



Vitamin K2

An Essential Nutrient for Bone Health

- Supports the skeletal system
- Supports bone building cells
- Supports normal blood clotting
- Benefits cardiovascular health

An Essential Vitamin

Vitamin K is best known for its role in blood clotting, but it also has important functions in the skeletal system. Deficiencies of vitamin K can cause serious problems in cardiovascular, bone and liver health. Vitamin K from the diet is mostly in the form of vitamin K1 (phylloquinone). However, it is vitamin K2 that has the strongest benefits for bone health.

Bone and Heart Health

Vitamin K2 acts as a cofactor for various proteins. One of its main roles is modifying the structure of a protein called osteocalcin, which binds calcium to the bone matrix. Vitamin K also strengthens bone building cells and helps block bone teardown. Low levels of vitamin K are associated with an increased incidence of osteoporosis. Vitamin K also has roles in cardiovascular health. Calcium deposition in arterial tissue leads to a loss of its elasticity and an increased risk of cardiovascular disease. Vitamin K has a protective effect on arterial elasticity.

Clinically Tested

AOR's formulation delivers menatetrenone, a form of vitamin K2 that has been extensively clinically studied for its effects on bone metabolism and other areas of health.



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60 Vegi-Caps

Serving Size: 1 Capsule
Vitamin K2 120 mcg
(Menatetrenone [MK-4])

Key Features: Form of Vitamin K found in the body.

Suggested Use:

Take 1 capsule daily with food, or as directed by a qualified health care practitioner.

Main Indications:

Supports skeletal health.
Normal blood coagulation.
Cardiovascular health.

Cautions:

Persons taking anticoagulant "blood thinning" medications such as Warfarin/Coumadin, must not take this product.

Pregnancy / Nursing:

Do not take.

Source:

Solanisol (from *Nicotiana tabacum*).

Complementary Products:

Strontium Support II, Advanced Bone Protection, Ortho Bone

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Vitamin K2

Vitamin K is an essential component for health. It constitutes a family of compounds that exist as natural vitamin K1 (phyloquinone) and vitamin K2 (menaquinones). Even though vitamin K has been known of since the early part of the last century, researchers and clinicians mainly focused on its role in blood clotting. However, recent studies have shed light on its functions in bone health and other areas.

Vitamin K1 is the more prevalent form in our diet and is found in leafy green vegetables (lettuce, broccoli, cabbage, spinach etc) and vegetable oils. Vitamin K2 constitutes a family of compounds that include MK-4 and MK-7 forms that are rich in fermented foods like natto and various cheeses, and the lesser available forms MK-8 and MK-9. Recent studies have suggested that vitamin K2 is better absorbed and persists longer in the plasma than vitamin K1 and may be more appropriate for supplementation.

Pharmacological Functions:

The chief function of vitamin K is to act as a co-factor (an adjunct) for vitamin K-dependent proteins in the body and convert the glutamate residues of these proteins into gamma-carboxyglutamate groups via the enzymatic process of carboxylation. Such proteins include coagulation factors, bone turnover molecules (osteocalcin), vascular repair proteins (Matrix GLA) and proteins responsible for cell-cycle arrest, signal transduction and cell-cell adhesion. The latter three proteins have implications in the aberrant growth of cells e.g. tumorigenesis.

1. Bone Health

Bone is a living tissue that continually undergoes remodeling via synthesis and degradation of bone tissue by bone building (osteoblast) and bone breakdown (osteoclast) cells respectively. In addition to other key nutrients for proper bone-remodeling e.g. calcium, vitamin D, vitamin C, zinc, magnesium and manganese, vitamin K plasma status is important for maintaining healthy bone. Osteocalcin is a small protein and the degree of its carboxylation (hence vitamin K status) is a measure of bone health. There is a direct correlation between carboxylation of osteocalcin and bone health. In human studies low serum vitamin K levels have been associated with increased incidence of osteopenia (pre-osteoporotic condition) and full-blown osteoporosis.

2. Vascular Health

Arterial calcification shares many similarities with bone metabolism. Matrix GLA protein is found in vascular tissue. Under-carboxylation of this protein (much like osteocalcin) is an indication of low plasma K levels and consequently the arterial tissue is less elastic due to increased calcium deposition resulting in increased incidence of cardiovascular mortality and ischemic heart disease. Studies have shown that vitamin K intake can have a protective effect and prevents loss of elasticity, a key indicator of vascular health. Furthermore, there is a clinical study that shows that vitamin K may protect not only against warfarin-induced calcification but also may stabilize and help control anti coagulation levels. However, it is strongly advised that patients taking blood thinning medication like warfarin (Coumadin) should consult their physicians before taking vitamin K2.

3. Hepatocellular Carcinoma

Studies have suggested that high levels of vitamin K intake may be associated with a lower incidence of one particular type of liver cancer (hepatocellular carcinoma). The mechanism is postulated to be an effect on inhibiting the cell cycle, cell-cell adhesion, and possibly the ability to metastasize.