

# RESEARCH

NEWS

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## BLACK RASPBERRIES SHOW MULTIPLE DEFENSES IN THWARTING CANCER

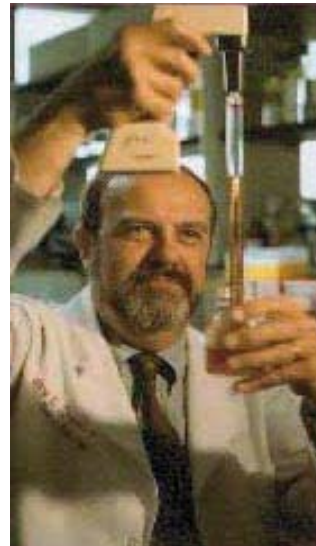
COLUMBUS, Ohio - A cup of black raspberries a day may help keep esophageal cancer at bay.

Researchers found evidence in rats that black raspberries may both prevent the onset of esophageal cancer as well as inhibit precancerous growth already underway.

"Black raspberries are loaded with nutrients and phytochemicals that may prevent the development of cancer," said [Gary Stoner](#), a study co-author and a professor of public health and researcher at the [Comprehensive Cancer Center](#) at Ohio State University.

Stoner, who has also found similar anti-carcinogenic effects with strawberries, said the study results suggest that a daily diet of about 1.4 to 2 cups of fresh berries may be ideal for staving off certain types of cancer.

"Although this level is larger than a standard serving size of fruit, it is behaviorally possible," he said. "The National Cancer Institute recommends that every American eat at least four to six helpings of fruit and vegetables each day. We suggest that one of these helpings be berries of some sort."



Gary Stoner

The research appears in the journal [\*Cancer Research\*](#).

Esophageal cancer is the sixth-leading cause of cancer-related deaths worldwide. The outlook is bleak for those diagnosed with the disease - five-year survival rates range from 8 to 12 percent.

In the current study, the researchers looked at black raspberries' ability to halt the onset of cancer, as well as the fruit's ability to inhibit the progression of precancerous cells to cancer.

They conducted experiments on two groups of rats. Some of the rats from each group were injected with NMBA, a chemical carcinogen that induces esophageal cancer. NMBA is one of a group of chemicals called nitrosamines, compounds that have been linked to cancer. Nitrosamines are found in fried bacon, cured meats, tobacco products, beer and certain industrial products.

Rats in the study received NMBA and their diet in a variety of combinations. Some rats were fed a regular diet without raspberries, while others received diets consisting of 5 percent or 10 percent black raspberries. Some were fed raspberries only after receiving NMBA, while others were fed the raspberry diet before and after the injection with the carcinogen.

Feeding the rats 5 and 10 percent black raspberries before and after NMBA treatment reduced the number of tumors per rat by 39 and 49 percent, respectively, when compared to animals not fed black raspberries.

The fruit also hindered the development of esophageal cancer in individual rats fed black raspberries after NMBA treatment. By week 15 of the study, diets of 5 and 10 percent black raspberries appeared to decrease tumor occurrence and size. At week 25, diets of 5 and 10 percent black raspberries had reduced the number of tumors by an average of 62 percent and 43 percent, respectively.

By week 35 of the study, a diet of 5 percent black raspberries had reduced the number of tumors per animal by 66.5 percent, compared with NMBA-treated control mice fed a regular diet.

"When berries were fed to the rats that had been pretreated with NMBA, the diet containing 5 percent black raspberries seemed to inhibit cancer to a greater degree than did a diet of 10 percent berries, a finding that has also emerged in other studies," Stoner said. "There are certain compounds in berries - and other fruits and vegetables - that in very high doses may actually promote the cancer process. This certainly doesn't mean to stop eating fruits and vegetables, but don't overdo it."

Scientists know that certain foods contain compounds that are likely to protect against specific types of cancer. Past studies suggest that tomatoes help protect against prostate

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cancer, and that tea consumption may reduce the risk for esophageal cancer. But the mechanism of prevention is still somewhat of a mystery.

Raspberries are chock full of compounds with potentially anti-carcinogenic effects, including vitamins, minerals and plant nutrients such as anthocyanins - strong antioxidants that give berries their color.

"We're currently looking at berry extracts and testing the ability of these extracts to inhibit the development and progression of cancer," Stoner said. "As we identify these extracts, we will then try to pinpoint the specific compounds in them that help inhibit cancer."

In the current study, Stoner and his colleagues tested the effects of ellagic acid - a plant nutrient shown to have protective effects against esophageal cancer. Berries are rich in ellagic acid. But the researchers found that ellagic acid alone could not account for the fruit's ability to inhibit cancer. "One or more additional berry components are undoubtedly contributing to the fruit's anti-cancer effects," Stoner said.

He chose black raspberries for this study because previous studies had shown that ellagic acid inhibited carcinogen-induced esophageal and colon cancer in animals. He and his colleagues then tested a series of fruits for their ellagic acid content, finding that berries contained the highest amount.

"We then decided to take a food-based approach to cancer prevention and began testing the berries' ability to inhibit chemically-induced esophageal and colon cancer," Stoner said. "Sure enough, we found that freeze-dried berries were highly protective in the esophagus and colon. But we also found that they were ineffective in protecting against lung cancer.

"The protective compounds in berries may not be absorbed into the blood stream and delivered to the lungs in high enough amounts to be protective. We do believe that they protect the esophagus and colon because they are absorbed by these organs as the food moves through the digestive tract."

The study was funded by a grant from the [Ohio Department of Agriculture](#) and the [National Cancer Institute](#).

Stoner co-authored the study with Laura Kresty, Mark Morse, Peter Carlton, Ashok Gupta, Michelle Blackwood and Charlotte Morgan, all of Ohio State, and Jerry Lu of the M.D. Anderson Cancer Center at the University of Texas in Smithville, Texas.

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