

Spices halt growth of breast stem cells, study finds

December 7 2009

A new study finds that compounds derived from the spices turmeric and pepper could help prevent breast cancer by limiting the growth of stem cells, the small number of cells that fuel a tumor's growth.

Researchers at the University of Michigan Comprehensive Cancer Center have found that when the dietary compounds curcumin, which is derived from the Indian spice turmeric, and piperine, derived from black peppers, were applied to breast cells in culture, they decreased the number of [stem cells](#) while having no effect on normal differentiated cells.

"If we can limit the number of stem cells, we can limit the number of cells with potential to form tumors," says lead author Madhuri Kakarala, M.D., Ph.D., R.D., clinical lecturer in internal medicine at the U-M Medical School and a research investigator at the VA Ann Arbor Healthcare System.

Cancer stem cells are the small number of cells within a tumor that fuel the tumor's growth. Current chemotherapies do not work against these cells, which is why cancer recurs and spreads. Researchers believe that eliminating the cancer stem cells is key to controlling cancer. In addition, decreasing the number of normal stem cells - unspecialized cells that can give rise to any type of cell in that organ - can decrease the risk of cancer.

In this study, a solution of curcumin and piperine was applied to the cell

cultures at the equivalent of about 20 times the potency of what could be consumed through diet. The compounds are available at this potency in a capsule form that could be taken by mouth. (Note: This work has not been tested in patients, and patients are not encouraged to add curcumin or piperine supplements to their diet at this time.)

The researchers applied a series of tests to the cells, looking at markers for breast stem cells and the effects of curcumin and piperine, both alone and combined, on the stem cell levels. They found that piperine enhanced the effects of curcumin, and that the compounds interrupted the self-renewal process that is the hallmark of cancer-initiating stem cells. At the same time, the compounds had no affect on cell differentiation, which is the normal process of cell development.

"This shows that these compounds are not toxic to normal breast tissue," Kakarala says. "Women at high risk of [breast cancer](#) right now can choose to take the drugs tamoxifen or raloxifene for prevention, but most women won't take these drugs because there is too much toxicity. The concept that dietary compounds can help is attractive, and curcumin and piperine appear to have very low toxicity."

Curcumin and piperine have been explored by other researchers as a potential cancer treatment. But this paper, published online in the journal *Breast Cancer Research and Treatment*, is the first to suggest these dietary compounds could prevent cancer by targeting stem cells.

In addition, tamoxifen or raloxifene are designed to affect estrogen, which is a factor in most, but not all breast cancers. In fact, the aggressive tumors that tend to occur more often in women with a family history or genetic susceptibility are typically not affected by estrogen. Because curcumin and piperine limit the self renewal of stem cells, they would impact cancers that are not estrogen sensitive as well as those that are.

Researchers are planning an initial Phase I clinical trial to determine what dose of curcumin or piperine can be tolerated in people. The trial is not expected to begin accruing participants until spring.

More information: *Breast Cancer Research and Treatment*,
[DOI:10.1007/s10549-009-0612-x](https://doi.org/10.1007/s10549-009-0612-x)

Source: University of Michigan Health System ([news](#) : [web](#))

Citation: Spices halt growth of breast stem cells, study finds (2009, December 7) retrieved 8 July 2023 from <https://medicalxpress.com/news/2009-12-spices-halt-growth-breast-stem.html>

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