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Quercetin's Effect on Blood Pressure

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STORY AT-A-GLANCE

- A Japanese study identified one mechanism behind the blood pressure-lowering actions of quercetin. It is related to the action of negative chloride ions in the cell's cytosol, influencing volume-dependent high blood pressure
- Quercetin is often combined with vitamin C or bromelain, a proteolytic enzyme found in pineapple stems. The combination increases the absorption and bioavailability of the supplement
- Quercetin is known to combat inflammation and support your immune system. It has strong antiviral properties and likely is a far safer alternative to antiviral drugs like Tamiflu, which shortens flu by only hours and has significant side effects such as convulsions, hallucinations and memory deterioration
- Other lesser-known health benefits of quercetin include the prevention or treatment of metabolic syndrome, nonalcoholic fatty liver disease (NAFLD), gout, mood disorders and against aluminum-induced neurodegenerative changes

Quercetin is a flavonol found in red grapes, onions, red leaf lettuce, elderflower and green tea, to name a few.[1] Research has demonstrated the positive effect it has on blood pressure. A Japanese study[2] identified one mechanism behind the blood pressure lowering actions, which is related to the action of negative chloride ions in the cell's cytosol.

Flavonols, like quercetin, are antioxidants,[3] which scavenge free radicals, helping to prevent DNA damage and cell death. In the past two years, the antiviral benefits of

quercetin have been the focus of many studies.[4] However, there are also many other lesser-known benefits, making it useful for a variety of different health conditions.

In many instances, quercetin is sold in combination with bromelain or vitamin C.[5] Quercetin is not water-soluble which reduces the absorption rate. However, when administered with vitamin C or bromelain, absorption and bioavailability increase.

Bromelain[6] is a proteolytic enzyme found in the stem of the pineapple plant, which has been used independently to reduce swelling after surgery or injury and has been used topically to help treat burns.

Quercetin can reduce the effectiveness of some antibiotics[7] and enhance the effect of blood thinners. This can increase the risk of bleeding. It may also interact with corticosteroids, cyclosporine, digoxin and fluoroquinolones.

Quercetin Influences Volume-Dependent Blood Pressure

According to the Department of Health and Human Services,[8] nearly 1 out of every 2 adults have high blood pressure in the U.S., and most are recommended prescription medication with lifestyle changes. High blood pressure increases the risk for stroke and heart attack, which are two of the leading causes of death in the U.S.

The featured study[9] evaluated the blood pressure-lowering actions of quercetin on the body. According to the researchers, there are many factors that help to regulate blood pressure, including the nervous system, cardiac output, total blood volume and the renin-angiotensin system.

The researchers noted several past studies that demonstrated taking between 150 mg per day and 730 mg per day could lower high blood pressure, decreasing systolic and diastolic pressures.

The scientists wrote quercetin's antihypertensive actions operated through a modification of a variety of factors, including vascular compliance and resistance, total blood volume and the autonomic nervous system. In addition to these global actions,

quercetin appears to have a unique ability to regulate gene expression that is mediated by controlling negative chloride actions in the cell's cytosol.

Negative chloride ions help control the intracellular activity of many other ions[10] in the cytosol, which is the water-based fluid that surrounds intracellular structures. The gene expression that controls the chloride ions triggers sodium reabsorption, which then reduces body fluid volume and therefore influences volume-mediated high blood pressure.

Quercetin Combats Inflammation and Supports Immunity

A 2016 study[11] in the journal Nutrients detailed quercetin's properties for combating inflammation and supporting immunity. The mechanisms of action were many and included, but we're not limited to, inhibiting:

- Lipopolysaccharide (LPS)-induced tumor necrosis factor α (TNF-α) production in macrophages. TNF-α is a cytokine involved in systemic inflammation, secreted by activated macrophages, a type of immune cell that digests foreign substances, microbes and other harmful or damaged components
- LPS-induced mRNA levels of TNF-α and interleukin (IL)-1α in glial cells, resulting in "diminished apoptotic neuronal cell death"
- The production of inflammation-producing enzymes
- Calcium influx into the cell, which in turn inhibits:
    - Proinflammatory cytokine release
    - Histamine and serotonin release from intestinal mast cells release

According to the researchers, quercetin stabilizes mast cells, has cytoprotective activity in the gastrointestinal tract and "a direct regulatory effect on basic functional properties of immune cells," which allows it to inhibit "a huge panoply of molecular targets in the

micromolar concentration range, either by down-regulating or suppressing many inflammatory pathways and functions."[12]

In a 2016 paper[13] published in the journal Molecules, the researchers wrote that the anti-inflammatory and immunomodulating properties can be used in the treatment of restricted peanut-induced anaphylactic reactions, allergic rhinitis and bronchial asthma response. They concluded:

> *"Plant extract of quercetin is the main ingredient of many potential anti-allergic drugs, supplements and enriched products, which is more competent in inhibiting of IL-8 than cromolyn (anti-allergic drug disodium cromoglycate) and suppresses IL-6 and cytosolic calcium level increase."*

Quercetin Is a Far Safer Alternative to Antiviral Drugs

In the past two years, research into quercetin's antiviral properties has risen dramatically. In fact, this is one of the most well-studied attributes of quercetin. One study[14] funded by the U.S. Defense Advanced Research Projects Agency (DARPA) used an animal model demonstrating subjects treated with quercetin had lower morbidity and mortality after being challenged with the highly pathogenic H1N1 influenza virus.

Multiple other studies have also demonstrated quercetin's effectiveness against a variety of viruses including influenza A and B,[15] and a wide variety of influenza viruses, including H1N1, H3N2 and H5N1.[16]

Combining quercetin with bromelain or vitamin C has been a component of several successful COVID-19 protocols. Quercetin is a zinc ionophore,[17] which helps improve the cell's ability to absorb zinc where it is effective as an antiviral. Dr. Vladimir Zelenko was among the first doctors to discover and implement a treatment utilizing zinc and an ionophore that has been credited with saving millions of lives around the world.[18]

The early protocol used hydroxychloroquine,[19] which is another zinc ionophore. However, as research showed quercetin was as effective as hydroxychloroquine, early treatment protocols for low-risk patients included quercetin with vitamin C and zinc.[20]

Considering the powerful antiviral effects of quercetin, it is sensible to use it before resorting to antiviral drugs like Tamiflu. Not only has Tamiflu been shown to shorten the duration of flu symptoms by only hours,[21] scientists have also warned that the risks of Tamiflu far outweigh the benefits.[22]

Lesser-Known Health Benefits From Quercetin Supplements

In addition to lowering blood pressure, there are also other, less known benefits and uses for this supplement, including the prevention and/or treatment of:[23,24]

Cardiovascular disease	Asthma	Allergic reactions
Metabolic syndrome	Diabetes	Certain kinds of cancer
Neurodegenerative disease	Nonalcoholic fatty liver disease (NAFLD)	High Blood Pressure through vasodilation
Age-Related disorders	Arthritis	Learning and emotional function

Additionally, quercetin is also helpful for aluminum-induced neurodegenerative changes, such as those seen in Alzheimer's, Parkinson's and amyotrophic lateral sclerosis (ALS). As noted in a 2016 study:[25]

> *"Administration of quercetin (10 mg/kg body wt/day) reduced aluminum (10 mg/kg body wt/day)-induced oxidative stress (decreased ROS production, increased mitochondrial superoxide dismutase (MnSOD) activity).*
>
> *In addition, quercetin also prevents aluminum-induced translocation of cyt-c, and up-regulates Bcl-2, down-regulates Bax, p53, caspase-3 activation and reduces DNA fragmentation ...*

Further electron microscopic studies revealed that quercetin attenuates aluminum-induced mitochondrial swelling, loss of cristae and chromatin condensation. These results indicate that treatment with quercetin may represent a therapeutic strategy to attenuate the neuronal death against aluminum-induced neurodegeneration."

More Natural Ways to Lower High Blood Pressure

Quercetin is just one option to help you naturally lower high blood pressure. Other strategies include stress management and exercise along with the following:

- **Potassium/Sodium balance —** People who eat a lot of processed foods and very few fresh vegetables likely have an imbalance in their sodium-potassium ratio. The key to relaxing your arterial walls and reducing blood pressure is the ratio between sodium and potassium. If you're unsure of your sodium and potassium intake, use chronometer.com/mercola, which is a nutrient tracker that allows you to enter foods and then calculates the ratios automatically.

  Generally, it's recommended that you eat five times more potassium than sodium, but most Americans eat twice as much sodium as potassium. The American Heart Association[26] recommends a low-salt diet, but the ratio between potassium and sodium is far more important than your overall salt intake.[27]

  It's also a better strategy to promote public health and focus on a high-quality diet rich in potassium, as it is a nutrient that helps offset the hypertensive effects of sodium.

- **Aged Black Garlic —** According to research data, eating aged black garlic has demonstrated improvement in different cardiovascular disease risk factors, including helping to lower diastolic blood pressure.

  The objective of one study[28] was to analyze how daily consumption of aged black garlic extract with standardized s-allyl-L-cysteine (SAC) could impact

cardiovascular risk in people who had moderate hypercholesterolemia and who also followed dietary recommendations.

At the end of the study, the researchers found that those taking the aged black garlic extract had a reduction in systolic blood pressure of 5.85 mmHg as compared to those who took the placebo. According to Medscape,[29] the researchers concluded from the data that lowering diastolic blood pressure by 5 mmHg could lower the risk of death from stroke by 40%, and the risk of ischemic heart disease or other vascular death by 30%.

- **Inspiratory Muscle Strength Training —** Another study[30] evaluated the effect that inspiratory muscle strength training (IMST) could have on reducing blood pressure and thus reducing the risk of cardiovascular disease. While aerobic exercises are a foundational strategy for controlling high blood pressure, fewer than 40% meet the current recommended guidelines.[31]

  IMST was originally developed for critically ill patients with respiratory diseases. It helped to improve the strength of their inspiratory muscles by using a handheld device that provides resistance while inhaling.

  The study engaged 36 adults ages 50 to 79 who had above normal systolic blood pressure, half the participants used high resistance IMST and half use low resistance IMST for 6 weeks. At the end of the intervention, the group using high resistance had a nine-point reduction in their systolic blood pressure.

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