

You Need Vitamin K to Prevent Arterial Plaque & Heart Disease

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Accumulating evidence suggests that atherosclerotic calcification shares features with bone calcification. Vascular calcification, or hardening of the arteries, is common and clinically significant in atherosclerosis (coronary artery disease) and heart failure. It was long believed to be an end-stage process of "passive" mineral precipitation. However, there is now a growing awareness that vascular calcification is a biologically regulated phenomenon. [1]

In addition to being involved in the formation of osteocalcin, vitamin K is known to be involved in the formation of matrix Gla-protein (MGP). Osteocalcin is a protein produced by the osteoblasts, and is utilized within the bone as an integral part of the process of its formation. However, osteocalcin must be carboxylated before it can be effective in bone formation. Vitamin K functions as a cofactor for the enzyme that catalyzes the carboxylation of osteocalcin.

MGP is synthesized in a vitamin K-dependent way in smooth muscle cells of the healthy vessel wall.[2]

A recently described function of MGP is as a powerful inhibitor of calcification of arteries and cartilage. It appears that optimal vitamin K levels are needed to produce proper amounts of MGP to prevent arterial calcification.[3] MGP deficient mice develop extensive vascular calcification with replacement of the vascular media by progressively calcifying cartilage.[4]

Types and Source of Vitamin K

Vitamin K1, is also called phylloquinone or menaquinone 4. It is typically found in dark green leafy vegetables. Vitamin K2 has the chemical name menaquinone 7 and is synthesized by intestinal bacteria, and absorbed from the distal small bowel. Antibiotics have been shown to reduce vitamin K2 from this source.[5]

Fermented foods typically have the highest concentration of vitamin K found in the human diet and can provide several milligrams of vitamin K2 on a daily basis. This level far exceeds the amount found in dark green vegetables.

Natto is a fermented soy product that has been a staple food of eastern Japan for over 1,000 years. Many find it unpalatable due to its slimy texture, but it is far better absorbed than vitamin K from vegetables. Circulating vitamin K2 concentrations after the consumption of natto have been shown to be about 10 times higher than those of vitamin K1 after eating spinach.[6]

Japanese researchers found a statistically significant inverse correlation between the incidence of hip fractures in women and natto consumption.[7] In other words, the more natto consumed, the lower the incidence of hip fracture. Feeding ovariectomized rats natto has also been shown to have a preventive effect on bone loss.[8]

Although fermented food products provide the highest source of vitamin K, even relatively low vitamin-K-containing vegetables like lettuce, consumed one or more times per day, have produced a 45 percent lower risk of hip fracture as compared to women who consumed lettuce once or fewer times per week.[20]

Dosing and Toxicity of Vitamin K

Considering that the undercarboxylation of MGP is a risk factor for vascular calcification, it would seem the present Recommended Dietary Allowance (RDA) values for vitamin K are too low to ensure full carboxylation of MGP to decrease atherosclerosis.[9]

Other compelling evidence for an increased requirement for vitamin K is that nearly half of newborns were shown to have low vitamin K levels by the accurate undercarboxylated prothrombin vitamin K assay, despite their mothers consuming dietary levels equal to the RDA of 1 mcg/kg.[10]

There are no comparative studies on different dosing schedules of vitamin K, but it is likely that a dose of 1 to 5 mg daily (1000-5000 mcg) would approximate the levels seen in Japanese women who regularly consumed natto, fermented foods or dark green vegetables.

Unlike vitamin D, which is toxic in large doses, vitamin K1 (phylloquinone) is not toxic at 500 times the RDA. However, synthetic vitamin K3 (menadione) toxicity has occurred in infants given vitamin K3 by injection.

Vitamin K taken without fat is poorly absorbed. It appears that at least an ounce of fat is needed to optimize absorption.[11] Supplemental vitamin K1 appears to be much more available than vitamin K1 in a food source. Absorption of vitamin K1 was found to be about six times greater when it was ingested in the pure form as a tablet than when it was present in a food matrix, such as fresh spinach.[12]

The best sources of vitamin K are leafy green vegetables. Eggs have some as well. Below are a few examples of the vitamin K content of some good sources.

Food	Vitamin K (micrograms/100g)	Food	Vitamin K (micrograms/100g)
Collard Greens	440	Cabbage	145
Spinach	380	Olive Oil	55
Salad Greens	315	Asparagus	60
Kale	270	Okra	40
Broccoli	180	Green Beans	33
Brussels Sprouts	177	Lentils	22

If for whatever reason you are unable to obtain enough vitamin K then you might want to consider the relatively inexpensive form of [vitamin K that we are now carrying in our store](#).

This form has 500 mcg per drop, so 6 drops would give you 3000 mcg. You would have to eat over one pound of collard greens to get the equivalent amount of vitamin K. Clearly the collard greens or spinach would be better for you and would provide you with additional benefits, but if you already have heart disease a little extra vitamin K would seem a simple bit of insurance to make sure that your blood vessels don't harden.