

## Green Tea's Potential of Lowering LDL and Total Cholesterol

A recently-published meta-analysis reviewed a total of 31 clinical trials investigating outcomes of green tea consumption on blood lipids found that, among a total population of 3,321 subjects, consumption of green tea was shown to significantly reduce total cholesterol and LDL cholesterol. However, it did not have a significant effect on either HDL cholesterol or triglycerides. These effects were consistent across populations which were normal weight, overweight, or obese.

The meta-analysis is published in *BMC's Nutrition Journal*.

While clinical trials evaluating green tea's effect on blood lipids have reached varied results, strong evidence on the whole indicates that green tea has some protective effect on hyperlipidemia.

"Tea polyphenols, specifically catechins (flavonoids), are crucial in promoting health," the authors of the study said. "The four major catechins (constituting 25-30%) reported in green tea are epicatechin (EC), epigallocatechin (EGC), epicatechin gallate (ECG), and epigallocatechin gallate (EGCG). EGCG is most abundant (50-60% of total catechins), and has anti-inflam-



matory, antioxidant, anticarcinogenic, and anti-obesity properties."

Subjects that were included in the trial were adults who had consumed green tea for at least two weeks, and were enrolled in a trial with randomized, controlled design which

reported effects on measurements of one of the four blood lipid types. Any green tea extracts they were supplementing with did not include other active ingredients. The duration of the studies included ranged from 3 weeks to one year, with green tea catechin intake ranging from 80-2488.7 mg daily.

Overall, there was a 2.3% decrease in the total cholesterol concentration while consuming green tea across all of the trials involved. Additionally, green tea supplementation significantly reduced the LDL cholesterol by 4.55 mg/dL across all trials, compared to the placebo effects. It was found that the length of the trial durations had a greater impact on blood lipid reductions, indicating that sustained consumption resulted in a greater benefit.

## Cardiovascular Benefits of Aronia Berry

Artemis International commissioned a meta-analysis on the cardiovascular benefits of aronia berry. The review found benefits to systolic and diastolic blood pressure and cholesterol achieved by daily supplementation. Based on numerous outcomes that exist within the clinical trials to date, the review concluded that this fruit yields benefits to cardiovascular health, including a significant lowering of both systolic and diastolic blood pressure, as well as



cholesterol levels.

The study concluded that a daily dose of the fruit, also known as chokeberry, for an average of 6-8 weeks was effective at producing this therapeutic effect, concluding that this nutritional intervention was both safe and effective.

To ensure the accuracy of the data pooled from the trials, a 26-point quality assessment was used to rule out studies with issues such as publication bias and insufficient statisti-

cal power to ensure that the meta-analysis only represented studies of high quality that were available in widespread literature.

The benefits of aronia on both of these areas were more pronounced among individuals who were aged 50 years and older.

Based on the results, the authors concluded that the normalizing and targeted effects of aronia can support the use of this ingredient for both preventative and treatment applications of high blood pressure and abnormal cholesterol levels.

## High Potassium Intake Reduces Risk of Low Muscle Mass in Men

According to a cross-sectional study, using data obtained from the Korean National Health and Nutrition Examination Survey, higher potassium intake was associated with a reduced rate of lost muscle mass in men, but not in women.



The loss of muscle mass, which inevitably occurs with age and at a greater speed later in life, is considered a clinical concern, especially due to increased risk

of disease outcomes, a reduced quality of life, and a greater risk of injury.

Notably, loss of muscle mass is thought to be faster in men than in women, which may be mainly attributed to hormonal factors, the authors of the study wrote. While potassium doesn't appear to have a direct impact on these hormonal factors, it may hold several beneficial effects on the preservation of muscle mass, bone density, and insulin sensitivity.

The survey, which recruited 16,558 participants, included data on daily food intake, which was acquired using a 24-hour recall method. Appendicular skeletal muscle mass was calculated using X-ray absorptiometry, and researchers defined low muscle mass as under 7 kg per square meter for men, and below 5.4 kg per square meter for women.

In men 19 years and older, higher potassium intake was associated with lower odds for low muscle mass, with the top for quintiles seeing a range of 22-42% reduced risk for definitively low muscle mass compared to the bottom quintile of potassium consumption.

The authors of the study identified a few mechanisms of action by which potassium might be benefitting the study population in such a way. First, potassium has been used successfully in the treatment of metabolic acidosis, a kidney disease which causes protein-energy wasting (diets high in meats and grains can cause a low-grade version of this disease to occur). Additionally, potassium's evidenced relationship with insulin sensitivity and inflammation may have something to do with the protective effect, as insulin resistance in patients without diabetes is associated with impaired insulin signalling in muscle cells, and low potassium intake is associated with a greater amount of free radical synthesis.

## Vitamin C for Muscle Retention in Later Life

Researchers from Norwich Medical School conducted a clinical trial that concluded that vitamin C may mitigate the progressive decline of skeletal muscle mass and function associated with aging, which can lead to the condition sarcopenia, frailty, and a reduced quality of life. The study is published in the *Journal of Nutrition*.

Prof Ailsa Welch, the lead researcher of this study, said that the potent antioxidant properties of vitamin C may prevent long-term oxidative damage of the cells and tissues within skeletal muscle.

"Unopposed these free radicals can contribute to the destruction of muscle, thus speeding up age-related decline," Welch said. "But until now, few studies have investigated the importance of vitamin C intake for older people. We wanted to find out whether people eating more vitamin C had more muscle mass than other people."

The research team analyzed data sourced from more than 13,000 participants between the ages of 42 and 82 years old involved in the EPIC



(European Prospective Investigation into Cancer and Nutrition) Norfolk study. Their skeletal muscle mass was cross-examined with vitamin C levels, which were determined through a combined seven-day food diary and measurements of vitamin C concentrations in the blood. The greatest percentage contributions of different food groups to the daily vitamin C intake of the population were from fruits, vegetables, potatoes, and fruit juices (84.4% for men and 87.1% for women). One of the studies in the meta-analysis even found that muscle atrophy was reversed by the introduction of vitamin C into the diet.

Although the positive associations between vitamin C consumption and skeletal muscle retention were greater for women, statistically significant benefits were seen in men, as well. Women with high intakes of vitamin C had 3.9% greater muscle mass than their female counterparts who were shown to have low vitamin C intakes.

Vitamin C is believed to work due to its role in the synthesis of carnitine, and collagen, which is a crucial structural component of skeletal muscle cells and tendons, and carnitine is essential for the metabolism of long-chain fatty acids during physical activity.





## Algae Astaxanthin Potent of Immune-Influencing Function

cell growth, reduce bacterial load and gastric inflammation, and protect against oxidative stress in in vitro and rodent models. This study was the first to assess whether astaxanthin has any form of immune system modulation when consumed by people.

All of the participants in this study were young, healthy lean females averaging at 21.5 years old.

In a double-blind, placebo controlled study conducted over eight weeks, participants received a 2mg dose, an 8 mg dose, or a placebo daily for eight weeks. Immune response was tested on weeks 0, 4, and 8, and a tuberculin test was also performed at the conclusion of the eight-week period.

Researchers wrote that dietary astaxanthin enhanced both cell-mediated and humoral immune responses in young healthy females. All of these immune responses were generally observed after eight weeks of supplementation follow-

ing a cutaneous tuberculin injection.

Astaxanthin also heightened natural killer cell cytotoxic activity, according to the researchers.

“Natural killer cells serve in an immuno-surveillance capacity against tumors and virus-infected cells; therefore, astaxanthin may play a role in cancer etiology.” said the researchers.

Astaxanthin dramatically decreased open DNA damage biomarker by week four of feeding. Maximal response here was observed with the lower 2 mg dose. The 2 mg dose was also optimal for lowering plasma C-reactive protein concentrations, which demonstrates an anti-inflammatory action in humans.

The researchers concluded that, while the population was demographically homogenous, they believe that further research will yield similar results in a wide variety of participant types.

In a recently shared study by INAXA, the National Algae Astaxanthin Association, researchers revealed the positive impact that astaxanthin, a natural red carotenoid pigment found in microalgae and certain types of seafood, has on immune system modulation. Following 28 pre-clinical and five human trials conducted at Washington State University, led by Boon Chew, PhD, researchers concluded that improvements were seen in a variety of biomarkers, at first in test tubes, then in animals, and, finally, in human study participants.

According to the study authors, astaxanthin is known to modulate immune response, inhibit cancer

## Nitrate-Rich Beetroot Juice for Reducing Blood Pressure in Hypertensive Adults

In a study conducted on adults from Tanzania found that inorganic nitrate supplementation could be a feasible means of combatting high blood pressure affordably. The study was recently published in the *Journal of Nutrition*.

47 participants who were between the ages of 50 and 70, who had elevated blood pressure were randomly assigned to one of three groups in a placebo-controlled, double-blind, randomized setting, for a period of 60 days. They took daily either a high-nitrate beetroot juice and folic acid (N+F), a high-nitrate beetroot juice or placebo (N+P), or a nitrate-depleted beetroot juice and placebo (P+P). Measurements of blood pressure were taken, as were measurements of compliance in plasma and saliva samples at baseline, 30 days, and 60 days into the trial.

After 60 days, systolic blood pressure dropped in the N+P group by an average of 10.8 points. It dropped by an average of 6.1 points and 0.3 points in the N+F and N+P groups, respectively.

Similarly the group taking high-nitrate beetroot

juice and placebo saw the greatest decrease in diastolic blood pressure, averaging 5.4 points, compared to drops averaging 1.8 and 1.6 points in the N+F and P+P groups, respectively.



The preliminary research suggests that folate may hold antihypertensive properties via a separate mechanism, which is why researchers investigated whether the two compounds may hold additive benefits to hypertension. The results of the trial suggest that dietary inorganic nitrates were able to significantly lower blood pressure within the population of the study with or without the co-administration of folic acid.

The authors concluded that the present study provides preliminary evidence that dietary inorganic nitrate supplementation, alone or in combination with folic acid, represents a potential nutritional strategy to help combat the burgeoning hypertension epidemic.