

## **Two Recent Studies Suggest That Soy Isoflavone Supplementation May Benefit Breast And Prostate Cancer Patients**

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Breast cancer is the most common cancer diagnosed in women in the United States. Epidemiological, migration and experimental studies suggest that environmental factors, including nutritional practices, play a key role in the etiology of breast cancer, in addition to age, ethnicity, hormonal factors, growth factors, obesity and physical activity. The age-adjusted death rates from breast cancer are twofold to eightfold less in Asian countries than in the United States and Western Europe. The rate in Asian American women born in China or Japan and in their U.S.-born counterparts is about 50-75% lower than in U.S.-born white women. A number of researchers have suggested that the frequent consumption of soy products is largely responsible for the significant reduction in breast cancer incidence among Asian women. However, controversy about the use of soy was sparked when some recent animal studies suggested that soy may stimulate breast cancer growth and interfere with antihormonal treatments. Conversely, other animal studies have suggested that soy induces apoptosis (programmed cell death) of breast cancer cells, and is beneficial in the prevention of breast cancer as well as preventing recurrence of breast cancer.

It is particularly crucial to determine the answer to the question of whether soy is beneficial in humans because hundreds of thousands of patients with breast cancer consume soy supplementation either as chemoprevention of recurrent cancer and/or as treatment of their postmenopausal symptoms (soy isoflavones are known to reduce hot flashes and other menopausal symptoms). In addition, many women would like to know if the regular consumption of soy products and/or supplements can reduce their risk of developing breast cancer. In some Asian countries, where breast cancer rates are as much as 75% lower than in U.S. white women, the daily consumption of soy is on average 20-50-times higher per capita, compared to consumption rates by U.S. white women. Asian women, following a traditional Asian diet, have been shown to consume 30-50 mg of soy isoflavones per day. Soy isoflavones have been shown to produce many of the anti-cancer effects attributed to soy consumption.

The most definitive study performed to date, addressing the effects of soy on breast cancer, was published recently by M. Sartippour, JY Rao, S Apple et al, in *Nutrition and Cancer* in 2004. These researchers performed the first known pilot study, which examined the association between administration of soy isoflavone tablets in human breast cancer patients and their effects on human breast cancer tissue, as well as the proliferative activity of human blood from breast cancer patients.

The study was performed on 17 human breast cancer patients. After the diagnosis of breast cancer was made on the core-needle biopsy procedure, patients were enrolled, at which time blood and urine were collected in conjunction with routine preoperative tests. Breast cancer subjects received four tablets of soy isoflavones daily until their scheduled surgery date. Each tablet contained 50 mg of soy isoflavone as the active ingredient (200 mg of soy isoflavones ingested daily). Twenty-six age-matched control subjects who did not have breast cancer, but had similar demographic, lifestyle and other characteristics to

the breast cancer patients, were selected for comparison. The control subjects did not ingest the soy isoflavone tablets during the course of the study.

In this study the researchers observed that the 17 breast cancer patients receiving the soy isoflavone tablets did not show an increased rate of proliferation of breast cancer cells or endothelial cells during the course of the study (as determined by regular needle biopsy throughout the study period) compared to the breast cancer-free control subjects who were not ingesting soy isoflavone tablets. Furthermore, the researchers noted a statistically non-significant trend towards cancer growth inhibition in the isoflavone treated group, as manifested by higher apoptosis/mitosis ratios compared with those from the breast cancer-free, untreated control group. The apoptosis/mitosis ratio is a comparison of the rate of programmed cell death (growth inhibition) measured against the rate of cell division (proliferation). A faster rate of cell division (proliferation) is associated with breast cancer growth and spread of the disease. In this study researchers were able to show that the administration of soy isoflavones produced a favorable outcome on the apoptosis/mitosis ratios in breast cancer patients, which is consistent with the containment of breast cancer.

Overall, these findings suggest that supplementation with 200 mg of soy isoflavones daily by breast cancer patients may help to suppress the growth of breast cancer cells. As such, soy isoflavone supplementation deserves consideration as an intervention during the period leading up to breast cancer surgery in breast cancer patients and as a daily supplement to potentially help reduce the recurrence of breast cancer in breast cancer survivors.

Previous investigations have built a compelling case for regular soy consumption as a means to prevent the development of breast and ovarian cancers in women and prostate cancer in men. Soy isoflavones have been shown to lower endogenous estrogen levels, stimulate the production of sex hormone-binding globulin by the liver (which in turn leads to more bound and less free estradiol, reducing the amount of estrogens available for binding with estrogen receptors), inhibit the enzymes that promote cell proliferation (protein tyrosine kinase, DNA topoisomerase and ornithine decarboxylase), inhibit angiogenesis (which prevents the building of life-supporting blood vessels in and around malignant tumors), provide antioxidant defense and induce cell differentiation. Further, the weak estrogenic potential (more than 1,000 times weaker than estradiol) of soy isoflavones do not elicit a strong estrogenic response and thus have an anti-estrogenic effect that tends to inhibit the growth and proliferation of estrogen-dependent cancer cells, as demonstrated by the research of A. Molteni et al.

The recent study by M. Sartippour et al, provides further evidence that a high intake of soy isoflavones may not only prevent reproductive cancers, but may be beneficial in controlling the progression and recurrence of breast cancer.

In a similar intervention study, involving men with existing prostate cancer, supplementation with 100 mg per day of soy isoflavones showed a favorable outcome in stabilizing PSA levels (M Hussain et al, Nutrition and Cancer, 2003). In this study soy isoflavone supplementation was shown to decrease the rate of rise in serum PSA (prostate specific antigen) levels in patients with androgen dependent and androgen-independent prostate cancer. These researchers concluded that their data suggests that soy isoflavones may benefit some patients with prostate cancer by slowing the progression of the disease

and therefore, potentially delaying the development of symptoms, improving quality of life, and perhaps even prolonging survival.

The positive findings reported in these recent studies has prompted a great deal of interest in developing larger intervention trials using soy isoflavone supplementation in the treatment of breast, ovarian and prostate cancers. Studies involving a larger number of patients are certainly required before definitive statements can be made regarding the use of soy isoflavones in the treatment of these conditions, however, health practitioners should be aware of the encouraging results seen in these recent intervention trials, which they may wish to share with selected patients within their practice.

#### References:

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