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Can This Unique Raspberry Protect Your Heart?

Analysis by Dr. Joseph Mercola | February 01, 2024

STORY AT-A-GLANCE

- Your endothelium is the collective group of cells that line your blood vessels, representing about 1% of your body mass and a surface area of 5,000 square meters
- The endothelium is directly involved in a number of diseases, including heart disease, diabetes and chronic kidney failure
- Black raspberry decreases markers of inflammation and improves endothelial function, reducing risk factors of cardiovascular disease
- Drinking green tea is associated with an increase in flow-mediated dilation (FMD) of the brachial artery, a measure of endothelium function
- Pomegranate, grape seed extract and garlic are other natural compounds that support endothelial health

Your endothelium is the collective group of cells that line your blood vessels. Representing about 1% of your body mass and a surface area of 5,000 square meters, the endothelium has been described as a "multifunctional endocrine organ strategically placed between the vessel wall and the circulating blood."[1]

To put this into perspective, a single layer of endothelial cells lines the inner surface of your entire vascular system, separating your blood from the vessel wall. This "tissue-blood barrier" is semipermeable and plays a key role in regulating the transfer of molecules as well as vascular homeostasis.[2]

While endothelial dysfunction — an early sign of atherosclerosis[3] — is a hallmark of many diseases, including cardiovascular disease, there are a host of natural options to protect your endothelium and keep it healthy.

The Role of Your Endothelium on Overall Health

While once regarded as a simple barrier, the endothelium is now regarded as a dynamic endocrine organ that has a major influence on human health. In the International Journal of Biological Sciences, it's noted:[4]

> *"The endothelium was once thought of as the 'cellophane wrapper' of the vascular tree, with no other specific functions than affording selective permeability to water and electrolytes. However, enormous advances since the 1980's have led to an understanding of the complex functions of this large endocrine organ. Vascular endothelial cells line the entire circulatory system, from the heart to the smallest capillaries.*
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> *These cells have very distinct and unique functions that are paramount to vascular biology. These functions include fluid filtration, such as in the glomeruli of the kidneys, blood vessel tone, hemostasis, neutrophil recruitment, and hormone trafficking."*

In addition to serving as a physical barrier, endothelial cells metabolize, synthesize and release vasoactive and other compounds that affect vascular tone, blood pressure, blood flow, coagulation, fibrinolysis, inflammation, immunological reactions and more.

"Any perturbation affecting the capacity and equilibrium of the endothelium as a physical barrier and to metabolize, synthesize and release these substances will cause endothelial dysfunction, which contributes to the development and progression of cardiovascular diseases," according to a review in the World Journal of Cardiology.[5] Further, the endothelium is directly involved in a number of diseases, including:[6]

Peripheral vascular disease	Stroke	Heart disease
Diabetes	Insulin resistance	Chronic kidney failure
Tumor growth and metastasis	Venous thrombosis	Viral infectious diseases

Black Raspberry and Other Natural Options for Endothelial Health

A healthy lifestyle, including diet and exercise, supports endothelial function,[7] but so, too, do a variety of substances from nature.

Black raspberry — Anthocyanins, the most abundant flavonoids in black raspberries, have anti-inflammatory and anti-angiogenic effects, meaning they help prevent angiogenesis, which may promote cancer. In human intestinal microvascular endothelial cells and human esophageal microvascular endothelial cells, black raspberry extract had both anti-angiogenic and anti-inflammatory effects.[8]

In a study on patients with metabolic syndrome, black raspberry also increased circulating endothelial progenitor cells (EPCs) and improved cardiovascular risks after 12 weeks.[9] Separate research, also on people with metabolic syndrome, similarly revealed that black raspberry significantly decreased inflammatory cytokines, improving vascular endothelial function.[10]

Animal studies also suggest that black raspberry decreases markers of inflammation and improves endothelial function, reducing risk factors of cardiovascular disease.[11] Flavonoids like those in black raspberries even alleviate the vascular endothelial barrier dysfunction that's induced by advanced glycation end products.[12]

It's believed that metabolism of flavonoids is involved in their beneficial role in cardiovascular health, as metabolism increases flavonoids' vascular efficacy,

"resulting in a diversity of structures of varying bioactivity in human endothelial cells."[13]

Green tea — Drinking green tea is associated with an increase in flow-mediated dilation (FMD) of the brachial artery, a measure of endothelium function. "The beneficial effect of green tea on endothelial function may be attributed to its high flavonoid content.

As has been shown, epigallocatechin gallate, a major catechin in tea, acutely improves endothelial function in humans with coronary artery disease," researchers explained in the European Journal of Preventive Cardiology.[14]

Green tea also increases nitric oxide production by endothelial cells and may boost vascular function via anti-inflammatory pathways. According to the European Journal of Preventive Cardiology scientists:[15]

> *"Endothelial function is of paramount importance for the proper function of the cardiovascular system, and its dysfunction is a key event in the progression of atherosclerosis. The beneficial effect of green tea on cardiovascular risk could partly be explained by the improvement of endothelial dysfunction … green tea has an acute beneficial effect on endothelial function in healthy individuals."*

Green tea is also a rich source of quercetin. In one study of 30 men with coronary heart disease, consuming quercetin-rich polyphenol extract led to an increase in flow-mediated dilation of arteries, signaling improved endothelial health.[16] It also inhibits platelet aggregation and has vasorelaxant properties that help lower blood pressure and prevent cardiac hypertrophy, in which the heart muscles thickens.

Black chokeberry — Black chokeberry (Aronia melanocarpa), known for its astringent berries, is another concentrated source of beneficial phenolic compounds, including proanthocyanidins, flavanols, anthocyanins, flavonoids and chlorogenic and caffeic acids.[17]

Black chokeberry extracts significantly induce endothelial cells nitric oxide (NO) production, even at relatively low concentrations. NO plays an important role in vascular function and endothelial cell dysfunction may impair NO production, increasing the risk of cardiovascular diseases. Writing in the Journal of Food Biochemistry, researchers explained:[18]

> *"These in vitro results may be translated into potential future clinical applications where Aronia extracts may be used for prevention and coadjuvant treatment of cardiovascular diseases via increases in endothelial NO synthesis and related improvements in vascular functions."*

Grape seed extract — Grape seed extract contains antioxidant proanthocyanidins, a type of polyphenol that may also benefit endothelial function, thereby protecting heart health. Writing in the journal Nutrients, scientists from Tokyo Medical and Dental University noted:[19]

> *"Over recent decades, endothelial function impairment has been shown to play a key role in the early stages of atherosclerosis, linking cardiovascular risk factors, such as hypertension, dyslipidemia, diabetes mellitus, and chronic smoking, to endothelial dysfunction.*
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> *Nitric oxide (NO), an endothelium-dependent relaxing factor, also plays a central role in BP [blood pressure] control. Therefore, the preservation of normal endothelial function and regulation of BP are crucial to preventing progression to CVDs."*

In the study of middle-aged adults with prehypertension, participants received either low-dose or high-dose grape seed proanthocyanidin extract or a placebo for 12 weeks. Grape seed extract improved vascular elasticity, while high-dose grape seed extract also decreased blood pressure.[20]

Pomegranate — Due to its high polyphenol content, pomegranate acts against oxidative stress and is useful for endothelial dysfunction. Pomegranate contains

antihypertensive, antiatherogenic, antihyperglycemic and anti-inflammatory compounds that protect heart health by improving endothelial function.

In describing its protective role in endothelial dysfunction, researchers with Federal University of Espirito Santo in Vitoria, Brazil, explained:[21]

> *"We have shown that pomegranate, or rather its components (e.g., tannins, flavonoids, phytoestrogens, anthocyanins, alkaloids, etc.), have beneficial effects on the cardiovascular system, improving parameters such as oxidative stress and the enzymatic antioxidant system, reducing reactive oxygen species formation and acting in an anti-inflammatory way."*

Many of pomegranate's — known as "the jewel of autumn" — beneficial polyphenols are stored in the peel, which is why pomegranate peel powder is one of my favorite supplements.

Research shows pomegranate peel contains more than twice the amounts of antioxidants — specifically phenolics, flavonoids and proanthocyanidins — than the pulp, for instance, and has been shown to protect low-density lipoprotein against oxidation to a far greater degree than pulp.[22,23]

Other research found polyphenol-rich pomegranate peel extract improved endothelial dysfunction in mice by modulating gut microbiota.[24]

Garlic — Garlic is a powerful antioxidant that may help fight reactive oxygen species (ROS) in your body. In one study, aged garlic extract reduced ROS, helping to prevent endothelial dysfunction.[25] Garlic's therapeutic properties may act synergistically to support heart health and protect against heart-related events like heart attack.

Aged garlic extract supplementation may increase microcirculation, helping to prevent the atherosclerotic process, while a garlic-herb preparation blocked atherosclerosis progression 1.5-fold in postmenopausal women, with the benefit lasting for 12 months.[26] Further, according to a review published in the journal Antioxidants:

> *"Based on current research, garlic can significantly reduce the risk of atherosclerosis, hypertension, diabetes, hyperlipidemia, myocardial infarction, and ischemic stroke, thanks to the synergistic effects of its nutritional and phytochemical components.*
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> *For example, atherosclerosis and vascular inflammation are usually accompanied with oxidative stress, endothelial dysfunction, and inflammatory cytokines. From a dietary approach, garlic has the potential role in the prevention and treatment of atherosclerosis and myocardial infarction."*

Among garlic's protective effects is the ability to lower blood pressure levels. **Aged black garlic** (ABG), which contains more antioxidants than raw garlic,[27] may be particularly beneficial. While it's unknown exactly how garlic may lower blood pressure, scientists noted that ABG extract helps improve vasodilation and levels of endothelial nitric oxide synthase (eNOS), among other benefits.[28]

Fibrinolytic enzymes — The connection between enzymes and the endothelium was highlighted during the COVID-19 pandemic. Studies suggested damage to the endothelium contributed to the development of blood clots, or thrombosis, in the blood vessels of severely ill COVID-19 patients.[29]

When physicians at the Yale School of Medicine began running clotting tests on their patients,[30] levels of Von Willebrand factor (VWF), a clotting protein released by endothelial cells, were found to be significantly elevated, which suggested that damaged endothelial cells may be releasing large quantities of VWF, leading to clots.[31]

"Our findings show that endotheliopathy is present in COVID-19 and is likely to be associated with critical illness and death. Early identification of endotheliopathy and strategies to mitigate its progression might improve outcomes in COVID-19," the researchers concluded.[32]

Under healthy conditions, blood cells can pass through the endothelium lining blood vessels, but when exposed to viral infections and other inflammatory agents, the

endothelium becomes sticky and releases VWF. The end result is a cascade of clotting and inflammation, both characteristics of severe COVID-19.

In the European Heart Journal it's stated, "COVID-19, particularly in the later complicated stages, represents an endothelial disease."[33] This is where enzymes come in. One study reported three case studies of patients with severe COVID–19 respiratory failure who were treated with tissue plasminogen activator (tPA), a serine protease enzyme found on endothelial cells that's involved in fibrinolysis, or the breakdown of blood clots.[34] All three patients benefitted from the treatment.

Beyond COVID-19, another study involved 1,062 people with mild hyperlipidemia and/or mild atherosclerosis. They took the fibrinolytic enzyme nattokinase, which "effectively managed the progression of atherosclerosis and hyperlipidemia with a significant improvement in the lipid profile."[35]

Significant reduction in carotid artery intima-media thickness, a measure of the extent of arterial thickening related to endothelial dysfunction, was noted, with improvement rates ranging from 66.5% to 95.4%.

When using these enzymes for fibrinolytic therapy they need to be taken on an empty stomach, at least one hour before or two hours after meals. Lumbrokinase, which is about 300 times stronger than serrapeptase and nearly 30 times stronger than nattokinase,[36] is my strong personal preference and recommendation if you are using a fibrinolytic enzyme.

Endothelial Health Depends on a Healthy Lifestyle

Protecting endothelial health is much like protecting heart health — it involves a comprehensive, healthy lifestyle. A sedentary lifestyle, smoking, excess alcohol[37] and ultraprocessed foods can all negatively affect endothelial health, while exercise[38] and fresh, whole foods, including citrus fruits and dark green vegetables, are protective.[39]

In addition to black raspberry and the other natural substances above, coenzyme Q10 (CoQ10), a fat-soluble antioxidant, also acts directly on your endothelium, dilating your blood vessels and lowering blood pressure.[40,41] CoQ10 is associated with significant improvements in endothelial dysfunction.[42] By the age of 65, your body typically produces only about half the amount of CoQ10 it did at 25[43] so supplementation with CoQ10 or its reduced form ubiquinol is helpful in some cases.