Soy and Cancer: Seeds of Answers, But No Fruit

A recent government report has concluded that evidence supporting the health benefits of soy in preventing several diseases—including cancer—is limited and uncertain despite many studies of the compound.

The analysis, which was funded by the Agency for Healthcare Research and Quality (AHRQ), looked at 178 prospective studies of soy foods, soymilk, and soy supplements, including extracts of isoflavones—hormonal compounds found in soy. The review team looked at soy’s effect on cancer, bone health, kidney disease, endocrine function, reproductive health, neurocognitive function, glucose metabolism, and heart disease, and found that soy consumption seemed to offer small benefits in reducing the risk of heart disease and hot flashes during menopause. However, results were inconclusive for the other diseases studied, including cancer.

“Our main question of interest really was, ‘For the general population—meaning Western and North American—what are the health benefits of including soy foods or soy-related supplements in the diet?’” said study author Ethan Balk, M.D., Ph.D., associate director of the Evidence-Based Practice Center at Tufts-New England Medical Center in Boston.

Three randomized controlled trials and two cohort studies looked at the effect of soy on testosterone levels, a hypothesis studied because higher testosterone levels have been associated with an increased risk of developing prostate cancer. Four of the trials found a statistically nonsignificant decrease in testosterone levels with soy consumption. The AHRQ analysis did not put a great deal of weight on the quality of any these studies and said the results “precluded any meaningful conclusion.”

Twenty-five clinical studies monitored people with no history of cancer to see if soy consumption had an effect on tumor-related biomarkers. None of the studies looked at the development of cancer as an outcome. Among the biomarkers reported were estrogen metabolite levels, estrogen and progesterone receptor expression, prolactin concentration, gonadotrophin levels, endometrial biopsy histological dating, dehydroepiandrosterone levels, prostate-specific antigen levels, insulin-like growth factor concentration, and cortisol levels—but none of these biomarkers have been clearly and consistently linked with cancer risk.

“None of the [cancer] findings were particularly relevant to the primary outcome from AHRQ, the effect of soy consumption on the risk of cancer in the general population,” Balk said, since many soy studies used biomarkers for cancer that are not widely accepted or looked at soy as a treatment for disease, not for prevention. “Our recommendation would be that if researchers are really wanting to move forward, there should be a move to use outcomes that have already been verified.”

Because there are not many biomarkers that have been validated, and because it takes a long time for actual cancer to develop, prospective studies of dietary factors and cancer are difficult. “When it comes to exactly the kind of studies [the AHRQ report] included, we do have a very unclear picture of the benefits of soy,” said Karen Collins, a nutritionist with the American Institute for Cancer Research in Washington, D.C. But she added that results of some in vitro studies, population studies, and case-control studies indicate that soy...
may be associated with a lower risk of cancer and that better-designed studies might clarify the connection.

Many, though not all, epidemiology studies suggest that people who eat a lot of soy have lower incidences of breast, colon, endometrial, and prostate cancers than the general population. For example, in a population-based study in Japan, women who frequently ate miso soup, which contains soy, were up to 50% less likely to develop breast cancer than women who ate the smallest amounts of soy.

“The only way you can get definitive data is to look at clinically relevant endpoints after an intervention,” said Mark Messina, Ph.D., of Nutrition Matters Inc., a consulting company that works with the soy industry. “These studies, at least in soy, have not been conducted, and maybe they never will be” because of cost and the daunting task of maintaining patient compliance with a particular diet.

This is the case for many dietary components associated with cancer prevention, he said.

Using epidemiologic data and animal studies as support, a soy-products company, Solae, L.L.C., has applied to the U.S. Food and Drug Administration for a qualified health claim for soy protein and cancer. The company is asking the FDA to allow it to state on product labels that consuming soy protein is associated with reduced risks of certain cancers. (See News, Vol. 96, No. 16, p. 1198, “FDA Reviews Expanded Claims on Health Benefits of Certain Foods.”) The FDA has not made a final decision on Solae’s petition.

Researchers hope that continued research into the health effects of soy will give some insight into what role, if any, soy may play in cancer prevention and treatment. The NCI is funding a large cohort study of Seventh Day Adventists that will look at, among other things, whether soy consumption is associated with cancer risk. NCI is also funding studies of soy protein supplements to prevent prostate cancer in men with high PSA levels, soy isoflavones to treat men with adenocarcinoma of the prostate, and isoflavones to prevent progression of prostate cancer. Another hot topic in soy research, most researchers agreed, was the question of whether the timing of soy consumption modifies any putative effects. Several epidemiological studies have indicated that eating soy during adolescence may be associated with a reduced risk of cancer, whereas eating soy later in life may have less of an effect.

“True, recommendations based on noninterventional studies can always change,” said Collins, “but in the meantime, it seems to be a matter of ascertaining risk. There’s no long-term data on the safety of isoflavone doses, but soy foods seem quite safe.”

—Damaris Christensen

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