

Public release date: 10-Aug-2007

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[American Association for Cancer Research](#)

Green tea boosts production of detox enzymes, rendering cancerous chemicals harmless

PHILADELPHIA – Concentrated chemicals derived from green tea dramatically boosted production of a group of key detoxification enzymes in people with low levels of these beneficial proteins, according to researchers at Arizona Cancer Center.

These findings, published in the August issue of *Cancer Epidemiology, Biomarkers & Prevention*, a journal of the American Association for Cancer Research, suggest that a green tea concentrate might help some people strengthen their metabolic defense against toxins capable of causing cancer.

In a study of 42 people, the concentrate – composed of chemicals known as green tea catechins in amounts equal to that found in 8-16 cups of green tea – boosted production of the enzymes, which belong to the glutathione S-transferase (GST) family, by as much as 80 percent in some participants.

GST enzymes are believed to be crucial to the body's defense against cancer-causing chemicals and other toxins, according to the study's lead investigator, H.-H. Sherry Chow, Ph.D., a research associate professor at the University of Arizona. They modify the cancer-causing molecules that would otherwise damage cellular DNA, thus rendering them inert.

They actually convert known carcinogens to non-toxic chemicals, and studies have shown a correlation between deficient expression of these enzymes and increased risk of developing some cancers," Chow said.

Expression of this enzyme varies dramatically in people due to genetic variation and environmental factors," Chow added. Green tea catechins somehow increase gene expression of these enzymes, which can be an advantage to people with low levels to start with."

Green tea has long been of interest to researchers given studies that have shown populations in which it is often consumed, such as the Chinese and Japanese, generally have lower rates of cancer. To find out if green tea can protect against cancer, the NCI has sponsored a number of rigorous scientific studies testing capsules of the extract, Polyphenon E, that have been prepared in Japan to meet exact specifications. These pills contain epigallocatechin gallate (EGCG), a catechin known for its potent antioxidant activity, and are currently being tested against a variety of cancers in clinical trials.

This study was designed to see if green tea catechin concentrate had any effect on the levels of GST enzymes in healthy individuals – research that could explain the tea’s anti-cancer properties. Healthy volunteers were asked to abstain from consuming any tea or tea-related products for four weeks. At the end of this washout period, blood was drawn and baseline GST enzyme levels were determined for each participant. Then, the volunteers were asked to take four Polyphenon E capsules, for a total of 800 milligrams of EGCG, each morning on an empty stomach for four weeks and to abstain from drinking tea or eating many cruciferous vegetables, which contain other beneficial chemicals. Another blood sample was taken after four weeks, and GST activity was determined.

Researchers found that use of Polyphenon E enhanced GST activity when data from all participants were included for analysis. But it had its most significant effect in volunteers whose baseline blood measurements showed low GST activity – an 80 percent increase compared to baseline GST activity. Activity did not change in volunteers with medium GST expression, or in those with the highest levels, GST seemed to decrease slightly although researchers believe that decline was due to random variation.

This is the first clinical study to show proof that chemicals in green tea can increase detoxification enzymes in humans,” Chow said. There may be other mechanism in play by which green tea may protect against cancer development, but this is a good place to start. /p>

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The NCI supported the study and researchers from NCI also participated in conducting the study.

The mission of the American Association for Cancer Research is to prevent and cure cancer. Founded in 1907, AACR is the world's oldest and largest professional organization dedicated to advancing cancer research. The membership includes nearly 26,000 basic, translational, and clinical researchers; health care professionals; and cancer survivors and advocates in the

United States and more than 70 other countries. AACR marshals the full spectrum of expertise from the cancer community to accelerate progress in the prevention, diagnosis and treatment of cancer through high-quality scientific and educational programs. It funds innovative, meritorious research grants. The AACR Annual Meeting attracts more than 17,000 participants who share the latest discoveries and developments in the field. Special Conferences throughout the year present novel data across a wide variety of topics in cancer research, treatment, and patient care. AACR publishes five major peer-reviewed journals: Cancer Research; Clinical Cancer Research; Molecular Cancer Therapeutics; Molecular Cancer Research; and Cancer Epidemiology, Biomarkers & Prevention. Its most recent publication, CR, is a magazine for cancer survivors, patient advocates, their families, physicians, and scientists. It provides a forum for sharing essential, evidence-based information and perspectives on progress in cancer research, survivorship, and advocacy.
