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Berries Reduce Effects of Tobacco Smoke Carcinogen, OSU Researcher Finds

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COLUMBUS, Ohio – Certain berries, such as strawberries and raspberries, may do more in the way of preventing diseases than inhibit the development of colon and esophageal cancers.

Years of research on strawberries and red and black raspberries have shown that the fruits inhibit the development of those cancers in rats. Now, in collaboration with a scientist from Indiana University, an Ohio State University researcher has discovered that the berries reduce the ability of benzo(a)pyrene, a carcinogen found in tobacco smoke and in the environment, to transform normal cells to cancer cells in the laboratory. The rate of reduction in some cases was as high as 90 percent.

Benzo(a)pyrene, formed when gasoline, garbage, or any animal or plant material burns, is carried through the air and water and can affect humans and animals if breathed in or touched. It is most commonly found in coal-, tar- and asphalt-production plants, smoke houses, and municipal trash incinerators and has even been discovered in charcoal-grilled foods and cigarette smoke.

Gary Stoner, head of the Laboratory of Cancer Chemoprevention and Etiology at OSU's James Cancer Hospital and Solove Research Institute, conducted these studies in collaboration with James Klaunig of Indiana University and John Cassady and Nanjun Sun of the OSU College of Pharmacy.

Stoner has considered feeding laboratory rats with the methanol extract to see if the lung takes up the berry components in sufficient quantities to protect against cancer induced by benzo(a)pyrene. In previous studies, when whole freeze-dried raspberries and strawberries were fed to rats, they did not protect against benzo(a)pyrene-induced lung cancer. Stoner thinks that the active components in the berries will be more concentrated in the methanol extract and that the extract may be protective. In the meantime, he is conducting studies with

Steven Schwartz of the OSU College of Food, Agricultural, and Environmental Sciences to identify the active components in the methanol extract.

“What exactly do berries do? Well, we know that they inhibit the metabolism of carcinogens so there are fewer mutational events that can lead to cancer. Berries also slow the growth rate of pre-cancerous cells, also reducing the development of cancer,” said Stoner. “Now we are trying to understand how that process occurs and what components contribute to the process.”

Ellagic acid, found in berries, has long been considered to be an anti-carcinogenic and anti-mutagenic compound that contributes to cancer inhibition. Stoner, however, is convinced that ellagic acid is not working alone in preventing, halting or reversing the development of certain cancers.

“Berries contain many vitamins, minerals and phytonutrients that individually have been shown to inhibit cancer,” said Stoner. “I think that’s one of the reasons that cancer inhibition cannot be attributed to ellagic acid alone.”

Steve Clinton is another OSU researcher conducting research on strawberries and human health. His work focuses on the effects of strawberries on prostate cancer.