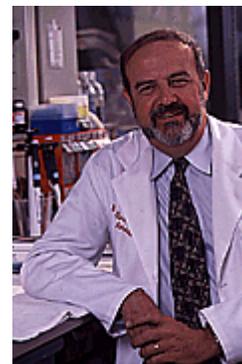


BLACK RASPBERRIES A POTENTIALLY POWERFUL AGENT IN FIGHT AGAINST COLON CANCER

COLUMBUS, Ohio -- There is a potentially powerful biological weapon for health -- a mix of compounds suspected of thwarting colon cancer -- hiding deep inside the juicy sweetness of a black raspberry. And if it can be harnessed, it could play a major role in preventing the second leading cause of cancer deaths in the United States.

In a recent study, rats that were injected with a cancer-causing agent and then fed a berry-rich diet had 80 percent fewer malignant tumors compared to rats that had no berries in their diet.

For years, scientists have touted the health benefits of eating fruits and vegetables. They're only now starting to gain an understanding of what compounds give certain foods a healthful edge. Black raspberries are rich in several substances thought to have cancer-preventing properties, said [Gary Stoner](#), a study co-author and a professor of public health at Ohio State University. Stoner is also a researcher at the university's [Comprehensive Cancer Center](#).



Gary Stoner

Such substances are called antioxidants. The researchers also compared the antioxidant activity of black raspberries to that of blueberries and strawberries, two fruits with suspected chemopreventive effects. Black raspberries prevailed in the comparison by as much as 40 percent.

"We were surprised by how much difference there was between the antioxidant activity of the raspberries vs. the other fruits," Stoner said.

The research appears in the current issue of the journal *Nutrition and Cancer*.

Rats were injected with azoxymethane (AOM), a carcinogen that causes colon tumors. After two weeks of exposure to AOM, the animals were placed into four groups and fed diets mixed with 0, 2.5, 5 or 10 percent freeze-dried black raspberries. Two additional groups of rats, which did not receive AOM, served as controls. The two latter groups were fed a diet containing 0 or 5 percent freeze-dried black raspberries, respectively.

The tumors were smaller in the rats that ate freeze-dried berries when compared to the animals not fed the berries.

Nine weeks after the final injection of AOM, researchers looked for the development of tiny lesions in the colon called aberrant crypt foci (ACF). Although ACF rarely occur in humans, the lesions can develop into polyps in rats. In humans, polyps are benign masses of tissue which, if left untreated, could develop into malignant tumors.

Every rat injected with the carcinogen AOM developed the ACF lesions. While most of these lesions go away on their own, Stoner said, some may eventually develop into malignant tumors. In rats fed diets supplemented with black raspberries, the number of malignant tumors seemed to correspond with the amount of freeze-dried berries fed to a rat -- the more berries a rat ate, the fewer tumors it had.

At the end of the study, the prevalence of adenocarcinomas or malignant tumors was reduced by 80 percent in the rats that ate the most black raspberries in their diets.

“That’s a much higher reduction than I thought we’d see,” Stoner said.

Adenocarcinomas were reduced by 28 and 35 percent, respectively, in the groups eating diets of 2.5 and 5 percent black raspberries. This reduction is based on the average number of tumors found in rats that had been injected with AOM and fed a berry-free diet.

The tumors were smaller in the rats that ate freeze-dried berries -- diets of 2.5, 5 and 10 percent yielded reductions in tumor size of 28, 42 and 75 percent, respectively, when compared to the animals not fed the berries.

The researchers also measured urinary levels of 8-OHdG -- a compound that is related to the degree of oxidative damage in the body. The process of oxidation produces free radicals, which can damage cells as well as genetic material. Free radicals are thought to play a role in the onset of cancer.

Berries reduced the level of 8-OHdG in the urine by 73, 81 and 83 percent in the 2.5, 5 and 10 percent berry diets, respectively.

“This suggests that berries bind up a good portion of free radicals, preventing them from causing damage in the body,” Stoner said.

In addition to measuring the levels of some of these chemopreventive compounds, Stoner and his colleagues compared the antioxidant activity of the black raspberries to that of strawberries and blueberries. Previous studies suggested that these two fruits had antioxidant activity superior to that of other fruits commonly eaten in the United States, but researchers had not studied black raspberries.

Using a device that measured each fruit’s ability to absorb free radicals, the researchers found that black raspberries topped the charts: these berries exhibited 11 percent more antioxidant activity than did blueberries and 40 percent more than strawberries.

One reason for the raspberries' seemingly stellar health advantage may be their richness in compounds such as anthocyanins, which give berries their almost-black pigment; phenols, such as ellagic, coumaric and ferulic acid; calcium; and vitamins such as A, C, E and folic acid. All of these substances are known chemopreventive agents, Stoner said.

Fresh black raspberries are undoubtedly beneficial, but they are also expensive and can be hard to come by. Freeze-dried berries have as much nutritional content as fresh berries do, but the freeze-dried version isn't readily available to consumers, Stoner said. He tells people to hold off on getting discouraged, though.

“The results of this study would translate in humans to eating two large bowls -- or four cups -- of fresh black raspberries each day,” he said. “That may seem a bit extreme. People need to know that these animals are given whopping doses of a carcinogen. It’s conceivable that a much lower dose would be effective in humans.”

It’s also good to keep in mind that the [National Cancer Institute](#) continues to recommend four to six helpings of fruits and vegetables each day. “We’re just suggesting that people make one of those helpings berries,” Stoner said.

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Stoner conducted the research with Ashok Gupta, Ronald Nines, Laura Kresty, Wendy Frankel, Suzy Habib, Krista La Perle and professor of food science and nutrition Steven Schwartz, all with Ohio State; Gabriel Harris of the [National Institute of Occupational Safety and Health](#) in Morgantown, W. Va.; and Daniel Gallaher of the [University of Minnesota, Twin Cities](#).

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