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Tea and Cancer Prevention: Fact Sheet

The antioxidants found in tea--called catechins--may selectively inhibit the growth of cancer (see Question 1).

In laboratory studies using animals, catechins scavenged oxidants before cell damage occurred, reduced the number and size of tumors, and inhibited the growth of cancer cells (see Question 3).

However, human studies have proven more contradictory, perhaps due to such factors as variances in diet, environments, and populations (see Question 4).

NCI researchers are investigating the therapeutic and preventive use of tea catechins against a variety of cancers (see Question 5).

Tea drinking is an ancient tradition dating back 5,000 years in China and India. Long regarded in those cultures as an aid to good health, researchers now are studying tea for possible use in the prevention and treatment of a variety of cancers. Investigators are especially interested in the antioxidants-called catechins-found in tea. Despite promising early research in the laboratory, however, studies involving humans so far have been inconclusive.

1. What are antioxidants?

The human body constantly produces unstable molecules called oxidants, also commonly referred to as free radicals. To become stable, oxidants steal electrons from other molecules and, in the process, damage cell proteins and genetic material. This damage may leave the cell vulnerable to cancer. Antioxidants are substances that allow the human body to scavenge and seize oxidants. Like other antioxidants, the catechins found in tea selectively inhibit specific enzyme activities that lead to cancer. They may also target and repair DNA aberrations caused by oxidants (1).

2. What is the level of antioxidants found in tea?

All varieties of tea come from the leaves of a single evergreen plant, *Camellia sinensis*. All tea leaves are picked, rolled, dried, and heated. With the additional process of allowing the leaves to ferment and oxidize, black tea is produced. Possibly because it is less processed, green tea contains higher levels of antioxidants than black tea.

Although tea is consumed in a variety of ways and varies in its chemical makeup, one study showed steeping either green or black tea for about five minutes released over 80 percent of its catechins. Instant iced tea, on the other hand, contains negligible amounts of catechins (1).

3. What are the laboratory findings?

In the laboratory, studies have shown tea catechins act as powerful inhibitors of cancer growth in several ways: They scavenge oxidants before cell injuries occur, reduce the incidence and size of chemically induced tumors, and inhibit the growth of tumor cells. In studies of liver, skin and stomach cancer, chemically induced tumors were shown to decrease in size in mice that were fed green and black tea (1, 2).

4. What are the results of human studies?

Although tea has long been identified as an antioxidant in the laboratory, study results involving humans have been contradictory. Some epidemiological studies comparing tea drinkers to non-tea drinkers support the claim that drinking tea prevents cancer; others do not. Dietary, environmental, and population differences may account for these inconsistencies.

Two studies in China, where green tea is a mainstay of the diet, resulted in promising findings. One study involving over 18,000 men found tea drinkers were about half as likely to develop stomach or esophageal cancer as men who drank little tea, even after adjusting for smoking and other health and diet factors (3). A second study at the Beijing Dental Hospital found consuming 3 grams of tea a day, or about 2 cups, along with the application of a tea extract reduced the size and proliferation of leukoplakia, a precancerous oral plaque (1).

However, a study in the Netherlands did not support these findings. It investigated the link between black tea consumption and the subsequent risk of stomach, colorectal, lung, and breast cancers among 58,279 men and 62,573 women ages 55 to 69. The study took into account such factors as smoking and overall diet. It found no link between tea consumption and protection against cancer (4).

5. Is NCI evaluating tea?

National Cancer Institute (NCI) researchers are also investigating the therapeutic use of green tea. One recently completed but unpublished NCI trial studied the antitumor effect of green tea among prostate

cancer patients. The 42 patients drank 6 grams of green tea, or about 4 cups, daily for four months. However, only one patient experienced a short-lived improvement, and nearly 70 percent of the group experienced unpleasant side effects such as nausea and diarrhea. The study concluded drinking green tea has limited antitumor benefit for prostate cancer patients (5).

Other ongoing NCI studies are testing green tea as a preventive agent against skin cancer. For example, one is investigating the protective effects of a pill form of green tea against sun-induced skin damage while another explores the topical application of green tea in shrinking precancerous skin changes. For more information about NCI-sponsored studies on green tea, go to http://www.cancer.gov/clinical_trials/.

References:

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(4) Goldbohm RA, Hertog MG, Brants HA, van Poppel G, van den Brandt PA. Consumption of black tea and cancer risk: a prospective cohort study. *JNCI* 1996; 88 2): 93-100.
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