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# Cornell University Program on Breast Cancer and Environmental Risk Factors in New York State (BCERF)

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FACT SHEET #27

## Dietary Fat and the Risk of Breast Cancer

*Early studies suggested that high dietary fat intake was associated with a higher incidence of breast cancer. Other studies have failed to show a clear relationship between fat intake and breast cancer risk. These conflicting reports have left some women feeling frustrated. A closer look at the information available provides us with some idea of how fat in our diet might influence breast cancer risk and why the research results in this area are not in agreement. Also, some recommendations can be made for fat intake that would help promote general health. Although researchers may currently disagree on the role fat plays in the development of breast cancer, they do agree that the results of previous studies indicate that this relationship is worthy of further study.*

### **Does the consumption of fat increase the risk of breast cancer?**

The evidence on the relationship between the consumption of fat and the risk of breast cancer is mixed. According to international correlation studies, in countries with a high incidence of breast cancer such as the US, fat contributes about 34% of the total calories. In countries with a low incidence of breast cancer such as China, fat contributes much less, about 15%-20% of the total calories. The limitation of this kind of study is that it can demonstrate only that dietary fat and breast cancer are related in the population, not that dietary fat causes breast cancer in particular women. These studies look at estimates of food intake for whole populations and do not provide information about the dietary habits of individual women. Also, they typically do not take into account the effects of other risk factors for breast cancer such as early age at menarche (a girl's first menstrual period) or family history in their analysis.

In numerous case-control studies, women with breast cancer and women without breast cancer were asked about their dietary habits during the previous year or two. Results from 25 studies that looked at the effect of total fat intake on breast cancer risk are inconsistent. Only two of those studies reported that a high fat diet was significantly associated with an increased risk of breast cancer. However, several of the studies reported a modest, but not significant increase in the incidence of breast cancer in women who had the highest levels of fat intake compared to women at the lowest levels of fat intake.

In cohort studies, a large group of women without breast cancer is asked about their usual dietary habits, including their consumption of foods containing fats and oils. These same women are contacted years later to see how many developed breast cancer. None of the available cohort studies

reported a significant increase in the risk of breast cancer associated with a high fat intake. All of these studies were done in Western countries where the average total fat intake was usually well above 30% of total calories. Also, they include only current dietary habits and do not consider changes in the diet and/or diet during childhood.

In contrast, there are more than 95 studies, using four different animal models of breast cancer that reported that dietary fat increased the development of breast tumors in laboratory animals. This effect appears to be dependent on the type of fat in the diet, as discussed in more detail below.

### **Why are the results of studies of dietary fat and breast cancer contradictory?**

The following is a list of some possible reasons why it has been so difficult to establish whether there is a link between dietary fat and breast cancer.

- It is difficult to study the relationship between specific nutrients and breast cancer. We consume foods, not individual nutrients. Therefore, the whole diet may be what is most important.
- There are differences among studies in design and in how dietary fat intake was measured.
- In many studies, the range of fat intake in the population studied is very narrow. For example, most of the women in the US studies have a fat intake of about 30%-40% of total calories compared to 15%-35% in China. It may be that there are not enough women at the very low levels of fat intake in western countries like the US to show a difference in breast cancer rates.
- Studies of diet and breast cancer risk usually include information about current dietary habits only. These studies



are not able to determine if a high dietary fat intake during early childhood or adolescence influences breast cancer risk.

- Diet, exercise and obesity are all very closely related and may influence breast cancer risk independently or together.
- The effect of a high fat diet on the risk of breast cancer may not be as important as the effect of the different kinds of dietary fat, including saturated, monounsaturated and polyunsaturated fat.

### **How do dietary fats differ in ways that are important to breast cancer risk?**

Many studies have also tried to determine if saturated, monounsaturated and polyunsaturated fats have different effects on the development of breast cancer. Both saturated fats and polyunsaturated fats, particularly those containing omega-6 fatty acids have been shown to increase the growth of breast tumors in laboratory animals. In human studies of saturated and polyunsaturated fats, the results are mixed and it is not possible to draw a conclusion.

The results of the human studies may differ because the different types of fatty acids mentioned above are present in many different kinds of foods and oils that may also have independent effects on breast cancer risk. Also, there may be differences in the structure of the saturated, monounsaturated and polyunsaturated fatty acids present in the different types

**Dietary fat** contains different types of fatty acids. These fatty acids can be saturated, monounsaturated, or polyunsaturated. Saturated fatty acids are found in higher concentrations in foods of animal origin such as meats and dairy products in which the fat is solid at room temperature. Polyunsaturated fatty acids are found in higher concentrations in foods of plant origin such as vegetable oils and foods made from them in which the fat is liquid at room temperature. Sometimes when food is processed, vegetable oils are made more saturated as in the manufacture of margarine or food products such as cookies or snack foods. Monounsaturated fatty acids are intermediate between the other two types and are found in highest concentrations in foods such as olive oil and canola oil. These different types of fatty acids may have different effects on the development of breast cancer.

More information about the fat composition and other nutrients of various foods can be found at the USDA website: [http://www.nal.usda.gov/fnic/cgi-bin/nut\\_search.pl](http://www.nal.usda.gov/fnic/cgi-bin/nut_search.pl). A complete analysis of dietary fat includes all food sources, condiments such as butter, and cooking practices such as frying.

of foods and oils. These structural differences include differences in the length of the fatty acid chain and the location of the saturation along that chain. Polyunsaturated fatty acids are called “omega-6” or “omega-3” to indicate the location of the saturation in the fatty acid chain. Omega-6 fatty acids are plentiful in vegetable oils and omega-3 fatty acids are plentiful in fish and fish oils. A measurement of polyunsaturated fatty acids may include both of these types of fatty acids without considering that they may have different effects on breast cancer risk.

### **Is there any evidence that some types of fats may help reduce the risk of breast cancer?**

The results from some studies suggest that in addition to trying to limit our intake of fat for overall health, it might also be helpful to replace certain fats in our diet with others. While these studies do not show conclusively that specific types of fats can prevent breast cancer, they do offer promise for dietary steps that may reduce breast cancer risk.

**Olive Oil:** In three out of five studies, the consumption of olive oil was associated with a significant decrease in the risk of breast cancer. Of the two remaining studies, one reported that the consumption of olive oil was associated with a lower incidence of breast cancer and the other reported no association between olive oil consumption and breast cancer. These studies were done in Mediterranean countries such as Greece, Italy and Spain, where women may have a total fat intake of about 42% of total calories. This total fat intake is comparable to or even higher than that seen in the US. However, the incidence of breast cancer is lower in these countries compared to the US. Although the total fat intake of these Mediterranean women is similar to that of American women, an important difference may be that most of the fat in their diets comes from olive oil.

The possible relationship between the consumption of olive oil (which contains a lot of monounsaturated fat) and breast cancer risk has led to studies of monounsaturated fat. Meat and canola oil also contain a lot of monounsaturated fat. In studies of the relationship between monounsaturated fat and breast cancer risk, the results are mixed. Most of the studies report that there is no association between the consumption of monounsaturated fat and the risk of breast cancer. A few studies report that monounsaturated fat increases risk, and others report that it decreases the risk of breast cancer. One possible reason for the discrepancy in results may be that there is something about olive oil specifically, and not the monounsaturated fat, that is influencing breast cancer risk. Olive oil also contains vitamins, flavanoids, and phenolic compounds that may



help slow the development of breast cancer. It is also possible that it is something else in the diet of the women who were studied that helps reduce their risk of breast cancer.

**Fish Oil:** There is very strong evidence from several animal studies that fish oils slow the development and decrease the growth of breast tumors. The evidence from human studies is not as conclusive, with about half of the studies reporting a decrease in the risk of breast cancer associated with a high intake of fish. Although international correlation studies have also reported that fish consumption is associated with a lower incidence of breast cancer, the limitations of these studies, as described earlier, need to be considered.

According to several animal studies and the results of some human studies, the ratio of fatty acids in the diet may be as important as the type of fatty acids. This is the ratio of “omega-3” fatty acids (plentiful in fish and fish oil) to “omega-6” fatty acids (plentiful in vegetable oils). Women who eat a lot of fish usually have a high omega-3/omega-6 ratio. In animal studies, a high omega-3/omega-6 ratio decreased the incidence, size and growth of breast tumors.

### **Why do I need fat in my diet?**

We need to obtain certain types of essential polyunsaturated fatty acids in our diets because our bodies cannot make them, and they are necessary to help our bodies maintain cellular activities and function properly. Fat in the diet functions as an energy source. Dietary fat carries flavor, tenderizes food, and is necessary for the absorption of fat-soluble vitamins A, D and E. Fat stored in the body insulates the body against temperature extremes and protects vital organs from trauma.

### **What are the current recommendations for the consumption of fat in a healthy diet?**

The uncertainty of the specific nature of the relationship between dietary fat and breast cancer makes it difficult to set guidelines on fat consumption with respect to breast cancer. However, the national recommendation for general health according to Healthy People 2000, is for a diet that is less than 30% total calories from fat, less than 10% total calories from saturated fat, and 1-2% linoleic (one of the essential polyunsaturated fatty acids). For example, under these guidelines, in a diet of 2000 calories, fat would make up fewer than 600 calories, which is equivalent to 67 grams of fat. In addition to these specific guidelines on fat intake, women should eat a healthful diet consisting of plenty of fruits, vegetables, and whole grains, and remain physically active.

It is important to note that eating reduced fat foods does not necessarily mean that the diet is balanced and healthy. For example it would be more beneficial for women to incorporate more fruits and vegetables and whole grains into their diets, rather than increasing their consumption of “low-fat” or “reduced-fat” snacks and prepared foods.

### **Are more studies being done?**

Because of the important health implications regarding dietary fat and breast cancer risk and the current controversy over the influence of fat on breast cancer risk, this relationship is still the focus of much study. Clinical or intervention trials offer hope for an answer. Several clinical trials that are currently underway to study the relationship between dietary fat, other components of the diet, and the risk of breast cancer, other diseases, and mortality are, 1) The Women’s Health Initiative (WHI), 2) The Women’s Intervention Nutrition Study (WINS) and 3) The Women’s Healthy Eating and Lifestyle Study (WHEL).

### **Should breast cancer survivors consume less fat?**

There is evidence from some animal studies that a high fat diet increases the progression of breast cancer and decreases survival. There are also differences between the mortality rates from breast cancer in countries with a low fat intake, such as Japan, compared to countries with a high fat intake, such as the US. Overall calorie intake, to which dietary fat is one contributor, may increase body weight. An increase in body weight may influence the recurrence of breast cancer and survival.

### **How might dietary fat influence the risk of breast cancer?**

There are some biologically plausible mechanisms that continue to fuel the debate on the role of dietary fat in breast cancer. Some studies suggest that a high fat diet may raise the concentration of hormones such as estrogen. A diet that is high in fat may lead to increases in body weight, an established risk factor for postmenopausal breast cancer. Some researchers think that a high fat diet in childhood may lead to faster growth and an earlier menarche, an established risk factor for breast cancer. Others are studying the possibility that a high fat intake may alter the expression of genes involved in the growth of mammary tumors (breast cancer).

Some fats (olive oil and fish oil) may decrease the risk of breast cancer because they are less susceptible to free-radical peroxidation. This means that fewer cell-damaging free radicals are formed.



### What Can Women Do Now?

- Get plenty of exercise and maintain a healthy weight.
- Eat more fruits, vegetables and grains.
- When sautéing fresh vegetables, or making salad dressing, try olive oil.

We would like to acknowledge the valuable contributions of Elaine Yee-Tak Cheng (Cornell 2000) and Dana Hibner (Cornell 1999) to this fact sheet.

An extensive bibliography on *Dietary Fat and the Risk of Breast Cancer* is available on the BCERF web site: <http://www.cfe.cornell.edu/bcerf/>

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