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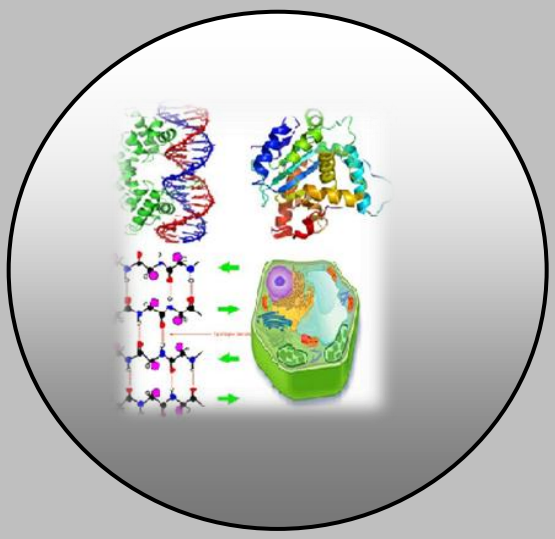

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REVIEW ARTICLE

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The Quiescent Benefits and Drawbacks of Coffee Intake

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ABSTRACT

Remember when people used to worry that coffee would harm their hearts, give them ulcers, and make them overly nervous? In excess, coffee, and more particularly, caffeine, can cause problems. But the fretting about two or three cups a day, or even more, is fading as study results suggestive of health benefits from coffee keep on coming in. Coffee drinking is associated with a lower risk of depression among women, a lower risk of lethal prostate cancer among men, and a lower risk of stroke among men and women. Go back a little further, and you'll come across reports of possible (it's not a done deal) protective effects against everything from Parkinson's disease to diabetes to some types of cancer. Caffeine has been studied more than any other ingredient in coffee, and it tends to get credit if the body part benefited is the brain. But coffee contains literally a thousand different substances, and some of the lesser lights are thought to be responsible for healthful effects in other parts of the body. Some studies show caffeinated and decaffeinated coffee as having the same effect, which suggests that something else in coffee is involved. Explanations for the association between coffee consumption and lower rates of heart disease and diabetes often point to chlorogenic acid and other obscure antioxidant substances as the responsible parties. Antioxidants are substances that sop up reactive molecules before they have a chance to harm sensitive tissue like the lining of blood vessels.

Chlorogenic acid was probably the main antioxidant in your cup of coffee this morning. Some experiments have shown that it may also inhibit absorption of glucose in the digestive system and even out insulin levels. Chlorogenic acid might be another coffee ingredient with a split personality. Along with caffeine, it seems to push up levels of homocysteine, an amino acid that has been associated with artery-clogging atherosclerosis. Coffee isn't a great source of vitamins and minerals, but as a plant-based drink, it contains some, and a few that we should be getting more of. Let's start with magnesium. A cup of coffee contains about 7 mg, which is a drop in the daily-requirement bucket (420 mg for men, 320 mg for women). A cup of coffee or two can help close that gap a little bit. Potassium can offset some of the negative consequences of sodium. At about 116 mg per cup, coffee's contribution toward the 4,700 mg of the potassium that we're supposed to get daily is a widow's mite, but it's something. A cup of coffee also has small amounts of niacin (0.5 mg) and choline (6.2 mg).

Keywords: Coffee, Caffeine, Chlorogenic acid, Homocysteine, Antioxidant substances, Anti-depression, Prostate cancer.

There is nothing quite like a cup of hot coffee to banish that feeling of somnolence and get the brain cells chugging away. But quite apart from the sense of wellbeing that a good cup of brew, with its heady aroma, can produce, studies published recently also indicate that this beverage that millions around the world enjoy could be providing some health benefits too. In May this year, the prestigious medical journal, *The New England Journal of Medicine*, published a study that examined the effects of drinking coffee in a cohort of over four lacs men and women in the US. Coffee "appeared to be inversely associated with most major causes of death in both men and women, including heart disease, respiratory disease, stroke, injuries and accidents, diabetes, and infections," observed Neal Freedman of the National Cancer Institute (NCI) in the US and his colleagues in their paper. After taking into account tobacco-smoking and other confounding factors, men who drank six cups or more cups of coffee a day had a 10 per cent lower risk of death compared with those who did not take it at all. Women coffee-drinkers had a 15 per cent lower risk of death. Those who drank caffeine-containing coffee as well as the decaffeinated form were both found to benefit from their habit (Cadenas, 1989).

But, as the authors pointed out, it was not possible to conclude from an observational study whether the association that was noticed actually reflected cause and effect. Then, last month there came another study, this time in *Circulation Heart Failure*, a journal of the American Heart Association. The study analyzed five independent prospective studies, with a total of over 1.4 lacs participants, for links between coffee consumption and heart failure. This study observed a statistically significant 'J-shaped relationship' between coffee and heart failure. Moderate consumption of coffee — up to four servings a day — reduced the risk of heart failure. But excessive coffee drinking had no benefit and may even be dangerous, remarked Murray Mittleman, director of the Cardiovascular Epidemiology Research Unit (CERU) at Beth Israel Deaconess Medical Center (BIDMC) in Boston and senior author of the study, in a press release.

The paper, however, also pointed out that experimental studies had consistently shown that coffee and caffeine were associated with acutely raised blood pressure. A recent analysis had reported that habitual light to moderate coffee consumption increased the risk of developing hypertension but more frequent consumption did not pose any addition risk. It could be that habitual coffee-drinkers develop a tolerance for caffeine, the authors said. Other studies have suggested that drinking coffee could also be associated with a lower risk of developing type 2 diabetes. In 1991, the World Health Organization's International Agency for Research on Cancer (IARC) held that "coffee is possibly carcinogenic to the human urinary bladder." But more recent studies have indicated that coffee could be beneficial, protecting against several cancers, including of the breast, bowel, prostate and liver (Prakash and Singh, 2009).

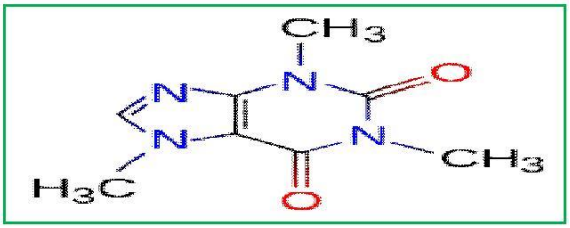
A paper from Jiali Han of the Harvard Medical School and the others that has just been published in the journal *Cancer Research* found that caffeine intake was associated with reduced risk for developing a form of skin cancer known as basal cell carcinoma. Roughly 1,000 chemicals have been reported in roasted coffee, point out Jonathan Krell and Justin Stebbing of Imperial College London (ICL) in a commentary published recently in *The Lancet Oncology*. The active compounds in coffee associated with anti-cancer properties are largely unknown but antioxidants might have a role. Moreover, the roasting process too was important and affected the antioxidant content. But they also cautioned that a large proportion of the evidence for the beneficial effects of coffee was derived from epidemiological studies that were open to misinterpretation and error. More well-designed studies were needed to assess this subject further. Meanwhile, "like many aspects of life, 'everything in moderation' seems the safest policy to adopt," they remarked (Maheshwari, 2005).

Coffee may taste good and get you going in the morning, but what will it do for your health? A growing body of research shows that coffee drinkers, compared to nondrinkers, are:

less likely to have type 2 diabetes, Parkinson's disease, and dementia

have fewer cases of certain cancers, heart rhythm problems, and strokes

"There is certainly much more good news than bad news, in terms of coffee and health," states Frank Hu, MD, MPH, PhD, nutrition and epidemiology professor at the Harvard School of Public Health (HSPH). But (you knew there would be a "but," didn't you?) coffee isn't proven to prevent those conditions. Researchers don't ask people to drink or skip coffee for the sake of science. Instead, they ask them about their coffee habits. Those studies can't show cause and effect. It's possible that coffee drinkers have other advantages, such as better diets, more exercise, or protective genes. So there isn't solid proof (Singh et al. 2009).



Caffeine molecule

But there are signs of potential health perks -- and a few cautions. If you're like the average American, who downed 416 8-ounce cups of coffee in 2009 (by the World Resources Institute's estimates), you might want to know what all that java is doing for you, or to you. Here is a condition-by-condition look at the research.

Type 2 Diabetes

Hu calls the data on coffee and type 2 diabetes "pretty solid," based on more than 15 published studies. "The vast majority of those studies have shown a benefit of coffee on the prevention of diabetes. And now there is also evidence that decaffeinated coffee may have the same benefit as regular coffee," Hu states WebMD.

In 2005, Hu's team reviewed nine studies on coffee and type 2 diabetes. Of more than 193,000 people, those who said they drank more than six or seven cups daily were 35% less likely to have type 2 diabetes than people who drank fewer than two cups daily. There was a smaller perk -- a 28% lower risk -- for people who drank 4-6 cups a day. The findings held regardless of sex, weight, or geographic location (US or Europe). More recently, Australian researchers looked at 18 studies of nearly 458,000 people. They found a 7% drop in the odds of having type 2 diabetes for every additional cup of coffee drunk daily. There were similar risk reductions for decaf coffee drinkers and tea drinkers. But the researchers cautioned that data from some of the smaller studies they reviewed may be less reliable. So it's possible that they overestimated the strength of the link between heavy coffee drinking and diabetes

How might coffee keep diabetes at bay?

"It's the whole package," Hu says. He points to antioxidants -- nutrients that help prevent tissue damage caused by molecules called oxygen-free radicals. "We know that coffee has a very strong antioxidant capacity," Hu states.Coffee also contains minerals such as magnesium and chromium, which help the body use the hormone insulin, which controls blood sugar (glucose). In type 2 diabetes, the body loses its ability to use insulin and regulate blood sugar effectively. It's probably not the caffeine, though. Based on studies of decaf coffee, "I think we can safely say that the benefits are not likely to be due to caffeine," Hu states (Dheer et al. 2005).

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