



What's all the fuss about green tea?

BY DAVID SCHARDT

Green tea is hot. You can buy a bottled green tea beverage just about anywhere these days. It's also the first food that Health Canada has allowed to make an antioxidant claim ("increases antioxidant capacity in the blood").

How good is the evidence that green tea is good for your health? Studies in laboratory animals are impressive, but compelling evidence in humans has been hard to come by.

Stroke

"Drinking tea regularly may be one of the most practical lifestyle changes you can make to significantly reduce your risk of suffering a stroke," says epidemiologist Lenore Arab of the University of California at Los Angeles. Arab co-chaired the Fourth International Scientific Symposium on Tea and Human Health in 2007.

She and her colleagues pooled the results from 10 studies—of nearly 200,000 people in China, Japan, Finland, the Netherlands, Australia, and the United States—that looked at tea consumption and stroke risk.¹ (The meta-analysis was funded by Unilever, which owns Lipton.)

"The benefit of drinking tea came shining through no matter where people lived in the world," says Arab. Those who drank at least three cups every day had a 21 per cent lower risk of suffering a stroke compared with those who drank less than a cup a day.

"If this turns out to be true, that's a pretty strong finding for something that's the third leading cause of death in Canada and the United States," notes Eric Rimm, director of the Program in Cardiovascular Epidemiology at the Harvard School of Public Health in Boston, Massachusetts.

Rimm says "if" because the studies that Arab's team examined weren't designed to prove cause and effect.

"There's a strong association, but we don't know if there's something about the people who drink tea that would account for their having fewer strokes," explains Rachel Johnson, a professor of nutrition at the University of Vermont and a spokesperson for the American Stroke Association.

What's needed, she says, is a trial that randomly assigns people to drink either tea or an indistinguishable tea-free placebo.

If tea matters, is green tea better than black? (Green tea comes from the unfermented leaves of the plant *Camellia sinensis*, while black tea is made from the fermented leaves.)

In Arab's meta-analysis, it wasn't. But in animal studies, compounds in green tea called polyphenols seem to protect lab animals against damage caused by strokes.

For example, when researchers induce strokes in gerbils, Arab explains, the animals' brains suffer less damage if they are first fed a tea polyphenol called EGCG (epigallocatechin gallate).²

If the same is true in humans, green tea may help stop strokes from becoming severe enough to be noticed.

So-called "silent" strokes are common, and are far less damaging than major strokes. "At least 10 per cent of people older than 65 have damage to the white matter of their brains, which is probably evidence of silent strokes that didn't cause paralysis or pain or other symptoms that would lead them to be diagnosed with stroke," says Arab.

"When I'm asked when is the best time to drink tea, I say right before your stroke!" she jokes.

So should you start drinking three cups of green tea every day to protect your brain? It's far too early to say.

It's much more important to keep your blood pressure under control by shedding pounds if you're overweight, eating less salt and more fruits and vegetables, and taking blood-pressure-lowering drugs if necessary.

Prostate Cancer

"The evidence that green tea prevents the development of prostate cancer in men is not very encouraging," says researcher Susanne Henning of the Center for Human Nutrition at the University of California at Los Angeles.

For example, in four studies that followed more than 95,000 men in Japan and Hawaii for 7 to 20 years, those who drank the most tea had no lower overall risk of being diagnosed with prostate cancer than those who drank the least.³⁻⁶

But for men with—or at high risk of—prostate cancer, tea may make a difference, says Henning.

"I would definitely advise them to drink



A green tea with "negligible" levels of polyphenols, admits the company.



large amounts of green tea, because it may slow down the progression of the disease.”

Only one of the four studies in Japanese and Hawaiian men looked at the risk of advanced prostate cancer separately. It found that those who drank five or more cups of green tea a day had half the risk of those who drank less than one cup a day.³

Then there's a 2006 Italian study “whose results were remarkable,” says Hasan Mukhtar, a professor of cancer research at the University of Wisconsin in Madison.

Researchers recruited 60 men with high-grade prostatic intraepithelial neoplasia (PIN) lesions, some of which turn into prostate cancer.⁷ Half the men were given 600 milligrams a day of a green tea extract and half were given a placebo. After one year, 10 of the men had been diagnosed with prostate cancer. Nine were in the placebo group. Only one had been taking the green tea extract.

“It was a nice study, but it was pretty small,” says tea researcher Joshua Lambert of Pennsylvania State University. “It

needs to be confirmed by larger intervention studies.”

Several trials are in the works.

Five years ago, UCLA's Henning started giving men who were awaiting surgery to remove their cancerous prostate five cups of green tea, black tea, or water every day. She's looking at whether the tea has any impact on their PSA levels or on the cancer cells in their prostate. (PSA levels may reflect the growth of prostate cancer.)

And in 2007, researchers at the Moffitt Cancer

Center and Research Institute in Tampa, Florida, began giving green tea extracts to men with high-grade PIN lesions. They expect to complete their study by the end of 2012.

Among the brands with the least sugar. Mostly brewed tea, but Arizona has no polyphenol numbers.

Tea Talk

Flavonoids, polyphenols, EGCG, antioxidants. Sorting out the names of the potentially beneficial compounds in tea can make your head spin. Here's what the terms you're likely to see mean:

Polyphenols are a broad group of chemicals found in many foods, including tea, cocoa, fruits, and vegetables.

Among the polyphenols in tea is a family of compounds called the **flavonoids**, and among the flavonoids is a smaller group, the **catechins**. The catechin found in the greatest concentration in tea—and the one most studied for its health benefits—is **EGCG**.

Some companies use the more-familiar term **antioxidants** to describe the polyphenols in their tea drinks.

Breast Cancer

“Cohort studies that follow women for years really do not show any protective effect from drinking tea on the risk of developing breast cancer,” says Anna Wu, co-leader of the Cancer Control Research Program at the University of Southern California's Keck School of Medicine in Los Angeles.

In the six studies that tracked more than 140,000 women in Japan, Sweden, the Netherlands, and the United States for up to 24 years, those who reported drinking the most tea were no less likely to be diagnosed with breast cancer than those who drank the least tea.⁸

But green tea may make a difference in women who already have breast cancer.

In two studies of Japanese women who had been diagnosed with breast cancer, those who drank more than three cups of green tea every day had a 27 per cent lower risk of having their cancer recur than those who drank little or no green tea.^{9,10}

That's far from proof, though.

“The problem in interpreting studies like these is that drinking green tea is an indicator of an Asian lifestyle, including lower body weight, more physical activity, and more soy in the diet,” points out Regina Ziegler, a researcher at the U.S. National Cancer Institute in Bethesda, Maryland.

“So it could be that this lifestyle, rather than drinking green tea, helped protect these women from getting breast cancer again.”

Metabolism

The EGCG in Jamieson Laboratories' weight loss supplement SlimDOWN One can stimulate “increased caloric expenditure...to enhance weight loss,” claims the company's Web site.

The tiny amount of EGCG—15.2 milligrams—in a daily dose of SlimDOWN One is equivalent to about 1½ tablespoons of brewed green tea. But even if SlimDOWN One contained a meaningful amount of EGCG, it might not matter.

“If you test the tea polyphenols like EGCG alone, you don't see that they have very much of an effect on metabolism,” says researcher Mario Ferruzzi of Purdue University in West Lafayette, Indiana.

They don't appear to do much for weight either.

In a recent meta-analysis, overweight men and women who consumed 282 mg of EGCG every day weighed no less after 12 weeks than similar people who took a placebo.¹¹

“If you combine tea polyphenols with caffeine, you do see a bump in short-term energy expenditure compared to people taking just caffeine or a placebo,” notes Ferruzzi. “Whether that helps you maintain a healthy weight is a whole other issue.”

(Ferruzzi is a co-patent holder for a weight-maintenance drink that contains



The green tint comes largely from added colours.

The Bottom Line

- Green tea is rich in plant compounds that help protect laboratory animals from cancer and other diseases. But the jury is still out over whether it helps protect humans against cancer, strokes, or cognitive decline.
- If you want the full range of potentially beneficial compounds in green tea, drink it freshly brewed and often.
- If you drink bottled tea, look for one made primarily from brewed green tea, not tea extracts.

tea and caffeine and that was the basis for Enviga, a drink marketed in the United States by Coca-Cola.)

In the meta-analysis, the mix of EGCG and caffeine wasn't very impressive. After three months of taking polyphenols plus caffeine every day, overweight men and women—some were dieting and some weren't—lost an average of just one more pound than similar people who took a placebo.

"Small and not likely clinically relevant," was the way the researchers summed up their results.

Memory

"Regular tea drinkers may experience a different rate of cognitive decline than non-tea drinkers," says UCLA epidemiologist Lenore Arab.

Arab and her colleagues analyzed data from the U.S. Cardiovascular Health Study, which has been tracking heart disease and stroke rates in adults 65 years of age and older in North Carolina, California, Maryland, and Pennsylvania since 1989.

More than 4,800 of the study participants took a yearly Mini-Mental State Examination (MMSE)—a questionnaire that is used to screen for memory loss and other cognitive impairment.

Those who drank tea—green or black—at least five times a week had about a 30 per cent slower rate of decline in their scores than those who didn't drink tea at all. But so did those who drank tea just one to three times a month. So it's not clear whether tea, rather than something else about tea drinkers, protects the brain.

The results, which were presented at an Alzheimer's disease conference last summer, haven't yet been published.

An earlier long-term study among older Chinese adults living in Singapore also found that tea drinkers had a slower rate of cognitive decline than non-tea drinkers.¹²

Arab's bottom line: "We are still very early in the game. We're not there yet in terms of saying anything that's definitive." 🍵

¹ *Stroke* 40: 1786, 2009.

² *J. Neurosci. Res.* 77: 892, 2004.

³ *Am. J. Epidemiol.* 167: 71, 2008.

⁴ *Br. J. Cancer* 95: 371, 2006.

⁵ *Cancer Causes Control* 15: 911, 2004.

⁶ *Cancer Res.* 49: 1857, 1989.

⁷ *Cancer Res.* 66: 1234, 2006.

⁸ *Carcinogenesis* 27: 1310, 2006.

⁹ *Jpn. J. Cancer Res.* 89: 254, 1998.

¹⁰ *Cancer Letters* 167: 175, 2001.

¹¹ *Am. J. Clin. Nutr.* 91: 73, 2010.

¹² *Am. J. Clin. Nutr.* 88: 224, 2008.

Going Green

If green tea has any health benefits—and that's a big "if"—*how much* of what you drink may matter. "Consume enough of the tea polyphenols and consume them often enough—that means three or more servings a day—to keep their levels in your blood high," recommends Purdue University polyphenols researcher Mario Ferruzzi.

The best source of tea polyphenols: brewed green tea.

"Make sure you drink a proper cup, not some weak ready-to-drink or instant tea product that has maybe a third or less of what's in brewed tea," says Ferruzzi.

Steep the tea bag or tea leaves for at least three minutes, suggests tea researcher Claudia Fajardo-Lira of the University of California at Northridge. "It takes time for the polyphenols to dissolve into the water."

Squeezing in some lemon helps, since it supplies vitamin C, which protects the polyphenols from being oxidized and lost.

What about milk? "Although the prevailing view has been that milk binds up some of the tea's important constituents and makes them unavailable for absorption," says Ferruzzi, "the effect is actually negligible" unless the tea and milk sit for more than an hour before you drink it.

A 250-millilitre cup of fresh-brewed green tea contains about 320 milligrams of polyphenols, including roughly 190 mg of EGCG. If you don't have time to brew a cup from scratch, you'll have to settle for a lot fewer polyphenols.

Most bottled green teas are less than 100 per cent tea because they're sweetened with sugar, glucose-fructose, or honey. What's more, some—SoBe, for example—are made from tea extracts that may not contain as much of the full range of polyphenols as the real thing. In fact, SoBe Green Tea's polyphenols are too negligible to even list on the label, according to its manufacturer, Pepsi-Cola.

Deciphering which bottled green teas supply the most potentially beneficial ingredients isn't easy. While most labels disclose numbers, those numbers may not always refer to the same compounds.

Lipton PureLeaf's label, for example, reveals how much "flavonoid antioxidants" are in the bottle, while Nestea and Canada Dry use the term "polyphenols." (See "Tea Talk" for what the terms mean.)

The Nutrition Facts labels on some green teas give numbers for the whole bottle or can, so it's easy to see how many calories you're downing. But some larger bottles—of Canada Dry Green Tea Ginger Ale and Lipton Green Tea with Citrus, for example—give numbers for a 250 mL serving. If you're going to drink the whole 591 mL bottle, get out your calculator. The calories can pile up quickly.



More than twice the polyphenols (126 mg per 250 mL) of Nestea Iced Green tea.



More sugar than regular ginger ale and less green tea than "natural flavours."