

Can Plant Compounds Reduce Breast Cancer Recurrence and Death?

Soy and green tea were linked to reduced risk of cancer relapse, while other phytonutrients were linked to lower mortality.

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Natural compounds in soy and other plants may reduce the risk of [breast cancer](#) recurrence and improve survival, according to a meta-analysis of observational studies published in [JNCI Cancer Spectrum](#). Randomized controlled trials would be the best way to confirm these findings, but such studies of food consumption can be difficult to conduct.

A large body of research has linked phytochemicals in plants to incidence and outcomes for various types of cancer, but data are conflicting. Some of the most well-studied compounds include isoflavones found in soybeans and related products, phytonutrients found in green tea and cruciferous vegetables (members of the cabbage family) and lignans found, for example, in flaxseed and nuts.

In an effort to make sense of the widely varying research, M. Diana van Die, PhD, of Western Sydney University in Australia, and colleagues performed a systematic review and meta-analysis of studies looking at associations between phytochemical consumption and breast cancer outcomes.

Plant compounds can regulate several molecular and metabolic processes that play a role in cancer development and progression, including cell signaling, cell cycle regulation, oxidative stress, inflammation, apoptosis, angiogenesis and metastasis, according to the study authors. Soy, in particular, contains [plant-derived phytoestrogens](#) that can bind to estrogen receptors and cause effects similar to, though weaker than, those of human estrogen. Some studies suggest that catechins in green tea inhibit cell proliferation and may help some cancer treatments work better.

A search of MEDLINE, EMBASE, the Cochrane Library, ClinicalTrials.gov and other sources yielded 32 relevant studies. Most were assessed as high quality, while seven were considered moderate quality. After further narrowing the eligibility criteria, the authors were left with 22 mostly prospective observational studies for the meta-analysis, a statistical method for pooling data from multiple studies. Phytonutrient consumption was assessed using food frequency and dietary questionnaires. Most studies looked at phytonutrient intake before a breast cancer diagnosis, but a

few focused on post-diagnosis consumption.

The meta-analysis included 11 studies of soy isoflavones, proteins or products, with a total of more than 44,000 participants; three studies of cruciferous vegetables, with more than 17,000 total participants; three studies of lignans, with more than 14,000 participants; three studies of enterolactone, a compound produced when bacteria in the gut digest lignans, with 3,864 participants; and two studies of green tea, with 1,632 participants.

The study authors found that soy isoflavones were associated with a 26% reduction in the risk of breast cancer recurrence, particularly for postmenopausal women and those with estrogen-receptor-positive (ER-positive) tumors. The effect was greatest for people who consumed 60 milligrams per day, equivalent to two to three servings of soy milk, cooked soybeans or tofu. Similarly, soy proteins and products were associated with a 52% reduction in recurrence. The links between soy isoflavone and product consumption and lower mortality were not statistically significant overall, but soy products were associated with a 25% reduction in breast cancer-specific death for ER-positive disease alone.

A higher level of enterolactone in the blood before or shortly after diagnosis was associated with an overall 28% reduction in breast cancer-specific mortality and a 31% decline in all-cause mortality. But in a more detailed analysis, only postmenopausal women and those whose cancer had not spread to lymph nodes saw a significant benefit. Enterolactone had no effect on cancer recurrence in the two studies that looked for an association.

Lignan consumption was associated with a nonsignificant reduction in breast cancer-specific and all-cause mortality for postmenopausal women but an apparent increase in deaths for premenopausal women. This suggests their effects may depend on the hormonal environment, but further research is needed, the study authors noted. No studies assessed the effect of lignans on breast cancer recurrence.

Green tea consumption prior to diagnosis was associated with a 44% reduction in the risk of recurrence for people with Stage I and II breast cancer, but not those with Stage III or IV. Those who drank at least three cups per day saw the greatest effect. Cruciferous vegetables had no evident effect on cancer recurrence or mortality, perhaps because reported consumption was quite low. “[A]n effect on breast cancer progression at higher doses is still plausible,” the authors wrote.

The enterolactone mortality findings were considered “probable” evidence thanks to an adequate sample size and a plausible biological mechanism. But most of the other findings were graded as “limited suggestive” evidence or were not graded due to small numbers or the lack of established biological mechanisms.

On the whole, the researchers were unable to tell from this analysis whether consuming soy, lignans and other plant compounds prior to breast cancer diagnosis versus after diagnosis made a substantial difference. Some research suggests that phytochemicals protect against development

of cancer, but whether lifetime consumption affects later disease progression is unclear. This leaves open the question of whether people who already have cancer can improve their outcomes by adding more phytonutrients to their diet.

“This research highlights the need for more robust studies in this area looking at the most effective dosages of these compounds and whether starting to consume them after diagnosis has the same effect as a lifelong dietary habit before diagnosis,” senior study author Channing Paller, MD, of the Sidney Kimmel Comprehensive Cancer Center at Johns Hopkins, said in a [news release](#). “This is what patients are looking for.”

While waiting for more answers, Paller added a note of caution: “It is critically important to stress that these studies were conducted on women who received medical and/or surgical treatment for breast cancer and that these foods and phytonutrients should not be considered as alternatives to treatment.”

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