# Broccoli component limits breast cancer stem cells

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A compound derived from broccoli could help prevent or treat breast cancer by targeting cancer stem cells -- the small number of cells that fuel a tumor's growth -- according to a new study from researchers at the University of Michigan Comprehensive Cancer Center.

The study tested sulforaphane, a component of broccoli and broccoli sprouts, in both mice and cell cultures. Researchers found sulforaphane targeted and killed the cancer stem cells and prevented new tumors from growing.

"Sulforaphane has been studied previously for its effects on cancer, but this study shows that its benefit is in inhibiting the breast cancer stem cells. This new insight suggests the potential of sulforaphane or broccoli extract to prevent or treat cancer by targeting the critical cancer stem cells," says study author Duxin Sun, Ph.D., associate professor of pharmaceutical sciences at the U-M College of Pharmacy and a researcher with the U-M Comprehensive Cancer Center.

Results of the study appear in the May 1 issue of *Clinical Cancer Research*.

Current chemotherapies do not work against cancer stem cells, which is why cancer recurs and spreads. Researchers believe that eliminating the cancer stem cells is key to controlling cancer.

In the current study, researchers took mice with breast cancer and

injected varying concentrations of sulforaphane from the broccoli extract. Researchers then used several established methods to assess the number of cancer stem cells in the tumors. These measures showed a marked decrease in the cancer stem cell population after treatment with sulforaphane, with little effect on the normal cells. Further, cancer cells from mice treated with sulforaphane were unable to generate new tumors. The researchers then tested sulforaphane on human breast cancer cell cultures in the lab, finding similar decreases in the cancer stem cells.

"This research suggests a potential new treatment that could be combined with other compounds to target breast cancer stem cells. Developing treatments that effectively target the cancer stem cell population is essential for improving outcomes," says study author Max S. Wicha, M.D., Distinguished Professor of Oncology and director of the U-M Comprehensive Cancer Center.

The concentrations of sulforaphane used in the study were higher than what can be achieved by eating broccoli or broccoli sprouts. Prior research suggests the concentrations needed to impact cancer can be absorbed by the body from the broccoli extract, but side effects are not known. While the extract is available in capsule form as a supplement, concentrations are unregulated and will vary.

This work has not been tested in patients, and patients are not encouraged to add sulforaphane supplements to their diet at this time.

Researchers are currently developing a method to extract and preserve sulforaphane and will be developing a clinical trial to test sulforaphane as a prevention and treatment for breast cancer. No clinical trial is currently available.

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