

# Can Green Tea Naturally Lower Blood Pressure?

By [Dr. Joseph Mercola](#)

Theme: [Science and Medicine](#)

Global Research, January 04, 2024

[Mercola](#)

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*EGCG may be helpful for the prevention of arteriosclerosis, cerebral thrombus, heart attack and stroke — in part due to its ability to relax your arteries and improve blood flow*

*Green tea, consumed either in the form of a beverage or extract for two weeks or more, significantly lowers systolic blood pressure and diastolic blood pressure*

*A meta-analysis involving 25 randomized controlled trials also concluded that long-term tea intake — defined as 12 weeks or more — significantly improved blood pressure*

*Drinking about 0.5 to 2.5 cups of green tea daily for at least one year reduced the risk of developing high blood pressure by 46%, while those consuming more than 2.5 cups reduced their risk by 65%*

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Sipping high-quality green tea is a viable strategy to give your heart health a boost, including helping to lower your blood pressure naturally. After water, tea is the most consumed beverage in the world,<sup>1</sup> while cardiovascular diseases represent the No. 1 cause of death globally.<sup>2</sup>

High blood pressure, meanwhile, is a top contributor to cardiovascular events, contributing

to 7 million deaths every year. Further, nearly 50% of ischemic heart disease cases and 60% of strokes are linked with elevated blood pressure.<sup>3</sup>

Yet, even a small reduction in blood pressure may reduce the risk of coronary heart disease and stroke, according to scientists with Tongji Medical College in China. Green tea, then, which can help lower blood pressure,<sup>4</sup> could have a significant impact on public health worldwide.

## **Polyphenols in Green Tea Responsible for Blood Pressure Lowering Effects**

Green tea, which comes from the *Camellia sinensis* plant, contains a wealth of beneficial polyphenols, including the catechins epigallocatechin gallate (EGCG), epicatechin gallate, epigallocatechin and epicatechin.<sup>5</sup>

Polyphenols help protect plants from ultraviolet light, pathogens,<sup>6</sup> oxidative damage and harsh climates. With more than 8,000 polyphenols identified to date, consuming foods and beverages rich in polyphenols may help ward off both acute and chronic diseases, including cardiovascular and neurodegenerative diseases, cancer,<sup>7</sup> Type 2 diabetes and obesity.<sup>8</sup>

While polyphenols are best known for their anti-inflammatory and antioxidant effects, they affect multiple physiological processes related to enzyme activity, cell proliferation, signaling pathways and more.<sup>9</sup> Among the 8,000-plus known polyphenols, more than 4,000 are flavonoids.<sup>10</sup> Among them are the catechins abundant in green tea.

Catechins have anticancer effects that may help prevent lung, breast, esophageal, stomach, liver and prostate cancers,<sup>11</sup> along with anti-inflammatory and antioxidant properties.

Researchers at the University of Leeds and Lancaster University found the EGCG in green tea can help prevent heart disease by dissolving arterial plaque.<sup>12</sup> Other research suggests this compound also has the ability to inhibit amyloid beta plaque formation in the brain, which is associated with Alzheimer's disease.<sup>13</sup>

In regard to blood pressure, however, polyphenols in green tea help to lower it in numerous ways. EGCG may be helpful for the prevention of arteriosclerosis, cerebral thrombus, heart attack and stroke — in part due to its ability to relax your arteries and improve blood flow.<sup>14</sup>

The Tongji Medical College researchers explained:<sup>15</sup>

“In vitro studies have shown that green tea catechins exert a cardioprotective effect through multiple mechanisms, including the inhibition of oxidation, vascular inflammation, and thrombogenesis, as well as the improvement of endothelial dysfunction. Animal studies have also revealed that green tea catechins influence nitric oxide production and vasodilation, thereby improving endothelial dysfunction and hypertension in rodents.”

## Green Tea Significantly Reduces Blood Pressure

A meta-analysis of 24 randomized placebo-controlled trials assessed the effects of green tea supplementation on blood pressure.<sup>16</sup> Green tea, consumed either in the form of a beverage or extract for two weeks or more, significantly lowered systolic blood pressure and diastolic blood pressure.

The effects may have been most pronounced in people with high-normal blood pressure, high blood pressure or other cardiovascular disease risks. The study authors believe that the antihypertensive benefits are related to the numerous biological activities of green tea catechins. These include:<sup>17</sup>

- Increasing the concentration of nitric oxide in the plasma, which may inhibit proinflammatory cytokines and platelet aggregation, while improving endothelial dysfunction. In endothelial dysfunction, large blood vessels on the heart's surface become narrower instead of dilating<sup>18</sup>
- Anti-inflammatory effects, including suppressing inflammatory factors like cytokines, nuclear factor-kappa B and adhesion molecules
- Suppressing the contractile response, resulting in vasodilation and reduction in blood pressure

A previous meta-analysis involving 25 randomized controlled trials similarly concluded that long-term tea intake — defined as 12 weeks or more — significantly improved blood pressure.<sup>19</sup> Green tea significantly reduced systolic blood pressure by 2.1 mmHg and decreased diastolic blood pressure by 1.7 mmHg. While black tea also reduced blood pressure, green tea's effects were more pronounced.

A subgroup analyses of those who consumed tea for more than 12 weeks found systolic blood pressure decreased by 2.6 mmHg, which could “reduce stroke risk by 8 %, coronary artery disease mortality by 5% and all-cause mortality by 4% at a population level,” according to the study.<sup>20</sup> “These are profound effects and must be considered seriously in terms of the potential for dietary modification to modulate the risk of CVD [cardiovascular disease].”

The team suggested that the benefits may be due to factors other than an increase in the bioavailability of nitric oxide, stating:<sup>21</sup>

“The BP-lowering effect of tea may be associated with its antioxidant properties and endothelial protection. Tea and their flavonoids could act as antioxidants by scavenging reactive oxygen species and nitrogen species, and chelating redox-active transition metal ions.

... Tea intake has been reported to have various beneficial effects on vascular function, such as anti-inflammatory effects, anti-platelet effects and anti-proliferative effects. Thus, these effects may also be involved in potential mechanisms underlying the benefits of tea intake on BP.”

## How Much Green Tea Is Beneficial?

Studies vary on the exact amount of tea to consume for heart and blood pressure health. Among Japanese adults, one study found consuming three to five cups of green tea daily led to a 41% lower risk of mortality from cardiovascular disease compared with not drinking green tea.<sup>22</sup>

Other research suggests seven cups a day or more of green tea reduces the risk of all-cause mortality among people with a history of stroke by 62% and people with a history of heart attack by 53%.<sup>23</sup>

Meanwhile, among people with high-normal blood pressure, five to six cups of green tea daily was associated with a borderline reduced risk of cardiovascular disease mortality, as was one to two cups of green tea daily among people with optimal or normal blood pressure.<sup>24</sup>

A population-based study of more than 40,000 people in Japan also found that drinking more than two cups of green tea per day reduced their risk of cardiovascular disease mortality by up to 33% compared to those who drank less than half a cup.

Yet another study found drinking 120 to 599 milliliters (ml) — about 0.5 to 2.5 cups — of green tea daily for at least one year reduced the risk of developing high blood pressure by 46%, while those consuming more than 2.5 cups reduced their risk by 65% compared to those who consumed less than 0.5 cups.<sup>25</sup>

## What Else Is Green Tea Good For?

The tea plant *Camellia sinensis* has been used medicinally for thousands of years, and its polyphenolic compounds may affect glucose metabolism and insulin signaling, along with a host of additional benefits. For instance, tea, particularly green tea, has been linked with a reduced risk of stroke, diabetes and depression, and improved abdominal obesity and glucose levels.<sup>26</sup>

In animal studies, EGCG enhanced glucose homeostasis and enhanced wound healing in diabetic mice.<sup>27</sup> EGCG also alleviates insulin resistance, suppresses oxidative stress and regulates mitochondrial function.<sup>28</sup>

A meta-analysis of 17 trials further revealed that in patients with obesity, Type 2 diabetes or high blood pressure, drinking green tea led to reduced levels of fasting glucose, HbA1c and fasting insulin.<sup>29</sup> Green tea may also influence diabetes via its effects on adiponectin and more:<sup>30</sup>

“Adiponectin, the key component in the interrelationship between adiposity, insulin resistance, and inflammation, is inversely proportional to the incidence of diabetes in different populations. In a meta-analysis, supplementing green tea was reported to increase the adiponectin concentrations in patients with T2DM, thereby reducing the possibility of diabetes.

Green tea catechins have been shown to actively modulate the activity or expression of several receptors and enzymes involved in the absorption, metabolism transport, and synthesis of carbohydrates.

... Green tea and its constituents have been reported to positively improve several physiological parameters in clinical subjects with diabetes, such as body weight, body mass index, body fat, and lipid profile, thereby improving living conditions.”

Aside from diabetes, these compounds have anticancer effects that may help prevent lung, breast, esophageal, stomach, liver and prostate cancers,<sup>31</sup> along with anti-inflammatory and antioxidant properties.

## How to Choose High-Quality Tea

Green tea is among the least processed kinds of tea, which is why it contains some of the highest amounts of EGCG and antioxidants. Unlike other teas that you steep and strain, Matcha tea comes in the form of a powder that you add right into the water.

Matcha tea contains 10 times more bioactive compounds and polyphenols than conventional green tea,<sup>32</sup> since you're consuming the entire ground tea leaf. However, in terms of EGCG, research shows drinking matcha provides 137 times more than drinking another popular green tea called China green tips.<sup>33</sup>

Besides being an excellent source of antioxidants, green tea is also packed with vitamins A, D, E, C, B, B5, H and K, manganese and other beneficial minerals such as zinc, chromium and selenium. A telltale sign of high quality is that the tea is in fact green. If your green tea looks brown rather than green, it's likely been oxidized, which can damage or destroy many of its most valuable compounds.

To boost the benefits of green tea, add a squirt of lemon juice to your cup. Previous research has demonstrated that vitamin C significantly increases the amount of catechins available for your body to absorb. In fact, citrus juice increased available catechin levels by more than five times, causing 80% of tea's catechins to remain bioavailable.<sup>34,35</sup>

Choosing loose-leaf tea is also preferable to tea bags, as the bags may be made with heat-resistant polypropylene to prevent the bag from breaking apart in hot water. This means tiny pieces of plastic likely end up in your drink.

Paper tea bags are treated with epichlorohydrin, a chemical to prevent tears, which has been found to be a probable human carcinogen. Epichlorohydrin reacts with water to form 3-MCPD, another possible human carcinogen.

One study found that tea drinkers' daily intake of epichlorohydrin was 55.37 times greater in those using bagged teas than in those using loose teas.<sup>36</sup> Rinsing the tea bags, and not steeping for more than two minutes, may decrease some of the exposure, but using loose-leaf tea or matcha powder may provide an overall healthier choice.

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## Notes

<sup>1</sup> [Tea Association of the U.S.A.](#)

<sup>2</sup> [World Health Organization, Cardiovascular diseases](#)

<sup>3, 5, 15</sup> [Medicine \(Baltimore\). 2020 Feb; 99\(6\): e19047., Intro](#)

<sup>4, 16</sup> [Medicine \(Baltimore\). 2020 Feb; 99\(6\): e19047](#)

<sup>6</sup> [Oxid Med Cell Longev. 2009 Nov-Dec; 2\(5\): 270–278. doi: 10.4161/oxim.2.5.9498, Abstract](#)

<sup>7</sup> [Nutrients. 2010 Dec; 2\(12\): 1231–1246., Intro](#)

<sup>8</sup> [Front. Nutr., 21 September 2018](#)

<sup>9</sup> [Crit Rev Food Sci Nutr. 2020;60\(4\):626-659. doi: 10.1080/10408398.2018.1546669. Epub 2019 Jan 7](#)

<sup>10</sup> [Nutrients. 2010 Dec; 2\(12\): 1231–1246., 2. Classification of Polyphenols](#)

<sup>11, 31</sup> [Int J Mol Sci. 2020 Mar; 21\(5\): 1744](#)

<sup>12</sup> [Journal of Biological Chemistry May 31, 2018, doi: 10.1074/jbc.RA118.002038](#)

<sup>13</sup> [Infectious Agents and Cancer 2017; 12: 36](#)

<sup>14</sup> [Eur J of Cardiovascular Prevention & Rehabilitation, June 2008, 15\(3\):300-305](#)

<sup>17</sup> [Medicine \(Baltimore\). 2020 Feb; 99\(6\): e19047., Discussion](#)

<sup>18</sup> [Stanford Medicine, Endothelial Dysfunction](#)

<sup>19</sup> [British Journal of Nutrition August 19, 2014](#)

<sup>20, 21</sup> [British Journal of Nutrition August 19, 2014, Discussion](#)

<sup>22</sup> [Stroke. 2021 Mar; 52\(3\): 957–965](#)

<sup>23</sup> [JAHA December 21, 2022, Clinical Perspective](#)

<sup>24</sup> [JAHA December 21, 2022, Risk of Cardiovascular Disease Mortality According to Green Tea Consumption](#)

- <sup>25</sup> [Curr Med Chem. 2008; 15\(18\): 1840–1850., Intro](#)
- <sup>26</sup> [Curr Opin Clin Nutr Metab Care. 2013 Nov;16\(6\):688-97](#)
- <sup>27, 28</sup> [Nutrients. 2019 Jan; 11\(1\): 39., 6.4](#)
- <sup>29</sup> [Nutrients. 2023 Jan; 15\(1\): 37., 2.1](#)
- <sup>30</sup> [Nutrients. 2023 Jan; 15\(1\): 37., 2.1, 2.2](#)
- <sup>32</sup> [Appl. Sci. 2021, 11\(11\), 5087; doi: 10.3390/app11115087](#)
- <sup>33</sup> [Journal of Chromatography A September 5, 2003, Volume 1011, Issues 1-2, Pages 173-180](#)
- <sup>34</sup> [Purdue University November 13, 2007](#)
- <sup>35</sup> [Molecular Nutrition & Food Research September 13, 2007](#)
- <sup>36</sup> [Journal of Food Science and Technology December 6, 2022](#)

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