

Vitamin K2 Is Important for Vascular Health

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✓ Fact Checked

September 18, 2023

STORY AT-A-GLANCE

- › Vitamin K1 (phylloquinone) is found in green leafy plants and is best known for the role it plays in blood clotting. Vitamin K2 (menaquinones) comes in several forms, the most common of which are MK-4, found in animal foods, and MK-7, found in fermented foods. Vitamin K2 plays important roles in bone and cardiovascular health
- › Research has found that people with the highest intakes of both types of vitamin K have significantly lower risks of atherosclerosis-related heart disease. Those with the highest intakes of vitamin K1 had a 21% lower risk of being hospitalized with atherosclerosis-related heart disease and those with the highest intakes of vitamin K2 had a 14% lower risk. Those with high vitamin K2 intake also had a 34% lower risk of peripheral artery disease
- › One of the primary ways in which vitamin K2 protects your cardiovascular health is by activating matrix Gla protein (MGP), which is a potent inhibitor of arterial calcification. Vitamin K2 can have a direct blood pressure lowering effect in some individuals
- › Low vitamin K status also raises the risk of frailty, impaired mobility and disability in elderly individuals
- › Statin drugs can deplete your body of vitamin K2 by inhibiting MK-4 synthesis. As a consequence, statins may contribute not only to age-related frailty but also insulin resistance, because MK-4 synthesis requires the same enzymes that synthesize cholesterol

Vitamin K is a fat-soluble vitamin that has a significant influence on your bone, heart and cardiovascular health. Vitamin K1 (phylloquinone) is found in green leafy plants and is best known for the role that it plays in blood clotting.

Vitamin K2 (menaquinones) comes in several forms, the most common of which are menaquinone-4 (MK-4) and MK-7, which play important roles in bone and cardiovascular health. While vitamin K1 has been found to moderately reduce the risk of bone fractures,¹ MK-7 is more effective than vitamin K1 at reaching and protecting your bones.^{2,3}

MK-4 is a short-chain form of vitamin K2 found in animal products such as meat, eggs, liver and dairy.^{4,5} The source matters, however. For example, animal products from factory-farmed animals are not high in MK-4 and should be avoided. Only grass-fed animals (not grain-fed) will develop naturally high levels.

MK-4 has a short biological half-life, making it a poor candidate as a dietary supplement. However, MK-4 from food is important for good health as it plays a role in gene expression. For example, research⁶ has found it may lower your risk of liver cancer.

MK-7 is a longer-chained vitamin K2 found in fermented foods such as sauerkraut, certain cheeses and natto (a fermented soy product).⁷ It's produced by specific bacteria during the fermentation process. However, not all strains of bacteria make it,⁸ so not all fermented foods will provide it.

Most commercial yogurts, for example, provide little to no vitamin K2, and while certain types of cheeses, such as Gouda, Brie and Edam, are high in K2, others are not. MK-7 is what you'll want to look for in supplements, as this form is extracted from real food and has a longer half-life.⁹

Vitamin K-Rich Diets Lower Atherosclerosis Risk

A 2022 study by Edith Cowan University, in which patients were followed for 23 years, found that people with the highest intakes of both types of vitamin K had significantly lower risks of atherosclerosis-related heart disease.¹⁰

“ We believe that vitamin K works by protecting against the calcium build-up in the major arteries of the body leading to vascular calcification. ~ Dr. Nicola Bondonno ”

Those with the highest intake of vitamin K1 had a 21% lower risk of being hospitalized with atherosclerosis-related heart disease and those with the highest intake of vitamin K2 had a 14% lower risk. Those with high vitamin K2 intake also had a 34% lower risk of peripheral artery disease. As noted by senior author Nicola Bondonno:¹¹

"Current dietary guidelines for the consumption of vitamin K are generally only based on the amount of vitamin K1 a person should consume to ensure that their blood can coagulate.

However, there is growing evidence that intakes of vitamin K above the current guidelines can afford further protection against the development of other diseases, such as atherosclerosis.

Although more research is needed to fully understand the process, we believe that vitamin K works by protecting against the calcium build-up in the major arteries of the body leading to vascular calcification."

How Vitamin K Protects Your Cardiovascular System

One of the primary ways in which vitamin K2 protects your cardiovascular health is by activating matrix Gla protein (MGP), which is a potent inhibitor of arterial calcification.

As explained in a 2019 study,^{12,13} "Stiffening and calcification of the large arteries are forerunners of cardiovascular complications," and by improving your vitamin K2 status, you can significantly reduce arterial stiffness¹⁴ and improve blood pressure. Other investigations have also found that vitamin K2 can have a direct blood pressure lowering effect in some individuals.¹⁵

Vitamin K Status Also Plays a Role in Frailty

Vitamin K has also been shown to play an important role in frailty. As reported by Science News:¹⁶

"Reduced levels of circulating vitamin K are linked to an increased risk of mobility limitation and disability in older adults, according to a study published in the Journals of Gerontology: Series A¹⁷ ...

'Low vitamin K status has been associated with the onset of chronic diseases that lead to disability ...' said Dr. Kyla Shea, a nutrition scientist in the Vitamin K Laboratory at the Jean Mayer USDA Human Nutrition Research Center on Aging (HNRCA) at Tufts University.

'Here, we're building on previous studies that found that low levels of circulating vitamin K are associated with slower gait speed and a higher risk of osteoarthritis.' Dr. Shea and colleagues examined two biomarkers: circulating levels of vitamin K and a functional measure of vitamin K (plasma ucMGP).

They used data from 635 men and 688 women ages 70-79 years old, who participated in the Health, Aging, and Body Composition Study (Health ABC). Mobility was assessed every six months for 6 to 10 years through annual clinic visits and phone interviews in the intervening time.

For the analysis, the researchers defined mobility limitation as two consecutive semi-annual reports of having any amount of difficulty either with walking a quarter of a mile or climbing 10 steps without resting, and mobility disability as two consecutive semi-annual reports of having a lot of difficulty or inability to walk or climb the same amount.

They found that older adults with low levels of circulating vitamin K were more likely to develop mobility limitation and disability. The other biomarker, plasma ucMGP, did not show clear associations with mobility limitation and disability.

Specifically, older adults with low circulating vitamin K levels were nearly 1.5 times more likely to develop mobility limitation and nearly twice as likely to develop mobility disability compared to those with sufficient levels. This was true for both men and women."

Statin Drugs Deplete Vitamin K2

A factor that many overlook is the impact of statins (cholesterol-lowering drugs). In addition to depleting your body of Coenzyme Q10, which can adversely impact your heart health as it's crucial for mitochondrial ATP production and healthy contraction of the heart muscle, statin drugs can also deplete your body of vitamin K2 by inhibiting MK-4 synthesis.¹⁸

Consequently, statins may contribute not only to age-related frailty but also insulin resistance, because MK-4 synthesis requires the same enzymes that synthesize cholesterol. As noted in a 2020 study:^{19,20}

"There is emerging data to suggest that by inhibiting the production of intermediates of cholesterol synthesis, statins also inhibit the mevalonate pathway and impede the production of vitamin K2 in peripheral tissues.

There is growing evidence to suggest that vitamin K2 plays a key role in glucose homeostasis as well as vascular calcification. On this background, we hypothesized that statin use would be associated with both insulin resistance and vascular calcification in community-dwelling participants of a large longitudinal study of osteoporosis."

As predicted, statin users did have higher indices of insulin resistance, which the authors stressed "could be relevant in healthy aging." In conclusion, they recommended that individuals who have risk factors for diabetes should avoid lipophilic statins²¹ such as atorvastatin, simvastatin, lovastatin, fluvastatin, cerivastatin and pitavastatin.

Safer alternatives, according to this study, would be nonlipophilic statins (i.e., hydrophilic statins, which are only distributed to the liver), with the exception of

rosuvastatin, a high-potency hydrophilic statin. Doing this "may provide the intended cardiovascular protection without the increased incidence of insulin resistance," the authors said.

General Dosing Suggestions

To optimize your vitamin K status, the ideal solution is to eat plenty of vitamin K-rich foods. K1-rich sources include green leafy veggies like collard and turnip greens, kale, spinach, broccoli, Brussels sprouts, cabbage and lettuces.²²

K2 MK-4 is found in organic, grass fed and pastured animal foods like eggs, liver, meat, and dairy,^{23,24} while MK-7 is found in fermented foods such as natto, sauerkraut, and cheeses such as Gouda, Brie and Edam.²⁵

If you opt for an oral K2 supplement, it's best taken with your evening meal, along with any **vitamin D and/or calcium and magnesium** you may be taking. As explained in previous articles, anytime you take a vitamin D supplement, you also need to be mindful of taking extra vitamin K2 and magnesium.

The K2 is needed to prevent arterial calcification while magnesium is required for vitamin D conversion. If you take large doses of vitamin D, you may inadvertently deplete magnesium, as it's required in the conversion of vitamin D into its active form.

Research²⁶ has shown you need 146% more vitamin D to achieve a blood level of 40 ng/ml (100 nmol/L) if you do not take supplemental magnesium, compared to taking your vitamin D with at least 400 mg of magnesium per day.

Combined intake of magnesium and vitamin K2 has an even greater effect. You need 244% more oral vitamin D if you're not concomitantly taking magnesium and vitamin K2. What this means in practical terms is that if you take all three supplements in combination, you need far less oral vitamin D to achieve a healthy vitamin D level.

Unfortunately, the ideal ratio of vitamin K2 to D is still undetermined, so there are no hard and fast rules here. Some experts suggest 200 micrograms of vitamin K2 per day

will meet the needs of the "average" healthy person,²⁷ but if you're taking high-dose vitamin D, you may need a bit more.

Also, if you're going to use a vitamin K2 supplement, it is best to use MK-7, since MK-4 has a short biological half-life. One caveat: While nontoxic, people who are taking vitamin K antagonists, i.e., drugs that reduce blood clotting by reducing the action of vitamin K, are advised to avoid vitamin K2 (MK-7) supplements.

Sources and References

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