

Soy Processing Influences Estrogen-Dependent Breast Cancer Growth in Mice



Highly purified soy foods and supplements marketed in the United States may stimulate the growth of pre-existing estrogen-dependent breast tumors, said William Helferich, a professor of food science and human nutrition at the University of Illinois, in a recent study published in *Carcinogenesis*.

"Soy has been correlated with low rates of breast cancer in Asian populations, but soy foods in Asia are made from minimally processed soybeans or defatted, toasted soy flour, which is quite different from soy products consumed in the U.S.," Helferich said.

"Isoflavone-containing products consumed in the U.S. may have lost many of the biologically active components in soy, and these partially purified isoflavone-containing products may not have the same health benefits as whole soy foods," he continued.

Soy isoflavone products are marketed as dietary estrogens to women over age 50 as a natural alternative to hormone replacement therapy (HRT), but this is the age group in which most breast cancers occur.

Seventy-five percent of breast cancer cases are diagnosed in women over 50, and the majority of these cases are estrogen-dependent. For these women, Helferich said, consumption of highly processed isoflavone products may pose risk.

Helferich used a preclinical animal model that has been used extensively to evaluate breast cancer therapies, such as tamoxifen. "The results of this preclinical investigation are especially relevant to postmenopausal women with estrogen-responsive breast cancers who are looking for alternatives to HRT," he said.

In the study, mice were fed equal concentrations of the soy isoflavone genistein, allowing Helferich to determine

the influences that various bioactive soy compounds had on genistein's ability to stimulate estrogen-dependent breast tumor growth. "As bioactive compounds were removed, we observed an increase in estrogen-dependent tumor growth," he said.

If genistein had been the only biologically active compound, all diets would have resulted in similar tumor growth, but that was not the case, he said.

A soy flour and mixed isoflavones diet and a mixed isoflavone diet each contained equal amounts of genistein, but differed in the amount of other bioactive components originally present in the soy flour. Tumors neither grew nor regressed in animals fed these diets. "The minimally processed soy flour used in these diets is more like the soy foods in the Asian diet," Helferich said.

"Dietary soy products that contained isoflavones in more purified forms were associated with greater tumor growth. These products are similar to the materials used in isoflavone-containing dietary supplements, which is how many Americans consume these compounds," he added.

Other researchers contributing to the study were Clinton D. Allred, Kimberly F. Allred, Young H. Ju, Tracy S. Goepfing, and Daniel R. Doerge. The study was funded by grants from the National Institutes of Health and the USDA.



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