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Mushrooms May Play Role in Breast Cancer Prevention and Treatment

By Charles Bankhead

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A new study presented here at the 22nd Annual San Antonio Breast Cancer Symposium suggests that certain foods, such as mushrooms, contain naturally occurring chemicals that inhibit an enzyme known as aromatase that may have a role in the prevention or treatment of breast cancer. The investigation arose, in part, from evidence suggesting that certain fruits and vegetables can inhibit tumor growth.

Aromatase is a key enzyme in the body involved in estrogen synthesis, and research suggests that inhibition of this enzyme can slow breast cancer growth.

Investigators identified four different mushroom extracts that inhibited about 50% of the activity of the aromatase enzyme in tumors removed from laboratory animals given the mushroom preparation. "I think these results indicate that we might be able to modulate diet to prevent and reduce the incidence of breast cancer," Baiba J. Grupe, MD, tells WebMD. "This kind of 'designer diet' strategy has attracted a lot of interest and shows a lot of promise, although it is far too premature to try to extrapolate findings from animal models to what might happen in humans."

Grupe and associates at the City of Hope Medical Center in Duarte, Calif., evaluated the aromatase inhibition potential of green onions, celery, bell pepper, carrots, broccoli, spinach, and several types of edible mushrooms. The vegetables were boiled, dried, and reconstituted before testing in aromatase-containing tumor cells. Only the mushroom preparations demonstrated aromatase inhibition, says Grupe, who is currently an assistant professor of surgery at the University of Texas Medical Branch in Galveston.

Mushroom extract was then evaluated in laboratory mice implanted with aromatase-producing tumor cells. The animals were given mushroom extract daily, and the extract dose was increased over five weeks.

"It would be hard to extrapolate the dose to humans, but we started at about 6 g a day, which isn't very much dry material," says Grupe. "If you think in terms of the active component of the material, it would be infinitesimally smaller."

Tumors that formed in the animals were removed and evaluated. Compared to tumors from animals that received plain water, tumors from the mushroom-treated animals exhibited a decrease in aromatase activity. As the concentration of mushroom extract increased, aromatase activity decreased.

Aromatase inhibition was demonstrated with several varieties of edible mushrooms, including portabello, crimini, and button.

"People who eat mushrooms will get the same effect on aromatase activity whether the mushrooms are raw or cooked," Grupe says.

Other foods are known to exhibit aromatase inhibition, she added. However, it's not known at this point what effect might result from consuming multiple foods that inhibit the activity of the enzyme.