

National Institutes Of Health Discovers Protective Effects Of Coffee



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An exciting new study published in the New England Journal of Medicine suggests that **coffee drinking may add years to your life span.**¹

Evidence is rapidly accumulating about the ability of coffee to reduce vascular disease, slash cancer risk, preserve cognition, and mitigate diabetes/obesity.²

Rich in polyphenols, coffee contains over *1,000 different natural compounds*³ that favorably interact within cells.⁴ Coffee has the proven ability to turn on genes that promote youthful cellular functions.^{4,5}

One coffee compound in particular, **chlorogenic acid** provides a multitude of these benefits, including impeding after-meal glucose surges that can contribute to obesity and diabetes.⁶⁻¹¹

Researchers have found a way to naturally "super charge" coffee and dramatically increase its healthy polyphenol content.¹² This means people can obtain more of coffee's unique beneficial compounds while drinking less coffee. For those who can't drink coffee, standardized chlorogenic acid capsules are becoming enormously popular.

Before describing the longevity finding published in the New England Journal of Medicine, we first want to conjecture why coffee drinking still has negative health connotations.

One factor may be early memories of people drinking coffee who simultaneously smoked cigarettes. Smokers are often ravenous coffee drinkers.

Other unhealthy images are those suffering hangovers who use coffee to restore functionality, those suffering sleep deprivation who drink coffee to stay awake, and the hefty "cream and sugar" so many people add to their coffee. These images are hard to delete from our memory banks.

A more current negative health picture is the high-calorie coffee "milkshakes" that contribute to today's obesity epidemic. Certain religions admonish against tobacco, alcohol, and coffee, which implies that coffee drinkers are in the same poor-health category as nicotine addicts and alcoholics. Those who are able to abstain from alcohol addiction often switch to coffee. Finally, some people are sensitive to caffeine and are unable to drink coffee, or suffer heartburn in response to coffee consumption.



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If one can dispel these negative images, then coffee drinking may rise to the conscious level of a healthy choice, analogous to green tea drinking.

Coffee Consumption Associated with Lower Risk of Death

Researchers at the National Institutes of Health, in collaboration with AARP (American Association of Retired People), explored coffee drinking habits and their impact on mortality.¹ They enrolled 229,119 men and 173,141 women, beginning in 1995 and 1996, when the subjects were 50-71 years old. The subjects completed a thorough questionnaire probing their diet and lifestyle. Anyone with cancer, heart disease, or stroke at the time of enrollment was excluded, leaving basically healthy adults in late middle age.¹

The researchers noted each participant's coffee consumption at the beginning of the study. Then they followed them for a total of 13 years, gathering data on a total of 5,148,760 person-years.¹ This comprehensive study had massive statistical power.

During the study period, 33,731 men, and 18,784 women died of various causes.¹ According to the raw data, the risk of death seemed elevated among coffee drinkers. But coffee drinkers were more likely to smoke cigarettes, markedly affecting the data.

TABLE 1: COFFEE'S POWERFUL REDUCTION IN THE RISK OF DYING

Cups of Coffee/Day	Percent Lower Risk of Dying for Women	Percent Lower Risk of Dying for Men
Less than 1	No Reduction	No Reduction
1	5%	6%
2 or 3	13%	10%
4 or 5	16%	12%
6 or more	15%	10%

After the researchers adjusted for smoking and other factors, they found a remarkably strong association between coffee drinking and survival.¹ In other words, the more coffee the subjects drank; the less likely they were to die. You can see just how powerful this association was by looking at table ¹.

That risk reduction applied to what epidemiologists call "all-cause mortality," that is, coffee drinking was associated with a markedly lower risk of dying for any reason at all. A closer look at the data revealed another fascinating fact, one that previous studies had already hinted at.¹³⁻¹⁵ The



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survival association with coffee drinking and death applied to the risk of dying from specific diseases, including heart and lung disease, stroke, diabetes, and infections. It even applied to the risk of dying from injuries and accidents.¹

The protective effect of coffee drinking was evident whether subjects drank caffeinated or decaffeinated coffee.¹⁴

Caffeine, then, was not the protective component of coffee. Let's look at what else coffee contains that might explain its life-saving effects.

Coffee Polyphenols Have Multi-targeted Impact

In addition to caffeine, natural coffee beans contain more than 1,000 different compounds that could affect health and the risk of dying.³ Of those, the polyphenols are the best candidates, for several reasons.

Polyphenols are powerful antioxidants, with all the health benefits that implies. But polyphenols have other, more complex actions, including the surprising ability to modulate gene expression, regulating how much and how often a particular gene is "switched on."¹⁶⁻¹⁸ That means that polyphenols regulate many of a cell's most fundamental processes, including signaling that tells cells when to die, when to replicate, when to release or respond to other chemical signals, and so on.^{17,19}

The net effects of this impact on cellular signaling include improvements in tissue repair, immunity, and the body's ability to maintain itself in a steady state, called homeostasis.^{17,19} Impaired cellular signaling has been implicated in causing cancer, type 2 diabetes, and the risks for heart disease and stroke.²⁰

One polyphenol in particular, **chlorogenic acid**, is especially abundant in coffee, and is credited with providing many of its beneficial effects. Green coffee beans may possess up to 10% of dry weight chlorogenic acids making coffee the major source of chlorogenic acid in the diet.²¹ Along with other polyphenols, chlorogenic acid helps drive down the chronic inflammation that's associated with common diseases of aging, such as diabetes and atherosclerosis.⁶ Chlorogenic acid derivatives in roasted coffee protect cells with high fat content, like brain cells, helping to explain observations that coffee sustains cognition.⁷

Studies show that other coffee polyphenols beneficially influence the function of liver and fat cells, helping to reduce the impact of obesity and diabetes.⁸ A reduction in damage to DNA is the likely mechanism by which coffee consumption may lower your risk for cancer.⁹⁻¹¹ Coffee is the single largest source of those beneficial polyphenols and other antioxidants in our diets.²¹ On average, Americans who drink coffee consume 3.1 cups of coffee

per day.²²

But studies of benefits from coffee drinking consistently show that larger amounts, ranging from 4 to as many as 12 cups a day, provide the most protective benefits, reducing the risk of cardiovascular disease, cancer, diabetes, liver disease, and Alzheimer's disease.^{2,23-35}

It's obviously hard to drink that much coffee, and many people develop unpleasant, though not dangerous, side effects, such as heart palpitations and upset stomachs, if they try to consume that much. You will read about a new technique for retaining polyphenol content in both decaffeinated and regular coffee.

Let's now look at the many ways in which high coffee consumption is being linked to reduced risk of specific diseases.

What You Need to Know: Drinking Coffee Reduces Risk of Death and Age-Related Disease

- Despite long-held misconceptions, coffee drinking has major beneficial health effects.
- A recent massive study showed a 10-15% reduction in the risk of dying among people who consumed 6 or more cups of coffee daily. Coffee drinking sharply lowers the risk of developing many chronic, age-related conditions, including cognitive decline, cancer, diabetes, and cardiovascular disease.
- The newly discovered bioactive components in coffee are polyphenols, especially chlorogenic acid.
- But standard processing destroys much of the polyphenol content.
- An improved, patented method for handling coffee prior to roasting can boost the beverage's content of chlorogenic acid and other polyphenols by more than 200%, potentially reducing the number of daily cups required to achieve optimum health.

Coffee Benefits Your Brain

"Coffee consumption has been associated with benefits involving cognitive function in aging. For example, in one study of 676 individuals with an average age of about 75 years, coffee consumption was associated with significantly less cognitive decline over a 10-year time period. Furthermore, the least cognitive decline was observed with 3 cups of coffee per day, which was associated with a remarkable **4.3-times** smaller level of decline in cognitive function compared with non-consumers of coffee (P<0.001)."³⁶

Enriching coffee with polyphenols, especially chlorogenic acid, produces still greater benefits. Such innovative coffees are more neuroprotective even than green coffee, according to laboratory studies. One study showed green coffee increased brain cell survival by an impressive **78%**

in the face of severe oxidant stress, but a roasted coffee rich in chlorogenic acid derivatives produced a **203%** increase in survival.⁷

A chlorogenic acid-enriched decaffeinated coffee improved mood and attention in a pilot study of 39 healthy older people, compared with standard decaf coffee. A non-decaffeinated roast of similar formulation showed even more powerful effects.³⁷



These benefits are likely to be of special importance in the face of the growing epidemic of Alzheimer's disease and other neurodegenerative conditions. More than **40%** of people over 84 will be stricken by Alzheimer's disease, according to recent estimates.³⁸ Moderate levels of daily coffee consumption, 3-5 cups per day, are tied to reduced rates of Alzheimer's disease and other forms of dementia in older adults.^{35, 39, 40}

Of special interest, animal studies now provide evidence that caffeinated coffee consumption (greater than about 5 cups per day in a human), not only protect against brain damage in Alzheimer's disease, but can even reverse some of that damage-in as little as 5 weeks.³⁴

Some insight into how coffee attains its protection against Alzheimer's comes from studies of the "Alzheimer's protein" called **Abeta**. Caffeine, at levels comparable to 5 cups of coffee daily, reduces levels of the proteins that go into manufacture of Abeta, and lowers levels of Abeta itself in blood and brain tissue.^{34,41}

There is a well-established relationship between high coffee intake and protection from Parkinson's disease as well. People who drink one to four cups of coffee daily experience **47%** lower risk of the disease than those who drink none, and those who drink five or more cups have a **60%** risk reduction.⁴²

Coffee May Cut Cancer Risk

Coffee, especially brews enriched with chlorogenic acid, protect cells against the DNA damage that leads to aging and cancer development.⁹⁻¹¹ That explains in part the findings from large epidemiological studies linking coffee consumption to lower risk for several cancer types.^{27,43-47}

Women with the highest coffee intake are about **30%** less likely to develop endometrial cancer than those who consume none.⁴⁴ Some studies show an enhanced effect among obese women.^{43,46}

Breast cancer, the second leading cause of cancer death among American women, appears to be responsive to

coffee consumption. A **57%** reduction in the risk of estrogen-receptor negative (ER-negative, high risk) breast cancers was shown among women who drank 5 or more cups of coffee daily.²⁷ Chlorogenic acid and other polyphenols, according to lab studies, are the likely beneficial agents in such cancers.⁴⁷

Men also receive important cancer protection from coffee. While prostate cancer is the second leading cause of cancer death in men,⁴⁸ consumption of more than 6 cups of coffee per day is associated with an **18%** reduction in risk for the disease, and a **60%** reduction in risk of aggressive or fatal cancers.²⁶

"Heavy" coffee drinking has been associated in multiple studies with as much as a 57% reduced incidence of colon cancers.⁴⁹⁻⁵³ Coffee and its constituents target specific cancer cell signaling systems to suppress colon cancer formation and metastasis.⁴⁵

Cancers elsewhere in the digestive system are reduced by coffee consumption. A mere one cup daily was associated with at least a **42%** reduction in risk of developing liver cancer- even for those with confounding risk factors such as hepatitis C infection.^{28,54-56} Additionally, consuming at least one cup per day of coffee reduced the risk of death due to liver cancer by **50%** compared to non drinkers.⁵⁷ And more than 3 cups produced a **40%** reduction in the risk of cancers of the mouth, throat, and esophagus.^{58, 59}

New Polyphenol-Retaining Coffees Boost Health Benefits

Green, unroasted coffee beans are extremely rich in the polyphenols, especially chlorogenic acid, that improve health. But prior to consumption as brewed coffee, the beans are roasted at high temperatures (375 to 425 degrees Fahrenheit).

These extreme temperatures destroy an enormous amount of the beneficial polyphenols, leaving standard supermarket coffee substantially less healthful than it could be.

A new, patented technique has recently been developed that preserves much of the green coffee bean's original polyphenol content. Under controlled conditions, the manufacturer first soaks green coffee beans in water, then drains them before roasting.

Soaking the beans before roasting allows the manufacturer to "capture" the polyphenols at room temperature before the beans are exposed to hightemperature roasting. When the beans are "quenched" after roasting by being dropped back into the polyphenol-rich water, much of their original polyphenol content is "rescued."¹²

The result of this simple process is a roasted coffee bean with all the flavor and richness of regular coffee, but with a

substantial increase in its content of polyphenols, especially chlorogenic acid. In fact, the final brewed beverage has been found to contain as much as an **80%** increase in polyphenols overall, with an astonishing **200%** increase in chlorogenic acid content.¹²

What's the advantage of this extra step? Studies show that, for maximum health benefit, you need to drink 4 to 12 cups of conventional coffee daily.^{2,23-35} That's a lot of coffee for many people, and consumption at that level may induce undesirable effects. These newer "polyphenol-retaining" coffees, with twice the chlorogenic acid content, could deliver similar benefits in only half the number of cups.

Coffee Consumption Slashes Diabetes Risk

Large reductions in the occurrence of type 2 diabetes are associated with higher coffee consumption.²¹ If you aren't already diabetic, you may be able to cut your risk by an impressive **67%** by drinking larger amounts of coffee.⁶⁰

How much more coffee? A large, combined study of data on more than 450,000 people showed that each additional daily cup reduced diabetes risk by **7%**.²⁹ Other studies support this finding with reductions of **13%** for one cup/day, **47%** for 4 cups/day, and **67%** for 12 cups/day.^{60, 61}



Even if you do have diabetes, coffee is likely to be beneficial.

Chlorogenic acid, coffee's primary polyphenol, inhibits uptake of sugar from the intestine, reducing blood sugar levels.⁶² By inhibiting several enzymes in the sugar-regulating system, chlorogenic acid reduces production and release of new glucose into the bloodstream.^{63, 64}

Of special importance, coffee's chlorogenic acid can cut the after-meal glucose surge that's known to increase diabetics' (and others') cardiovascular risks.^{63,64} Other components in coffee enhance this effect by reducing carbohydrate storage and improving insulin sensitivity.⁶⁵

Coffee Consumption Protects Against Cardiovascular Disease

Three Coffees a Day May Ward Off Dementia

A study in the Journal of Alzheimer's Disease reports that drinking coffee may help at-risk adults over age 65 fend off Alzheimer's disease due to the elevated blood caffeine levels.⁷³

The study involved 124 patients between the ages of 65 and 88 who displayed mild cognitive impairment, which can be interpreted as an early sign of Alzheimer's. No patients

with blood caffeine levels above **1,200 ng/mL** developed the disease over a 2-4 year period, even though the scientists expected many of the participants to develop the disease within a few years. The major or only source of caffeine for the participants was coffee.

The lead author of the study, Chuanhai Cao, stated, "The results from this study, along with our earlier studies on Alzheimer's in mice, are very consistent in indicating that moderate daily caffeine/coffee intake throughout adulthood should appreciably protect against Alzheimer's disease later in life."

The scientists are careful to point out that coffee consumption will not completely protect people from Alzheimer's, but they firmly believe moderate coffee consumption can reduce a person's risk of Alzheimer's or delay its onset.

Coffee was long thought to increase the risks for high blood pressure and cardiovascular disease, but like everything else related to coffee, this has changed abruptly in recent years.

The "secret ingredient," not surprisingly, turns out to be **chlorogenic acid**. This compound, which can be increased in enriched coffees improves endothelial function and increases availability of artery-relaxing nitric oxide, which reduces any blood pressure increase triggered by caffeine.⁶⁶ In 2011, a large combination study concluded that there's no correlation between long-term coffee consumption and increased blood pressure or cardiovascular disease.⁶⁷

The beneficial effects of chlorogenic acid (and other coffee components) are evident from large observational studies. Deaths from cardiovascular disease overall, and from coronary heart disease and stroke, are all significantly reduced by coffee consumption.^{68,69} Table 2 shows results from one such study of diabetics, who are at especially high risk. Again, the risk reduction seems to be "dose-dependent," meaning that up to a point, the more coffee you drink, the lower your risk.

But there's an important caveat.

If you look at both tables 1 and 2, you'll see that the optimum risk reduction occurs mainly in people who drink somewhere around 4 to 6 cups daily. That makes the newer "polyphenol-retaining" coffees all the more attractive, because they can deliver a much more substantial polyphenol "punch" per cup, potentially avoiding any downside risk associated with very high total consumption.

Studies show a **33%** reduction in the risk of dangerous blood clots that can travel from veins to the lungs or brain with devastating consequences.⁷⁰ And just one cup of coffee can reduce the risk of clots in general, by inhibiting platelet aggregation (stickiness) within an hour.⁷¹

The mechanisms by which coffee consumption reduces cardiovascular disease are many and diverse. Polyphenols found in coffee enhance cholesterol outflow from arterial wall cells, reducing the risk of plaque formation and subsequent heart attack or stroke.⁹

Coffee extracts rich in polyphenols combat the dangerous structural changes in heart and liver associated with the metabolic syndrome, as they improve glucose tolerance, reduce blood pressure, and impede development of fatty liver disease.⁷²

Summary

After years of suspecting coffee of having negative impacts on health, scientists have now concluded that it has remarkable health benefits. Most strikingly, a recent study demonstrated sharp reductions in the risks of dying from any cause, in direct proportion to the amount of coffee consumed. This study comes on the heels of numerous others that demonstrate reduced risk of dying from specific diseases such as heart disease, stroke, cancer, diabetes, and neurodegenerative disorders.

Detailed analysis of coffee's many components reveals that polyphenols, especially **chlorogenic acid**, are the main contributors to coffee's beneficial effects.

Since conventional roasting processes readily destroy these compounds, it's important to seek out coffees that retain the maximum amount of polyphenol content. That way, you can enhance your health without the over consumption of coffee. Those who cannot tolerate coffee should consider taking **200 to 400 mg** of standardized chlorogenic acid supplement before most meals.

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