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Disease-fighting chemicals in apples could reduce the risk of breast cancer, Cornell study in rats suggests

ITHACA, N.Y. — An apple a day can help keep breast cancer away, according to a study in rats by food scientists at Cornell University.

"We found that tumor incidence was reduced by 17, 39 and 44 percent in rats fed the human equivalent of one, three or six apples a day, respectively, over 24 weeks," says Rui Hai Liu, Cornell associate professor of food science and lead author of the study.

The Cornell researchers treated a group of rats with a known mammary carcinogen and then fed them either whole apple extracts or control extracts. Liu, who says this is the first study of the effects of apples on cancer prevention in animals, also found that the number of tumors was reduced by 25, 25 and 61 percent in rats fed, respectively, the equivalent of one, three or six apples a day.

The report is published online at <http://pubs.acs.org/cgi-bin/abstract.cgi/jafcau/asap/abs/jf058010c.html> and will be published later this month in the *Journal of Agricultural and Food Chemistry*.

In an article in the journal *Nature* five years ago, Liu and his colleagues credited phytochemicals – antioxidants – in fresh apples with inhibiting human liver and colon cancer cell growth. Antioxidants help prevent cancer by mopping up cell-damaging free radicals and inhibiting the production of reactive substances that could damage normal cells.

"Studies increasingly provide evidence that it is the additive and synergistic effects of the phytochemicals present in fruits and vegetables that are responsible for their potent antioxidant and anticancer activities," Liu says.

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EDITORS: You may downlink a video news release and audio/visual cuts of Dr. Liu on Wed., March 2, from 05:00 to 06:00 A.M. EST and 10:00 to 11:00 A.M. EST. Satellite: G4R (also known as GALAXY 4R), located at 99.0 degrees West. Ku Digital transponder: K19 Slice "E." Downlink frequency: 12093.000 Horizontal. For any trouble with the downlink, call: 607-255-0509. For photo, see <http://www.news.cornell.edu/releases/Feb05/apples.cancer.ssl.html>.

This news release is available at <http://www.news.cornell.edu/releases/Feb05/apples.cancer.ssl.html>, with a link to other Cornell news releases and photographs. For information on receiving Cornell news releases via e-mail, go to <http://www.news.cornell.edu/subscribe.html> or send a query to cunews@cornell.edu.

“Our findings suggest that consumers may gain more significant health benefits by eating more fruits and vegetables and whole grain foods than in consuming expensive dietary supplements, which do not contain the same array of balanced, complex components,” says Liu.

He notes that the thousands of phytochemicals in foods vary in molecular size, polarity and solubility, which could affect how they are absorbed and distributed in different cells, tissues and organs. “This balanced natural combination of phytochemicals present in fruits and vegetables cannot simply be mimicked by dietary supplements,” he explains.

Furthermore, Liu notes that the health benefits of consuming fruits and vegetables extend beyond lowering the risk of developing cancers and cardiovascular diseases to include preventive effects for other chronic diseases, such as cataracts, age-related macular degeneration, central neurodegenerative disease and diabetes.

Says David R. Jacobs, professor in the Division of Epidemiology, School of Public Health, University of Minnesota: “Dr. Liu is in the forefront of a group of investigators, including myself, who find extensive evidence that extremely important health aspects of food work through the combination of substances that make up that food, a concept we call food synergy. Risk of many chronic diseases in modern life appears to be reduced by whole foods, but not by isolated large doses of selected food compounds. Dr. Liu’s current work on apples and breast tumors in rats is a perfect example of this principle.”

The study, which was coauthored by Jiaren Liu, a postdoctoral associate at Cornell, and Bingqing Chen of Harbin Medical University, China, was funded by the U.S. Department of Agriculture Federal Formula Funds, the U.S. Apple Association and the Apple Products Research and Education Council.

Related World Wide Web sites: The following sites provide additional information on this news release. Some might not be part of the Cornell University community, and Cornell has no control over their content or availability.

- Rui Hai Liu: <<http://www.foodscience.cornell.edu/faculty/liu/liu.htm>>
- Journal of Agricultural and Food Chemistry:
<<http://pubs.acs.org/journals/jafcau/index.html>>