



Soyfoods & the Breast Cancer Patient

MYTH

Traditional soyfoods such as tofu and soymilk increase risk of tumor recurrence in breast cancer patients.

ACTUALITY

There is essentially no human evidence indicating that traditional soyfoods increase tumor recurrence in breast cancer patients. In fact, there is evidence suggesting consuming soyfoods may actually be of benefit to such women.

Breast cancer incidence and mortality rates in soyfood-consuming countries such as Japan are much lower than they are in Western countries [1]. Several factors likely contribute to the differing breast cancer rates of these two regions. One may be the high soy consumption in Asia. There is in fact an impressive body of evidence suggesting soyfoods reduce risk of breast cancer. However, studies in support of this hypothesis indicate that to derive the proposed benefit soyfoods must be consumed during childhood and/or adolescence. Consuming as little as one serving per day may be enough to reduce risk later in life by as much as 25 to 50 percent [2, 3].

Despite the proposed benefits there is also concern that soyfoods might be harmful to some types of breast cancer patients. More specifically, there is concern that the isoflavones in soyfoods could stimulate the growth of estrogen-sensitive tumors – these are tumors whose growth is stimulated by the hormone estrogen [4].

Isoflavones are naturally-occurring constituents of soybeans that are commonly referred to as plant estrogens or phytoestrogens. There are many different types of phytoestrogens in foods (such as lignans in flaxseed) but soy is definitely one of the richest sources. However, isoflavones and estrogen are not equivalent, they have different chemical structures and although they share some properties in common they are also very different. That these two molecules are different is not at all surprising. Small differences in chemical structure can result in very different physiological effects. Consider the example of cholesterol, which is found in animal foods, and phytosterols, which are found in plants; these two molecules have almost identical chemical structures but the former raises blood cholesterol levels and the latter decreases them [5].



The primary basis for concern about isoflavones is the finding that when isolated isoflavones and certain types of isoflavone-rich products are added to the diets of mice with existing estrogen-sensitive tumors, tumor growth is stimulated [4]. However, not only are the results from animal studies often not predictive of events in humans, but even in the animal model in which isoflavones stimulate tumor growth, soyflour, which is a minimally processed soyfood, doesn't stimulate tumor growth [6]. Furthermore, not even all animal studies show isoflavones are tumor-stimulatory [7].

In addition, and more importantly, the human evidence is very supportive of safety. In human intervention studies, neither isoflavone supplements nor soyfoods adversely affect markers or indicators of breast cancer risk [8-10]. Markers of breast cancer risk include breast tissue density, which is measured via mammography, breast cell proliferation, which requires that breast biopsies be taken, and blood estrogen levels. Thus, there is essentially no clinical evidence indicating soyfoods are likely to be harmful to breast cancer patients.

In fact, there is epidemiologic (population) evidence suggesting that breast cancer patients may benefit by consuming soyfoods. In 2012, a pooled analysis of three studies was published involving 9,514 breast cancer survivors, two of the studies were from the United States and one was from China [11]. Approximately half of the study participants were caucasian and half Chinese and approximately half were premenopausal and half postmenopausal. Over the 7.4 year period the breast cancer survivors were followed, those women in the group who ate the most soy, were 13 percent less likely to die from any cause, 17 percent less likely to die from breast cancer and 25 percent less likely to report having a recurrence of their disease [11]. The last finding was statistically significant, which in scientific parlance indicates the finding was unlikely to have occurred by chance.

Not surprisingly, based on the clinical and epidemiologic evidence, in 2012, both the American Institute for Cancer Research and the American Cancer Society concluded that soyfoods can be safely consumed by breast cancer patients [12]. Interestingly, on the basis of their analysis of the scientific literature, Chinese researchers recently recommended that breast cancer patients incorporate soy into their diet specifically for the purpose of improving their prognosis [13].

Finally, it is important to remember that many breast cancer patients will live for many years without succumbing, and many others, will never succumb, to their disease [14]. Therefore, all cancer survivors need to consume a diet that is not only protective against cancer recurrence but that is protective against a range of chronic disease such as coronary heart disease. Soyfoods are certainly well-positioned to be part of that diet [15]



REFERENCES

1. Pisani P, Bray F, Parkin DM: Estimates of the world-wide prevalence of cancer for 25 sites in the adult population. *Int J Cancer* 2002, 97(1):72-81.
2. Messina M, Hilakivi-Clarke L: Early intake appears to be the key to the proposed protective effects of soy intake against breast cancer. *Nutr Cancer* 2009, 61(6):792-798.
3. Messina M, Wu AH: Perspectives on the soy-breast cancer relation. *Am J Clin Nutr* 2009, 89(5):1673S-1679S.
4. Helferich WG, Andrade JE, Hoagland MS: Phytoestrogens and breast cancer: a complex story. *Inflammopharmacology* 2008, 16(5):219-226.
5. Katan MB, Grundy SM, Jones P, Law M, Miettinen T, Paoletti R: Efficacy and safety of plant stanols and sterols in the management of blood cholesterol levels. *Mayo Clin Proc* 2003, 78(8):965-978.
6. Allred CD, Twaddle NC, Allred KF, Goeppinger TS, Churchwell MI, Ju YH, Helferich WG, Doerge DR: Soy processing affects metabolism and disposition of dietary isoflavones in ovariectomized BALB/c mice. *J Agric Food Chem* 2005, 53(22):8542-8550.
7. Onoda A, Ueno T, Uchiyama S, Hayashi S, Kato K, Wake N: Effects of S-equol and natural S-equol supplement (SE5-OH) on the growth of MCF-7 in vitro and as tumors implanted into ovariectomized athymic mice. *Food Chem Toxicol* 2011, 49(9):2279-2284.
8. Messina MJ, Wood CE: Soy isoflavones, estrogen therapy, and breast cancer risk: Analysis and commentary. *Nutr J* 2008, 7(1):17.
9. Hooper L, Ryder JJ, Kurzer MS, Lampe JW, Messina MJ, Phipps WR, Cassidy A: Effects of soy protein and isoflavones on circulating hormone concentrations in pre- and post-menopausal women: a systematic review and meta-analysis. *Hum Reprod Update* 2009, 15(4):423-440.
10. Khan SA, Chatterton RT, Michel N, Bryk M, Lee O, Ivancic D, Heinz R, Zalles CM, Helenowski IB, Jovanovic BD et al: Soy isoflavone supplementation for breast cancer risk reduction: A randomized phase II trial. *Cancer Prev Res (Phila)* 2012, 5(2):309-319.
11. Nechuta SJ, Caan BJ, Chen WY, Lu W, Chen Z, Kwan ML, Flatt SW, Zheng Y, Zheng W, Pierce JP et al: Soy food intake after diagnosis of breast cancer and survival: an in-depth analysis of combined evidence from cohort studies of US and Chinese women. *Am J Clin Nutr* 2012, 96(1):123-132.
12. Rock CL, Doyle C, Demark-Wahnefried W, Meyerhardt J, Courneya KS, Schwartz AL, Bandera EV, Hamilton KK, Grant B, McCullough M et al: Nutrition and physical activity guidelines for cancer survivors. *CA Cancer J Clin* 2012, 62(4):242-274.
13. Chi F, Wu R, Zeng YC, Xing R, Liu Y, Xu ZG: Post-diagnosis soy food intake and breast cancer survival: A meta-analysis of cohort studies. *Asian Pac J Cancer Prev* 2013, 14(4):2407-2412.
14. Izano MA, Fung TT, Chiuve SS, Hu FB, Holmes MD: Are diet quality scores after breast cancer diagnosis associated with improved breast cancer survival? *Nutr Cancer* 2013, 65(6):820-826.
15. Messina M, Messina V, Jenkins DJ: Can breast cancer patients use soyafoods to help reduce risk of CHD? *Br J Nutr* 2012, 108(5):810-819.