



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

April 2000
FACT SHEET #33

Dairy Foods and the Risk of Breast Cancer

The results of studies examining the relationship between eating dairy foods and breast cancer risk are inconsistent. Some studies showed a higher risk of breast cancer associated with eating dairy foods, others showed a lower risk and some showed no association at all. At this time, no absolute suggestions can be made to help women to decrease their risk of breast cancer by their choice of dairy foods.

Does eating dairy foods change a woman's risk of breast cancer?

Currently it is unclear if eating dairy foods affects a woman's risk of breast cancer. Many studies have examined this question in relation to dairy foods in general and to specific dairy foods, but the results of these studies are conflicting. In some studies women who ate large amounts of dairy foods had lower breast cancer risk compared to women who ate small amounts of dairy foods. Other studies showed higher breast cancer risk associated with eating dairy foods, and several studies showed no differences in risk. This problem is complicated by the fact that all of these studies had design limitations. Because of this conflict, no definitive suggestions relative to breast cancer risk can be made regarding dairy foods. The decision to include dairy products in one's diet should be made based on other nutritional considerations.

Why are the results of these studies so varied and inconclusive?

Possible reasons for the inconsistency of the results of studies examining the relationship between eating dairy foods and breast cancer risk are listed below.

- Separating out the effect of one part of the diet (dairy foods) and its relationship to breast cancer is not easy. People eat a variety of foods and are exposed to many diet and life-style risk factors in combination.
- The design and the focus of the studies varied greatly and none of the studies were decisive. Studies that did not focus on dairy foods directly collected limited information on which, how much and how often dairy foods were eaten.

- The studies included women from many different countries. The level of use of dairy foods, the total diet, and the exposure to other breast cancer risk factors is different from country to country. For example, two of the case-control studies examined women in Japan, a country whose diet includes very few dairy foods.
- Most of the studies examined current diet only. Studies in animals suggest that the diet during both childhood and adolescence may play an important role in breast cancer incidence. Although some studies did examine these periods of development, their influence would be missed in most of the analyses.
- The studies did not adjust their analysis for known risk factors. The best studies collected information from the women in the study about other known breast cancer risk factors, such as current age, age at menarche, age of first full term pregnancy, age of menopause, family history of breast cancer, and body size, in addition to, their food consumption patterns. This information was then used in the statistical analysis so that only the potential risk factor being examined, dairy food intake in this case, affects the outcome of the analysis. If the contribution of these risk factors is not accounted for, it is not possible to accurately assess risk from the diet.

Should women avoid or choose specific dairy foods?

The results of existing studies do not give women enough information to choose individual dairy foods to specifically reduce breast cancer risk. Concern for heart health and other cancers suggest that a choice of low fat dairy products would be wise. Other factors, which should enter into this decision,



include calcium and vitamin intake, total protein intake and lactose tolerance.

Does eating dairy foods affect the risk of premenopausal and postmenopausal breast cancer differently?

Some studies have suggested that certain dairy foods affect premenopausal and postmenopausal breast cancer risk differently. For example, one study found that drinking whole milk increased premenopausal breast cancer risk and decreased postmenopausal breast cancer risk whereas, eating butter did not affect premenopausal breast cancer risk but increased postmenopausal breast cancer risk. It is not possible to draw conclusions from these results. More studies are especially needed using this approach of examining premenopausal and postmenopausal breast cancer risk separately.

Does eating dairy foods during childhood and adolescence change a woman's risk of breast cancer?

Several studies have indicated the possibility of a small decrease in breast cancer risk associated with childhood and adolescent milk food consumption. Childhood, in Western cultures, is the time of highest consumption of milk. Bone growth throughout this period requires calcium, and milk is an especially good source of calcium. Three case-control studies examined the effect of childhood or adolescent consumption of dairy foods on breast cancer risk. One study examined the relationship of remembered childhood consumption of whole milk and the risk of premenopausal and postmenopausal breast cancer. A small decrease in risk for both types of breast cancer was associated with drinking whole milk daily during childhood. Two studies examined breast cancer risk and dairy food consumption during adolescence. The first of these studies found no change in the risk of breast cancer associated with eating dairy foods as an adolescent. The second study focused on fat types and found a decrease in the risk of both premenopausal and postmenopausal breast cancer associated with eating fat from milk, cheese and yogurt as an adolescent. More studies are needed of this important period of a woman's life. It should be noted that the American Academy of Pediatrics, taking into consideration the fat intake of Americans, currently recommends that children above the age of 2 years be given milk containing 2% fat rather than whole milk.

Don't dairy foods provide an important source of calcium for women?

In addition to its effects on childhood bone growth, calcium intake during the first 30 years of life is particularly important for women. The level of calcium intake during this period establishes bone density, which is a critical factor in the prevention of osteoporosis. Studies have associated a high bone density with increased risk of breast cancer. However, this association is thought to be the result of increased estrogen levels and is not associated with diet. The Healthy People 2000 report of the Center for Disease Control and Prevention has suggested the following number of daily servings of foods rich in calcium: two or more for children 2–10 years old; three or more for people 11–24 years old; and two or more for people older than 25 years. Foods rich in calcium include dairy foods, green vegetables (such as broccoli, spinach, kale and turnip greens), calcium set tofu, some legumes, canned fish, seeds and nuts.

Have dairy products been studied for breast cancer formation in animals?

Animal studies have examined the effect of several dairy foods on mammary (breast) tumor formation. No overall conclusion can be made as the number of studies is limited and the results are, in some cases, conflicting. Two animal studies on the effect of whole milk on mammary cancer in rats have been carried out. Both studies are from the same laboratory and saw increased mammary tumor formation when drinking water was replaced by whole milk. Skim milk also enhanced mammary tumor formation but not to the extent seen with whole milk. Cream, in contrast, had no effect on tumor formation. One laboratory in two different studies has also examined the effect of eating butter on mammary cancer in rats. Initially butter was found to reduce tumor formation but a study done two years later saw no effect. Studies of the effect of eating yogurt on mammary tumor formation in animals have also been carried out. One study on rats demonstrated increased mammary tumor formation but a second study using mice saw no effect of yogurt on two different stages of mammary tumor formation.

Are there specific components of dairy products that possibly reduce the risk of breast cancer?

In the recent past, some components of milk have been discovered and studied in animals, that may have the



potential to decrease breast cancer risk. The effectiveness of these chemicals in humans remains to be determined.

Conjugated linoleic acid, known as CLA, is a fatty acid that is found naturally in milk fat. Adding CLA to the diets of rats treated with a strong mammary (breast) carcinogen resulted in more than a 60% decrease in the number of breast tumors. Feeding CLA during the development phase of the mammary gland leads to a decrease in the total number and rate of growth of mammary terminal end bud cells. The terminal end bud cells are thought to be where mammary tumors start and both of these effects reduce tumor formation.

Milk is also supplemented with vitamin A and vitamin D. Both of these vitamins have possible activity against breast cancer. Studies in one laboratory have shown that vitamin D acted with calcium to prevent tumor formation in animals fed a high fat and high phosphate diet. These results are interesting because the diets of Western cultures are typically high in fat and phosphate and low in calcium and vitamin D. A case-control study found no difference between the vitamin D blood levels in breast cancer patients and women without breast cancer. The Harvard Nurses Health Study, a large cohort study, has linked low vitamin A intake to increased risk of breast cancer. A later study of the same group of women found an association between higher intake of vitamin A and decreased risk of premenopausal breast cancer. This relationship was especially strong in women with a family history of breast cancer. Food sources high in vitamin A include carrots, sweet potatoes and dark green vegetables. Supplemented milk and dairy products provide a small amount of vitamin A.

Two other naturally occurring chemicals in milk that have possible anticancer activity are sphingomyelin and butyric acid. Both these chemicals reduce colon cancer in laboratory animals but their effectiveness against breast cancer and in humans is unknown.

Do specific components of dairy products increase the risk of breast cancer?

Ecological studies, comparing the disease rates and diets of populations of people from different areas, have suggested a possible link between eating animal fat (such as that in milk) and increased risk of breast cancer. Epidemiological studies, which could determine a more definite association, have produced mixed results on this issue (see BCERF Fact Sheet #27, *Dietary Fat and Breast Cancer*). Further epidemiological studies are needed to determine if milk fat contributes to breast cancer risk.

Some members of the public are concerned about the effects of the use of hormones by dairy farmers to increase milk production. Hormone treated milk has higher levels of a growth hormone potentially associated with breast cancer, insulin like growth factor 1, IGF-1. IGF-1 normally occurs at low levels in cow's milk and tests indicate that IGF-1 is digested and inactivated when eaten. The Food and Drug Administration has evaluated milk from hormone treated animals and doesn't consider it a health problem.

Pesticide residues in milk products are also an area of public concern (see BCERF Fact Sheet #24, *Consumer Concerns About Pesticides in Foods*). The Food and Drug Administration is responsible for milk product testing and regularly performs tests that can detect more than 350 different pesticides (see BCERF Fact Sheet #25, *Pesticide Residue Monitoring and Food Safety*). Contamination of milk products with pesticide residues is rare and when it is seen, it is typically below the tolerances set by the Environmental Protection Agency (EPA). A tolerance is the maximum amount of a specific pesticide or its break down products that is allowed to remain in or on foods. For example, in 1998, 96% of the dairy product samples had no detectable contamination, and all of the samples with detectable contamination had pesticide levels below EPA tolerances.

Should breast cancer survivors change their consumption of dairy products?

The effect of dairy product consumption on breast cancer reoccurrence has not been directly examined. The inconclusiveness of the existing studies makes meaningful suggestions difficult. More research is needed in this area.

What studies need to be done?

- Large studies examining the various dairy products and their association with breast cancer risk need to be conducted. A focus on both pre- and postmenopausal breast cancer would be especially helpful since there is some indication that milk products may affect their risk differently. These studies should also make a special effort to accurately determine dairy food consumption; failure to do this can mask risk associations.
- Large studies examining breast cancer risk and the effect of eating dairy products during childhood and adolescence are also needed as these are times when women may be at most risk for breast cancer induction.



- Animal studies have shown that the amount and type of protein in the diet may affect breast cancer risk, more work is needed to understand this effect.
- Studies examining the effect of diet and dairy foods on the survival of women with breast cancer.

What can women do now?

- Choose low fat milk products.
- Add more vegetables, grains and fruits to their diet.
- Exercise regularly and maintain a healthy weight.

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

Prepared by:
Barbour S. Warren, Ph.D.
Research Associate, BCERF
and
Carol Devine, Ph.D., R.D.
Division of Nutritional Sciences and
Education Project Leader, BCERF

Funding for this fact sheet was made possible by the US Department of Agriculture/Cooperative State Research, Education and Extension Service, the New York State Department of Health and Cornell University.

We hope you find this Fact Sheet informative. We welcome your comments. When reproducing this material, credit the Program on Breast Cancer and Environmental Risk Factors in New York State.



Printed on recycled paper with soy-based ink.

Program on Breast Cancer and Environmental Risk Factors (BCERF)

College of Veterinary Medicine
Cornell University
Box 31
Ithaca, NY 14853-5601

Phone: (607) 254-2893
Fax: (607) 254-4730
email: breastcancer@cornell.edu
WWW: <http://envirocancer.cornell.edu>