

Soy Phytoestrogens and the Prevention of Breast Cancer

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It has been proposed that higher intake of plant-derived estrogens (phytoestrogens) may contribute to differences in incidence of breast cancer between Asian and Western populations (8, 21, 22, 23). Soy products are a relatively rich source of phytoestrogens, particularly the isoflavonoids, genistein, and diadzein, (7) which have been proposed as dietary factors that reduce risk of breast and other cancers.

Evidence substantiating the contention that phytoestrogens decrease risk of breast cancer is supported by recent epidemiological data of premenopausal women from China and Singapore. (24) Earlier studies showed that soy protein can reduce the number of tumors, in a dose-dependent manner, in animal models of chemically induced mammary carcinoma (9).

Breast cancer is the second most common cancer in Western countries. In Third World countries and Asian populations, breast cancer incidence is up to 75% less frequent. For instance, age-specific rates for breast cancer in England and Wales are 199.4 per 100,000 in women 60-65 years of age compared with 52.3 per 100,000 for women of similar age in Japan (1).

As much as 50% of breast cancer susceptibility is now linked to dietary factors (9). Dietary factors that affect breast cancer susceptibility are thought to include total dietary fat, individual fats such as olive oil, beta-carotene, vitamin E, fiber, cruciferous vegetables, alcohol, vitamin D status and other factors (10).

Apart from these dietary agents evidence is strong and consistent that soy-derived phytoestrogens from soy beans, miso, tofu and soy milk are largely responsible for the reduced incidence of breast cancer among Japanese women (1).

Phytoestrogens demonstrate a number of properties that are considered to be important in the prevention and possibly treatment of breast cancer. These compounds, which are structurally similar to estrogen made by the body, bind to the estrogen receptors on breast tissue, toning down the influence of the body's more dangerous estrogens (5).

The body's estrogens and estrogen replacement therapy are known to increase risk of breast cancer. High circulating levels of these estrogens increase the turn over rate of breast cells permitting genetic errors to accumulate with a resulting increased risk in cancer development (11).

By competing with estrogen for binding to receptors on breast tissue, phytoestrogens have been shown to minimize some of estrogen's more undesirable effects, which are linked to breast cancer development.

The Japanese diet provides up to 150-200 mg of phytoestrogens per day (30, 31).

A recent study of six premenopausal women living in the United Kingdom provided evidence that soy-derived phytoestrogens could alter reproductive hormone levels and menstrual cycle length in a favorably manner with respect to reducing breast cancer risk (14). In this study each participant consumed 60 grams of soy protein per day (yielding 45 mg of phytoestrogens) for one month.

A significant increase in menstrual cycle length was observed. Shorter menstrual cycles are linked to an increase in breast cancer due to a greater lifetime exposure to estrogen. Menstrual cycle length is significantly longer in Asian women than in Western women who typically have a cycle length of 26 to 29 days.

This study also noted a 300% reduction of lutenizing hormone and 200% reduction of follicle stimulating hormone during a one month period in which soy protein was consumed. These hormonal changes resulted in a longer follicular phase of the menstrual cycle and a shortened luteal phase. During the luteal phase of the cycle the cell division rate (mitotic activity) of breast tissue is four times greater than during the follicular phase (14).

Olsson et al. (26) made a retrospective assessment of cycle length and found a significantly shorter cycle length for breast cancer patients compared with controlled subjects (26.4 vs. 28.6d).

Overall the evidence suggests that soy phytoestrogens can directly reduce breast cancer risk by competing with estrogen, thus slowing down cell turnover rates and minimizing genetic mutations. As well, soy phytoestrogens are now proven to alter blood levels of reproductive hormones (L.H. and F.S.H.) in favor of longer menstrual cycles and a shortened luteal phase. All of these influences are associated with a lower incidence of breast cancer risk.

In short, women should strive to obtain a minimum of at least 40-50 mg of phytoestrogens per day from soy products. The following quantities of soy products will yield this amount of phytoestrogens:

Soy nuts – 1 oz.

Soymilk – 1 cup

Tofu – ½ cup

Tempeh – ½ cup

Miso – ½ cup

Textured vegetable protein – 2 oz.

Soybeans – ¾ cup

Soy flour – ½ cup.

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Wheat Fiber May Reduce Breast Cancer Risk

Wheat fiber may reduce the risk of breast cancer through two distinctive properties. Previously wheat fiber has been shown to bind with estrogens in the intestinal tract and drag them out of the body during a bowel movement. The liver, which acts like a large filtering plant receives large volumes of blood each minute of our lives. It routinely filters out estrogens from the bloodstream and dumps them into the intestinal tract through the bile duct. Once in the intestinal tract, estrogens can be re-absorbed back into the bloodstream and continue to exert their effects on target organs such as the breast, endometrium, and cervix. High circulating levels of certain estrogens (estrone and estradiol) are strongly associated with increased risk of breast cancer. Thus, by dragging excess estrogens out of the body, wheat fiber may help to reduce the risk of breast cancer.

In addition, we have also learned that wheat fiber is a good source of dietary lignin. Plant lignins are a potential precursor of lignans formed in the intestinal tract by bacterial fermentation. Lignans such as enterolactone and enterodiol are phytoestrogens, which are thought to reduce breast cancer risk.

In another article on this site I review the evidence that suggests that flaxseed powder can reduce breast cancer risk via its high concentrations of lignan precursors. In a similar fashion, wheat fiber is now being studied for its ability to reduce breast cancer as well. It contains lignins that are thought to be converted to lignans by bacteria found in the intestine.

All the more reason to choose wheat bread, multigrain breads, flaxbread and high fiber wheat-based breakfast cereals whenever possible.

References:

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