The Little-Known Benefits of Vitamin K2 for Healthier Aging

While you've likely heard of vitamin K, you may not be aware that there are two different forms of the nutrient: K1 and K2. Vitamin K1 is best known for its blood-clotting abilities; it was even given its "K" from the German word "koagulation" when it was first discovered in the 1930s.

However, the importance of vitamin K2 on human health was not elucidated until decades later — in fact, it's still in the process of being fully understood to this date.

Although vitamin K1 is readily available in our modern-day food supply, dietary vitamin K2 is a little harder to find. In this article, learn more about what vitamin K2 is, the top foods with vitamin K2, and the essential benefits of this nutrient.

What is Vitamin K2?

Vitamin K1 is the most commonly referenced form of vitamin K; this form is also known as phylloquinone and is found mainly in leafy green vegetables.

Vitamin K2 is actually a collection of compounds known as menaquinones, with the most vital forms being MK-4 and MK-7.

Some forms of vitamin K2 are synthesized by bacteria, while others, like MK-4, can be synthesized in the gastrointestinal tract from vitamin K1 or MK-7. However, humans' ability to efficiently convert vitamin K1 into MK-4 is low and can vary individually; therefore, dietary sources of vitamin K2 are needed.

Of the menaquinones, MK-7 is best able to reach the bones and liver, while MK-4 works most efficiently on other tissues, like the heart.

Vitamin K2 impacts several body systems through its ability to inhibit calcium from settling in places it shouldn't. For example, keeping calcium out of the kidneys and blood vessels prevents kidney stones and heart disease, respectively. Vitamin K2 also helps calcium get to where it needs to be: the bones and teeth.

Foods With Vitamin K2

MK-4 is the form of vitamin K2 found only in certain animal foods, while MK-7 is more abundant in fermented foods, as bacteria synthesize it.

The top two foods (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6413124/) with vitamin K2 are liver and natto, a traditional Japanese dish made of fermented soybeans, both of which are not commonly consumed foods in the American diet. Other vitamin K2-rich foods include egg yolks, grass-fed butter, dark meat chicken, and some hard cheeses, like Jarlsberg, Swiss, and Münster.

Cows and chickens have an enzyme that efficiently converts the vitamin K1 they consume from grass and other greens into vitamin K2. Therefore, meat and dairy from grass-fed and pasture-raised animals will have more vitamin K2 in them than conventionally raised animals. The latter typically consume grains and soy rather than the chlorophyll-rich greens that lead to vitamin K2 production.

Although there is no official recommendation for how much vitamin K2 to consume, most researchers (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3941825/) believe that not very much of the vitamin is needed to experience the benefits, with estimates ranging from 50 to 200 micrograms per day. For reference, 100 micrograms of vitamin K2 is found in 6 ounces of dark chicken meat, 5 ounces of hard cheese, or one-third of an ounce of natto.

Top 4 Benefits of Vitamin K2

1. Strengthens Bones

The bone-strengthening role of vitamin K2 was uncovered alongside the discovery of osteocalcin. This protein directs calcium from the bloodstream to the bones and teeth and is dependent on vitamin K2.

This ability of vitamin K2 to boost osteocalcin's functioning allows calcium to funnel into the bones, which reduces the risk of fractures and osteoporosis by increasing bone mineral density.

In addition, MK-4 stimulates the differentiation of osteoblasts, which produce new bone and increase mineralization. At the same time, MK-4 inhibits osteoclasts, the cells that degrade bone.

A review of randomized controlled trials published in May 2014 in Nutrients (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4042573/) found that postmenopausal women who took supplemental MK-4 experienced an increase in lumbar spine bone mineral density and a reduced incidence of fractures. This indicates that supplemental vitamin K2 is a good alternative if you don't have a diet high in vitamin K2-rich foods.

In a study from September 2013 in the journal Osteoporosis International (https://pubmed.ncbi.nlm.nih.gov/23525894/), postmenopausal women who supplemented with 180 micrograms of MK-7 per day for three years saw significant improvements in bone mineral density and bone strength compared to women who took a placebo.

Vitamin K2 has also been shown to improve the symptoms and inflammation associated with osteoarthritis and rheumatoid arthritis through similar mechanisms.

2. Improves Dental Health

Vitamin K2 can improve oral health in several ways. The vitamin K2-dependent osteocalcin also increases dentin production, which is the tissue under the tooth's enamel that prevents cavity formation.

Due to its ability to take calcium from the bloodstream and deposit it into bones and teeth, vitamin K2 can slow down the tooth loss that is common with age.

Vitamin K2 also improves saliva's buffering capacity, which is crucial for maintaining the oral environment's pH and enhancing enamel remineralization. Maintaining proper saliva buffering (https://pubmed.ncbi.nlm.nih.gov/25636605/) reduces acidity in the mouth and is critical for preventing cavities and gum diseases, like periodontal disease or gingivitis.

3. Supports Heart Health

Another protein reliant on vitamin K2 is matrix GLA protein, which inhibits calcium deposition on arterial walls. As calcified arteries lead to narrowing blood vessels and heart disease, inhibiting this process is beneficial to cardiovascular health.

In a study published in the Journal of Nutrition (https://pubmed.ncbi.nlm.nih.gov/15514282/) in November 2004, older adults who consumed higher amounts of dietary vitamin K2 had significant reductions in the relative risk of coronary heart disease mortality and lower levels of aortic calcification.

Importantly, dietary vitamin K1 was not linked to these benefits, indicating that cardiovascular support comes solely from the menaquinone family.

Although calcium has been known for decades to benefit the bones, supplementation trials using calcium have not shown beneficial effects — some have even resulted in detrimental health outcomes. This may be because of a lack of vitamin K2.

A large study published in BMJ (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3079822/) in April 2011 found that calcium supplements increased cardiovascular disease and mortality risk. However, the researchers did not include vitamin K2 in their supplement protocol. Without enough vitamin K2, supplemental calcium will not get deposited in the bones and, instead, could lead to arterial calcification and heart disease.

Therefore, if you're taking supplemental calcium, ensure that vitamin K2 is also in your daily routine, whether through foods or supplements.

4. Improves Metabolic Markers

Another benefit of the protein osteocalcin is its ability to improve blood sugar control by regulating the hormone that shuttles glucose from the blood into cells for energy or storage. Osteocalcin also increases pancreatic beta-cell growth; dysfunction of these cells is a characteristic of diabetes.

In a cohort study published in August 2010 in Diabetes Care (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2909045/), each 10-microgram increase in dietary menaquinone intake over the ten-year study was

associated with a 7% decrease in the risk of developing type 2 diabetes. These individuals also had improved lipid profiles and reduced CRP, a marker of inflammation.

Also published in Diabetes Care (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3161300/), a small placebo-controlled trial from September 2011 found that 90 micrograms of supplemental MK-4 per day for four weeks was linked to a significant improvement in the sensitivity to the hormone that regulates blood sugar metabolism.

Although the research on vitamin K2 and diabetes is still in its beginning stages, the results thus far seem promising for the vitamin's ability to improve glucose control.

Key Takeaway:

- Vitamin K2, the lesser-known form of the fat-soluble vitamin K, is found in the fermented food natto, liver, certain hard cheeses, grass-fed butter, egg yolks, and dark meat chicken.
- The vitamin K2 family, known as menaquinones (primarily MK-4 and MK-7), upregulates osteocalcin production. This protein strengthens bones and teeth and improves glucose metabolism, reducing the risk or severity of osteoporosis, arthritis, oral diseases, and type 2 diabetes.
- Vitamin K2 improves cardiovascular health by taking calcium from the bloodstream and depositing it into bones and teeth, rather than allowing it to calcify blood vessels and contribute to heart disease.