

Talking Points

Soy and Breast Cancer

Updated: August 2012

Issue:

Conflicting results from studies on soy's connection to breast cancer often leave consumers confused. This confusion arises from three factors – 1) the studies refer to a wider variety of interventions from soyfoods to soy supplements or purified isoflavones; 2) the quoted studies are conducted in animals or cells versus humans; and 3) the biomarkers used to suggest breast cancer may not be reliable predictors of breast cancer in humans. First, when the term soy is used, it could refer to a variety of foods, ingredients or supplements that may contain over 100 potentially biologically active compounds, including isoflavones such as genistein and daidzein. Secondly, the negative results are often from studies that use different animal and cell models which often do not apply to human health; whereas a growing body of human studies shows that women can safely eat soyfoods. Lastly, since breast cancer may take time to develop, researchers use various indicators for breast cancer risk which may or may not be good predictors of eventual occurrence of or mortality from breast cancer.

Definitions:

Isoflavones are bioactive compounds that are often described as phytoestrogens, plant estrogens because they are structurally similar to the female sex hormone estrogen. Soybeans are uniquely rich in isoflavones, primarily genistein and daidzein. Even though isoflavones have a similar structure to human estrogens, they act very differently in the human body, and therefore, should not be considered similar to human estrogens. Isoflavones are much weaker than naturally circulating human estrogens, as they have approximately 1/1000th the biological activity of synthetic estrogens. They do not have estrogen-like effects in humans and may actually function as anti-estrogens, inhibiting the effects of estrogen.

ODMA is a metabolite of the isoflavone daidzein by intestinal bacteria in approximately 80-90% of persons (equol producers occur in 30-50% of people).

Nipple Aspirates describes breast secretions pooled in the lactiferous sinuses and proximal ducts. The fluid contains certain proteins, such as apolipoprotein D (ApoD or GCDFP-24) and pS2, which are estrogen regulated and may be associated with increased risk of breast cancer.

Tamoxifen (Nolvadex®) is an FDA approved selective estrogen receptor modulator (SERM). This drug binds to estrogen receptors which prevent estrogen from binding. Tamoxifen is used to treat hormone receptor-positive breast cancer.

Talking Points:

1. **A review of over 130 human research trials and review articles published in peer-reviewed journals since 1998 indicates that soyfoods do not cause tumors in breast tissue and do not have significant effects on those at risk of getting breast cancer.**(1,2,3,4,5,6)
2. **In women with breast cancer or recurrence of breast cancer, soy intake generally appears to be inversely associated with breast cancer risk.** More and more human population studies (7,8,9,10,11,12,13,14) in Asians, Asian Americans, native Hawaiians, Latinos, and Caucasians, especially a recent study combining U.S. and Asian women, suggest that women who are at risk for developing breast cancer or who are breast cancer survivors can safely consume moderate amounts of soyfoods without danger and may even have a reduced rate of breast cancer risk.
3. **Scientific research concludes that breast cancer patients taking tamoxifen can safely consume normal amounts of soyfoods without adverse effects to total mortality and recurrence.** (15,16,17)
Initially, some animal research suspected genistein may interfere with tamoxifen,(18,19) the majority of research conducted in humans reports that soyfoods do not appear to interfere with the effectiveness of tamoxifen.(20,21) In fact, the effectiveness of tamoxifen may be influenced by other factors such as age, menopausal status, and BMI.(22)
4. **As more research is published, there is stronger support for the role of soyfoods in reducing the risk of breast cancer – especially when soy is consumed during childhood and adolescence.**(23,24,25,26,27,28) Intake of soyfoods (either traditional soyfoods or processed foods containing isoflavones) early in life may promote breast tissue differentiation and reduce the number of structures that allow cancer cells to exist.(29) The average intake of isoflavones in the U.S. and Europe is 1-2 mg/day, as opposed to Asian countries where the intake from early life ranges from 25-50 mg/day of traditional soyfoods.(30) Additionally research has shown that a diet low in meats and starches and high in vegetables and soy is associated with a reduced risk of breast cancer in Asian Americans.(31)
5. **Breast cancer is a very complex disease and risk may be dependent on multiple factors, including a woman's equol status, ethnicity, menopausal status, genotype, immediate family history of breast cancer, progesterone or estrogen receptor status, and above normal body weight or body mass index (BMI).**
 - a. *Equol and ODMA Status* - Results are inconsistent related to breast cancer risk factors and equol or ODMA (O-Desmethylangolensin) status. Equol and ODMA status show no effect on breast cancer risk or show a protective effect.(32,33,34,35,36,37,38,39)
 - b. *Estrogen and Progesterone Receptor Status*(40) - Intake of isoflavones and hormone receptor status appear to be associated in premenopausal women, sometimes showing a

protective effect, but not in postmenopausal women.(41,42,43,44)

- c. *Overweight* - In overweight premenopausal women, phytoestrogen intake is associated with decreased risk of breast cancer. There appears to be no association between phytoestrogen intake and breast cancer risk in overweight postmenopausal women.(45)

6. **When assessing results of human trials, if a finding is “statistically significant” it does not mean it will always represent a clinical change in health.** Likewise, results of a single trial of soy ingredients or substances must be considered within the larger body of human research and, often, when repeated **a follow-up study (46) has not found a negative effect of the preliminary study.(47)**
7. **When studying soy and breast cancer, researchers use various indicators for breast cancer risk which may or may not be good predictors of eventual occurrence of or mortality from breast cancer.** Researchers predict the risk of breast cancer usually using density of breast tissue, nipple aspirate fluid (NAF), as well as specific blood or urinary excretion levels of hormones. The value of some other indicators such as IGF-1 levels and sex hormone binding globulin (SHBG) to predict the occurrence of cancer remains uncertain; **a few studies have used changes in these indicators to suggest increased breast cancer risk.(48,49,50)**
8. **Drawing specific relationships between the amount of “soy” and breast cancer risk is difficult because “soy” may refer to any one of several different soy ingredients, including soyfoods, soy protein, soy supplements or purified isoflavones.** All of these substances have different strengths and bioactivity. Measurements of dietary intake of soyfoods or soy protein in most studies are not precise and usually based on food frequency questionnaires and/or interviews that cannot accurately quantify intake.
9. **No specific intake level of soy components has been associated with protection against breast cancer or level of safety.** Over the past 15 years, there have been over 130 articles examining the relationship of soy and breast cancer, but only about 10 percent fed specific amounts of soyfoods or soy protein, while the others used isoflavone supplements or estimated soyfood consumption.

Scientific Experts: Please direct media calls to researchers in this field of study.

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