A activity. Lycopene gives tomatoes, pink grapefruit, watermelon, and guava their red color. An estimated 80% of lycopene in the U.S. diet comes from tomatoes and tomato products such as tomato sauce, tomato paste, and catsup (ketchup). Although lutein and zeaxanthin are different compounds, they are both from the class of carotenoids known as xanthophylls. Dark green leafy vegetables like spinach and kale are particularly rich sources of lutein and zeaxanthin.

In women who have been diagnosed with early-stage breast cancer, increased vegetable and fruit intake decreases the likelihood of recurrence. A study published in 2005 examined the relationship between blood plasma carotenoid levels (as a marker of vegetable and fruit intake) and risk for a new breast cancer event in a group of 1,551 women with a history of early-stage breast cancer [3]. During the experimental period (1995-2000), 205 women had a recurrence or new primary breast cancer. Women with the highest carotenoid levels had significantly reduced risk for a new breast cancer event, even when other factors were taken into account (tumor stage, grade, and hormone receptor status; chemo and other therapies; clinical site; age at diagnosis; body mass index; plasma cholesterol concentration) that influence breast cancer prognosis.

**LIGNANS** are naturally occurring compounds found in a wide variety of foods, including seeds (flax, pumpkin, sunflower, poppy); whole grains (rye, oats, barley); bran (wheat, oat, rye); and fruits (particularly berries). Lignans are converted by

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your intestinal bacteria into two estrogen-like substances known as enterodiol and enterolactone. Because enterodiol and enterolactone can mimic some of the effects of **estrogen**, they (and lignans, in general) are classified as **phytoestrogens** (plant estrogens). Their estrogen activity, however, is weak, compared to your body's own estrogen. Phytoestrogens can attach themselves to estrogen receptors on breast and reproductive tissues, and may actually block estrogen from entering cells. This anti-estrogen action could help reduce the risk of hormone-associated cancers (breast, uterine, ovarian and prostate). Phytoestrogens may also help maintain bone density. What's more, a 2005 study found that 10% flaxseed and its lignan and oil components, alone and in combination, inhibited the growth and spread of human estrogen receptor-negative breast cancer cells in mice [4].

By far the richest source of lignans is flaxseed. Flaxseed oil contains negligible amounts of lignans, unless it is the "high-lignan" variety. Flaxseed is also a rich source of the **essential omega-3 fatty acid alpha-linolenic acid (ALA)**; see section titled "Balance Your Fat Intake" for more information).

**Tips for incorporating flaxseed into your diet:**

- Buy whole, fresh flaxseed and grind using a coffee grinder, or purchase it already ground as flax meal.
- Refrigerate flaxseed to keep it fresh, and use it within three months of grinding.
- Add flaxseed to yogurt, ice cream, or pudding.
- Do not add flaxseed to hot food or use it when cooking (e.g., frying, barbecuing) because heat destroys the valuable compounds.



**FIBER** is the indigestible but indispensable portion of plant food that has an array of health benefits. It is an important part of a plant- and whole foods-based diet. Fiber is classified by its ability to dissolve in water. Soluble fibers, for example, partially dissolve in water. They bind with fatty acids and prolong the amount of time it takes for your stomach to empty. Insoluble fibers do not dissolve in water. They move bulk through your system, and balance the pH (acidity) level in the intestines. Fiber may have an anticancer effect. A 2004 study found that increased **fiber** intake, independent of a low-fat diet, was associated with reduced blood levels of **estrogen** in women diagnosed with breast cancer [5]. The reduced estrogen levels may positively affect women with **estrogen receptor-positive (ER+)** tumors, because ER+ cancer cells need estrogen to grow. However, fiber's role in preventing breast cancer recurrence is not yet established. Current recommendations suggest that adults consume 20-35 grams of dietary fiber per day from a variety of plant foods. The best sources are fresh fruits and vegetables, nuts and legumes, and whole-grain foods.

## Sources of fiber

Type of Fiber	Sources
Soluble Fiber	Oatmeal, oat bran, nuts and seeds; legumes (dried peas, beans, lentils); apples, pears, strawberries, blueberries
Insoluble Fiber	Whole grains (whole wheat breads, barley, couscous, brown rice, bulgur); wheat bran; seeds; carrots, cucumbers, zucchini, celery, tomatoes

- [1] Auburn KJ, Fan S, Rosen EM, et al. Indole-3-carbinol is a negative regulator of estrogen. *J Nutr.* 2003;133(7 Suppl):2470S-2475S.
- [2] Tseng E, Scott-Ramsay EA, Morris ME. Dietary organic isothiocyanates are cytotoxic in human breast cancer MCF-7 and mammary epithelial MCF-12A cell lines. *Exp Biol Med.* 2004 Sep;229(8):835-42.
- [3] Rock CL, Flatt SW, Natarajan L, et al. Plasma carotenoids and recurrence-free survival in women with a history of breast cancer. *J Clin Oncol.* 2005 Sep 20;23(27):6631-8.
- [4] Chen J, Wang L, Thompson LU. The inhibitory effect of flaxseed on the growth and metastasis of estrogen receptor negative human breast cancer xenografts attributed to both its lignan and oil components. *Int J Cancer.* 2005 Sep 20; 116(5):793-8.
- [5] Rock CL, Flatt SW, Thomson CA, et al. *J Clin Onc.* 2004 Jun 15;22(12):2379-87.

## Consider...

Try to eat more fruits and vegetables. Eat at least five to nine half-cup servings of fruits and vegetables a day. If you need 2,000 calories a day to maintain your weight and health, aim for at least nine servings (4 1/2 cups) a day.

### Tips for increasing fruit and vegetable intake:

- Prepare your plate with no more than 1/3 meat and dairy; fill the rest with fruits, vegetables, and whole grains.
- Choose a variety of fruits and vegetables and include as many phytochemical-rich dark-green, leafy vegetables; yellow, orange, red and purple fruits and vegetables; cooked tomatoes; and citrus fruits as possible.
- Try new things – break out and choose one new fruit or vegetable each week.
- Buy a new cookbook with meatless recipes, and eat one meatless meal each week.
- Add herbs and spices such as garlic, ginger, parsley, cilantro and turmeric to your foods.
- Try making more nutritious muffins by folding a cup of grated carrots, apples, or zucchini into the batter.

### Eat more whole foods, and fewer processed foods. Tips for eating more whole foods:

- Try to cook from scratch when possible, and never overcook vegetables. Remember that carotenoids, the phytochemicals found primarily in red, yellow, and orange vegetables and fruits, as well as spinach, collard greens and kale, are best absorbed with fat in a meal. Chopping, pureeing, and cooking carotenoid-containing vegetables in oil generally helps your body better absorb the carotenoids they contain).
- Eat whole fruits instead of drinking fruit juices.
- Replace white rice, bread, and pasta with brown rice and whole-grain products.
- Choose whole-grain cereals for breakfast.
- Snack on raw vegetables instead of chips, crackers, or chocolate bars.
- Substitute legumes for meat two to three times per week in chili and soups.
- Experiment with international dishes (such as Indian or Middle Eastern) that use whole grains and legumes as part of the main meal (as in Indian dahls) or in salads (for example, tabbouleh).



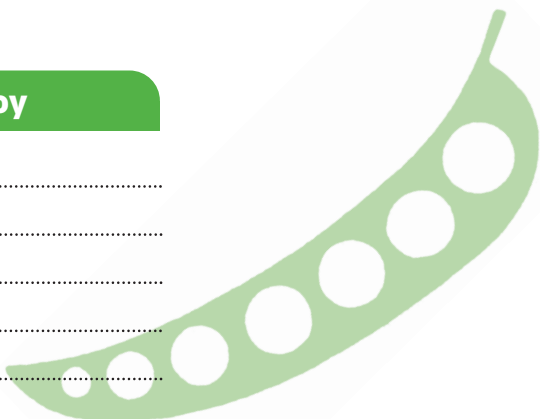
## Eat soy, but in moderation

**Soy foods contain many potentially anticarcinogenic compounds**, including soy isoflavones and other phytoestrogens. At present though, the safety of high intakes of soy **isoflavones** and other **phytoestrogens** (plant estrogens) in the diet of breast cancer survivors is an area of considerable debate among scientists and clinicians. No human studies have been conducted to establish whether the weak phytoestrogens in soy fuel cancer growth, or reduce the recurrence of breast cancer. To date, results of cell culture and animal studies have been conflicting. Some have found that soy isoflavones can stimulate the growth of **estrogen receptor-positive (ER+)** breast cancer cells [6, 7], however. The effects of high intakes of soy isoflavones in breast cancer survivors who are taking **anti-estrogen drugs** to prevent recurrence have not been studied, either.

### Whole Food Sources of Soy

Food	Serving Size*
Edemame	1/2 cup, cooked
Soybeans	1/2 cup, cooked
Soy milk	1 cup
Soy nuts	1 oz.
Soy yogurt	1 cup
Miso soup	1/2 cup
Tempeh	1/2 cup
Tofu	1/2 cup

\* Each serving provides  
30-60 mg of soy  
isoflavones.



Given the available data, women with a history of breast cancer should avoid protein meal supplements (such as bars and shakes) that are made with soy flour (often listed as “soy protein isolate”), because these contain high levels of isolated soy isoflavones. You can safely reap the health benefits of soy by consuming one to two servings per day from whole food sources.

- [6] Allred CD, Allred KF, Ju YH, Virant SM, Helferich WG. Soy diets containing varying amounts of genistein stimulate growth of estrogen-dependent (MCF-7) tumors in a dose-dependent manner. *Cancer Res.* 2001;61(13):5045-5050.
- [7] Ju YH, Allred CD, Allred KF, Karko KL, Doerge DR, Helferich WG. Physiological concentrations of dietary genistein dose-dependently stimulate growth of estrogen-dependent human breast cancer (MCF-7) tumors implanted in athymic nude mice. *J Nutr.* 2001;131(11):2957-2962.

### Consider...

If you wish to incorporate soy into your diet, eat whole soy foods such as tofu, tempeh, edamame, and miso, which contain moderate levels of soy isoflavones in combination with protein, fiber, and some fat.

- Phytoestrogens in soy may protect estrogen receptors from excessive stimulation by the body’s own hormones and foreign estrogen-like substances.
- The benefits of 1-2 servings per day of whole soy foods seem to outweigh the risks in most people.

**Avoid the high levels of isolated soy isoflavones** (often listed as “soy protein isolate”) that are found in some protein supplements or powders. If you want to add a liquid meal supplement to your diet, ask a registered dietitian to recommend one that suits your needs and taste.

- Soy isoflavones are phytoestrogens that can act in the body in similar ways as estrogens.
- High levels of soy isoflavones may raise the risk of breast cancer in post-menopausal women and interfere with the action of anti-estrogen drugs.





## Balance your fat intake

**The American Society for Clinical Oncology** suggests that eating a low-fat diet may stall recurrence of breast cancer, especially estrogen receptor-negative cancers [9]. One study indicated that breast cancer patients who eat excess calories have higher recurrence rates than those who consumed moderate calories [10]. There are a number of possible explanations for the relationship between breast cancer recurrence and excess fat or calorie consumption. For example, a higher caloric intake may fuel the division and growth of cells, including those that are cancerous. In addition, being overweight is associated with elevated estrogen levels and insulin resistance, both of which have been linked to breast cancer.

### Types of Dietary Fat

Type of Fat	Main Sources	State at Room Temp
Monounsaturated	Olives; olive oil, canola oil, peanut oil, cashews, almonds, peanuts and most other nuts; avocados.	Liquid
Polyunsaturated	Corn, soybean, safflower and cottonseed oils; cold-water fish and other sources of omega-3 fatty acids	Liquid
Saturated	Red meat, shellfish, whole-milk dairy products (cheese, milk, and ice cream), poultry skin, and egg yolks; coconut, coconut milk, coconut oil, palm oil, and palm kernel oil.	Solid
Trans	Most margarines; vegetable shortening; partially hydrogenated vegetable oil; deep-fried chips; many fast foods; most commercial baked goods.	Solid or semi-solid

**Fat is an important source of energy for the body** and aids in the absorption of essential vitamins. Some foods that are major contributors of fat in the diet include butter, margarine, shortening, visible fat on meat and poultry, whole milk, egg yolks, and nuts. However, fats from these sources – meats, full-fat dairy products, cookies, crackers, and fast food – are **saturated fats** or **trans fats** (a particular form of unsaturated fat that has physical properties generally resembling saturated fats). Both saturated and trans fats can raise the amount of low-density lipoprotein and the level of “bad” cholesterol in the bloodstream, heightening your risk for heart disease.

**Because they are not essential and provide no known health benefit**, there is no recommended or safe level of saturated and trans fats. You should eat as little of them as possible while consuming a nutritionally adequate diet, according to an Institute of Medicine dietary reference report [11]. The same report has also finally prompted the Food and Drug Administration to require that all Nutrition Facts food labels list trans fats.

**Although reducing fat intake is recommended**, it is not necessary to cut all fat out from your diet. Some fats are actually healthful. **Monounsaturated** and **polyunsaturated fats** reduce blood cholesterol levels and thus lower the risk of heart disease when they replace saturated fats in the diet. A study published in 1999 found that **omega-3 fatty acids** (a type of polyunsaturated fat) helped overweight people burn fat [12]. These omega-3 fatty acids may also benefit the immune system and reduce the risk of metastatic disease. Studies in animal models of cancer indicate that increased intake of the omega-3 fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) decreases the occurrence and progression of mammary, prostate, and intestinal tumors [13].

**Some fats  
are actually  
healthful**

**Humans must get two polyunsaturated fatty acids, alpha-linolenic acid (ALA; an omega-3 fatty acid) and linoleic acid (an omega-6 fatty acid)**, from the foods they consume, since neither is made by the body. They are considered **essential fatty acids**, and a lack of either one will result in symptoms of

deficiency, including scaly skin and dermatitis. **Flaxseed** (see section on “The Plant-based Diet” for tips on incorporating flaxseed into your diet), walnuts, and their oils are among the richest sources of ALA. Canola oil is also an excellent source of ALA.

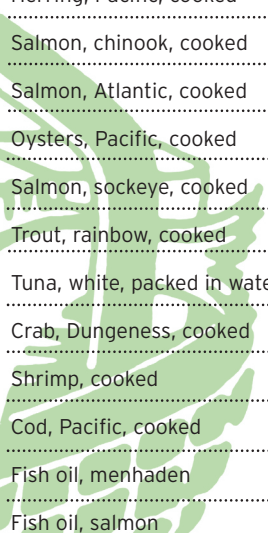
## Sources of the Essential Omega-3 Fatty Acid ALA

Food	Serving	ALA (g)
Flaxseed oil	1 tablespoon	8.5
Walnuts, English	1 ounce	2.6
Flaxseed	1 tablespoon	2.2
Walnut oil	1 tablespoon	1.4
Canola oil	1 tablespoon	1.2
Mustard oil	1 tablespoon	0.8
Soybean oil	1 tablespoon	0.9
Walnuts, Black	1 ounce	0.6
Olive oil	1 tablespoon	0.1
Broccoli, raw	1 cup, chopped	0.1

EPA and DHA can be obtained from the diet (or synthesized from ALA in the body). Fish from cold waters are an excellent dietary source of EPA and DHA.



## Cold-water Fish Sources of Omega-3 Fatty Acids EPA and DHA



<b>Food</b>	<b>Serving</b>	<b>Amount providing 1g of EPA+DHA</b>
Herring, Pacific, cooked	3 ounces*	1.5 ounces
Salmon, chinook, cooked	3 ounces	2 ounces
Salmon, Atlantic, cooked	3 ounces	2.5 ounces
Oysters, Pacific, cooked	3 ounces	2.5 ounces
Salmon, sockeye, cooked	3 ounces	3 ounces
Trout, rainbow, cooked	3 ounces	3.5 ounces
Tuna, white, packed in water	3 ounces	4 ounces
Crab, Dungeness, cooked	3 ounces	9 ounces
Shrimp, cooked	3 ounces	11 ounces
Cod, Pacific, cooked	3 ounces	12.5 ounces
Fish oil, menhaden	1 gram	5 grams
Fish oil, salmon	1 gram	3 grams

\*A 3-ounce serving of fish is about the size of a deck of cards.

- [9] <http://www.cancer.gov/clinicaltrials/results/low-fat-diet0505>.
- [10] Saxe GA, Rock CL, Wicha MS, et al. Diet and risk for breast cancer recurrence and survival. *Breast Cancer Res Treat.* 1999 Feb;53(3):241-53.
- [11] Institute of Medicine. *Dietary reference intakes for energy, carbohydrate, fiber, fat, fatty acids, cholesterol, protein, and amino acids.* Washington, DC: National Academies Press, 2002.
- [12] Mori TA, Bao DQ, Burke V, et al. Dietary fish as a major component of a weight-loss diet: effect on serum lipids, glucose, and insulin metabolism in overweight hypertensive subjects. *Am J Clin Nutr.* 1999 Nov;70(5):817-25.
- [13] Bartsch H, Nair J, Owen RW. Dietary polyunsaturated fatty acids and cancers of the breast and colorectum: emerging evidence for their role as risk modifiers. *Carcinogenesis.* 1999;20(12):2209-2218.

While fish is a great source of omega-3 fatty acids, you need to be mindful of the mercury levels that various fish contain. Please see chart below for seafood choices that have lower levels of mercury.

## Mercury Guide for Seafood Choices

### Highest in Mercury (Try to avoid)

.....  
 Tilefish  
 .....  
 Swordfish  
 .....  
 King Mackerel  
 .....  
 Shark  
 .....  
 Canned Albacore Tuna

### Lower in Mercury (Up to 12 oz., or two servings per week)

.....  
 Grouper                      Lobster  
 .....  
 Halibut                      Crab  
 .....  
 Salmon                      Scallop  
 .....  
 Cod                              Shrimp  
 .....  
 Pollock                      Canned Light Tuna  
 .....  
 Catfish                      Canned Salmon



## Consider...

- **Limit your intake of saturated and trans fats** and consume mainly unsaturated (mono- and polyunsaturated) fats from olives, olive oil, canola oil, avocados, flaxseed, most other seeds and nuts, and cold water fishes. It is impossible and not recommended to cut out all fats from a nutritionally adequate diet.
- Trans fats are often listed in ingredients as “hydrogenated” or “partially hydrogenated” oils. **Check food labels** for these ingredients and avoid foods that contain trans fats.
- **Try cutting out all commercially baked goods** (such as potato chips, cookies and cakes) and fast foods, which contain high levels of trans fats.



## Manage your weight

For the past two decades, researchers have studied the relationship between obesity and breast cancer. Most of the available evidence suggests that obesity is related to the development of breast cancer (in postmenopausal women) and decreased survival from breast cancer in both premenopausal and postmenopausal women. Obesity may impact on breast cancer survival because it can lead to larger cancers and a greater number of lymph nodes involved at the time of diagnosis, and because an excess of fat tissue is thought to increase estrogen levels, which may in turn influence the characteristics and growth rate of any breast cancer that may develop.

It is common for breast cancer survivors to gain weight after treatment. This can occur for many reasons, including a decrease in physical activity and a drop in metabolism caused by the menopause-like effects of certain cancer treatments. Eating well and exercising regularly can help you maintain a healthy weight or help you shed unwanted, excess pounds.

### Consider...

**There are many good reasons for maintaining a healthy weight**, even if the impact of obesity on risk of cancer metastasis/recurrence and cancer treatment effects is unclear. For example, obesity is associated with higher risk of heart attack and stroke. Tips for managing your weight:

- Be aware of the portion sizes that you eat, and use good judgment! You can still eat your favorite foods, but control the portion sizes if you are trying to maintain or lose weight. See the table below for a handy reference for portions of everyday foods.
- Limit your fat intake to 20% of total calories and avoid foods that are

especially high in saturated and trans fats, such as cookies, cakes, red meat, shellfish, butter, and fried foods.

- Eat five to nine servings of fruits and vegetables per day.

## Guide for Portion Size

Food and Amount	Guideline
Chicken or Fish, 3 oz. .....	Deck of cards, size of your palm .....
Vegetables, 1 cup .....	Size of your fist .....
Apple, medium .....	Size of a baseball .....
Pasta, 1/2 cup cooked .....	Ice cream scoop .....
Cheese, 1.5 oz. .....	Pair of dice, pair of dominoes .....
Butter, 1 tsp. .....	Tip of your thumb .....
Dry cereal, 1 cup .....	Large handful .....

**Introduce regular exercise into your routine.** Not only will exercise help you maintain your weight, it can also improve your cardiovascular health, promote your sense of well-being, and elevate your mood. Make sure to check with your physician before starting a new exercise regimen.

- Exercise about 40 to 60 minutes per day, most days of the week. You don't have to sweat it out at the gym to exercise – you can walk around a mall at a moderate pace, ride a bicycle, go dancing, swim, hike, and many other things.

**Calories In = Calories Out.** To lose weight, you need to expend more calories than you consume. To do this, you may need to decrease your caloric intake, increase the amount of exercise you do, or both.

**Slow and steady wins the race.** Weight loss should be gradual, about one to two pounds per week. Faster weight loss can deplete your body of necessary nutrients and weaken your immune system.



## Eat organic, if possible

**Try to eat organic foods if you can.** Produced without the use of synthetic fertilizers, bio-engineering, radiation, herbicides, fungicides, or pesticides, organic food is recommended because it contains less pesticide residue, which may be a carcinogen. Organically grown foods are also a better nutritional choice and provide better flavor than conventionally grown foods. Organic farms use soil-building programs that enhance soil fertility and promote environmental quality for future generations.

Fruits and vegetables naturally contain phytochemicals, which both protect the plant from predators as well as act as cancer-fighting antioxidants. The addition of pesticides reduces the need for these natural chemicals, so the plant produces less, thus reducing the level of antioxidant activity in the plant.

While results from studies examining the link between pesticide exposure and cancer risk and recurrence are inconclusive, pesticides are toxins that affect every individual differently and have no positive effects.

Therefore, it is wise to minimize your exposure as much as possible. By eating organic, not only do you reduce your exposure to toxins, but you also reap the benefits of higher antioxidant activity. One way to check for organic products is to **look for the U.S. Department of Agriculture organic seal** on produce and food items, which signifies that the item contains at least 95% certified organic ingredients. Products that are “Made With Organic Ingredients” must contain at least 70% certified organic ingredients but do not bear the USDA seal.





Organic products can be harder to find and more expensive than conventional products. Keep in mind that a plant-based diet has many benefits, so eating any produce, whether organic or not, is healthier than eating none at all. You can at least avoid the most heavily contaminated fruits and vegetables, and remember to wash all produce thoroughly before consumption.

Use the Shopper's Guide to Pesticides in Produce developed by the Environmental Working Group (<http://www.ewg.org>) to help you determine what popular fresh fruits and vegetables you should try to buy as organic.

## Shopper's Guide to Pesticide

### Higher in Pesticide (Try to Buy Organic)

Apples  
Bell Peppers  
Celery  
Cherries  
Grapes (imported)  
Nectarines  
Peaches  
Pears  
Potatoes  
Red Raspberries  
Spinach  
Strawberries

### Lowest in Pesticides

Asparagus  
Avocados  
Bananas  
Broccoli  
Cauliflower  
Corn (sweet)  
Kiwis  
Mangoes  
Onions  
Papayas  
Pineapple  
Peas (sweet)

### Consider...

**Buy organic produce and products** as much as possible, and look for the USDA organic seal, which means that the product contains at least 95% certified organic ingredients.

If you cannot buy all organic, make sure to **avoid the fruits and vegetables with the highest levels of pesticide residues** and to always wash all produce thoroughly before consumption.



## Pay attention to food safety and handling guidelines

**Cancer and its treatments destroy the body's ability to make white blood cells.** This can weaken your immune system and put you at risk for infections that you would not normally be susceptible to, including food-borne illnesses. **Here are some tips** for preventing food-borne illnesses:

### DO:

- Wash all raw fruits and vegetables thoroughly.
- Wash your hands carefully before and after preparing and eating foods.
- Wash all food preparation surfaces (knives, cutting boards) before and after preparing foods, and especially after handling raw meat.
- Thaw meats in the refrigerator on the bottom shelf.
- Cook all meats until well done (165° F for meats and 180° F for poultry).
- Refrigerate perishable foods immediately.
- Wash the tops of canned items before opening.
- Store prepared foods below 40° F.
- Store leftovers in small, shallow containers.

### AVOID:

- Raw or undercooked animal products, including meat, eggs, shellfish.
- Unpasteurized milk, milk products, and fruit and vegetable juices.
- Aged and soft cheeses such as Brie.
- Molded and outdated food products.
- Unrefrigerated cream- and custard-containing desserts and pastries.
- Salad bars, buffets, foods from street vendors.
- Leftovers older than 3 days.
- Damaged, rusted, dented, or swollen canned foods.
- Defrosted, then refrozen foods.



## Glossary

### **Alpha-linolenic acid (ALA)**

An essential fatty acid derived from plants that is converted within the body to omega-3 fatty acids to be used as energy. Sources of ALA include flax seeds, hemp seeds, walnuts, and canola oil.

### **Anti-estrogen (drugs)**

A class of drugs that blocks the action of the hormone estrogen in the body. Tamoxifen is an anti-estrogen drug.

### **Carotenoids**

A class of plant chemicals found in the yellow, orange, and red pigments of fruits and vegetables such as carrots, pumpkins, sweet potatoes, tomatoes, red peppers, spinach, and kale. Some common carotenoids are alpha-carotene, beta-carotene, lutein, and lycopene.

### **Essential fatty acid**

A type of fatty acid that the human body cannot produce and thus must be obtained from food.

### **Essential nutrient**

Any nutrient that the human body cannot produce, which must be obtained from food.

### **Estrogen**

A steroidal hormone. In women, estrogen is primarily produced by the ovaries and is responsible for regulating the development of secondary sex characteristics, including breasts, regulating menstruation, and preparing the uterus for fertilization and reproduction. In men, estrogen is produced in small amounts by the testes. In estrogen receptor-positive breast cancers, estrogen may promote the growth of cancer cells.

### **Estrogen receptor-positive (ER+) cancer/tumor**

Cancer cells that have a protein (receptor molecule) to which estrogen will bind. May also be called a “hormone-positive” cancer/tumor. Breast cancer cells that are ER+ need estrogen to grow and will usually respond to hormone (anti-estrogen) therapy that blocks these receptor sites.

### **Fat, monounsaturated**

Type of fat found in canola oil, olives and olive oil, nuts, seeds, and avocados. Although monounsaturated fats have the same concentration of calories as other fats, they may result in reduced blood cholesterol levels, which reduces the chance of heart disease. Thus, they are often referred to as “good” fats.

### **Fat, polyunsaturated**

A highly unsaturated fat that is liquid at room temperature. Polyunsaturated fats are found in greatest amounts in corn, soybean, and safflower oils, and many types of nuts. Although polyunsaturated fats have the same concentration of calories as other fats, they may result in reduced blood cholesterol levels, which reduces the chance of heart disease. Thus, they are often referred to as “good” fats.

### **Fat, saturated**

A type of fat most often found in animal food products including milk, eggs, meat, and butter. Saturated fat is also found in vegetable products such as coconut and palm oil. They are usually solid at room temperature. Saturated fats are often associated with higher levels of “bad” cholesterol and increased risk of heart disease.

### **Fat, trans**

A type of processed fat that does not occur in nature (also called hydrogenated or partially hydrogenated fat/oil). Used in baked goods like doughnuts, breads, crackers, potato chips, cookies and other processed food products such as margarine and salad dressings. The National Academy of Sciences recommended in 2002 that dietary intake of trans fatty acids be minimized.

## **Fiber**

The carbohydrate component of plant foods (fruits, vegetables, beans, legumes, nuts, seeds) that cannot be digested by humans. Also called bulk or roughage. Often categorized as soluble (partially dissolves in water) or insoluble.

## **Glucosinolates**

A class of sulfur-containing plant chemicals found in cruciferous vegetables such as broccoli, cauliflower, Brussels sprouts, and cabbage. Examples of glucosinolates are indole-3-carbinol and isothiocyanate.

## **Isoflavones**

A class of estrogen-like plant chemicals found in soy products.

## **Lignans**

A class of estrogen-like plant chemicals found in a variety of plants such as flax seeds, pumpkin seeds, rye, broccoli, and some berries.

## **Omega-3 fatty acids**

A type of polyunsaturated fat found primarily in marine or cold-water fish such as tuna, salmon, mackerel, sardines, and herring, in the form of docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA). Omega-3 fatty acids regulate a number of bodily functions, such as heart rate, blood pressure, and immune response.

## **Phytochemicals**

Any chemicals or nutrients derived from a plant source. Also called “phytonutrients”. Usually refers to plant compounds that are not required for normal functioning of the body but that nonetheless have a beneficial effect on health or an active role in the preventing or lessening disease.

## **Phytoestrogen**

A plant chemical that exerts estrogen-like effects in humans.



## Cancer Resources

### **Academy of Nutrition and Dietetics**

1-800-877-1600 or 1-800-877-0877  
eatright.org

### **American Cancer Society**

1-800-ACS-2345 (1-800-227-2345)  
cancer.org

### **American Institute for Cancer Research**

1-800-843-8114  
aicr.org

### **Avon Foundation**

1-866-505-AVON (1-866-505-2866)  
avonfoundation.org

### **Breastcancer.org**

610-642-6550  
breastcancer.org

### **CancerCare**

1-800-813-HOPE (1-800-813-4673)  
cancercare.org

### **Centers for Disease Control and Prevention**

1-800-CDC-INFO (1-800-232-4636)  
cdc.gov/cancer

### **Cook for Your Life**

212-799-3894  
cookforyourlife.org

### **Gilda's Club New York City**

212-647-9700  
gildasclubnyc.org

### **God's Love We Deliver**

1-800-747-2023 or 1-212-294-8100  
godslowewedeliver.org

### **Living Beyond Breast Cancer**

1-855-807-6386 or 610-645-4567  
lbbc.org

### **Memorial Sloan-Kettering Cancer Center**

1-800-525-2225  
mskcc.org

### **National Breast Cancer Coalition**

1-800-622-2838 or 202-296-7477  
breastcancerdeadline2020.org

### **National Cancer Institute, Cancer Information Service**

1-800-4-CANCER (1-800-422-6237)  
cancer.gov

### **National Coalition for Cancer Survivorship (NCCS)**

1-877-NCCS-YES (1-877-622-7937)  
canceradvocacy.org

### **The Susan G. Komen Breast Cancer Foundation**

1-877-GO KOMEN (1-877-465-6636)  
komen.org

### **ABCD After Breast Cancer Diagnosis**

1-800-977-4121 or 414-977-1780  
abcdbreastcancersupport.org

## Acknowledgements

This publication was made possible through the generous support of the Avon Foundation.

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