THE IMPORTANCE OF
THE CINNAMON CHEWABLE, ULTRA K2-D3

Why Take Vitamin K2 & D3?

Vitamin K2 is required for modification of proteins that deposit calcium in bones. Research suggests that vitamin D and vitamin K2 each support bone and cardiovascular health, which makes a combination supplement an excellent choice. As with vitamin D, our knowledge of vitamin K has also grown in recent years, leading many to advocate the use of supplemental vitamin K2.

Vitamin D3 is required for absorption of calcium from the gut, regulation of serum calcium levels, and regulation of at least 1000 genes The average person requires between 2,000-10,000 IU per day of D3 to maintain optimal serum levels of 25(OHO)D1,2.

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ULTRA K2-D3

ULTRA K2-D3 ITEM #: 3621-0060-01

DESCRIPTION
All natural cinnamon flavored, chewable tablet delivering both vitamins K2 and D3.

HOW SUPPLIED
60 tablets, cinnamon flavor.

DIRECTIONS
Take 1 tablet or more daily with or between meals or as directed by your doctor. Store in a cool place and keep from children.

Supplement Facts

Serving Size 1 Tablet	Servings Per Container 60
Amount Per Serving	**% Daily Value**
Vitamin D3 (as cholecalciferol)	2000 IU 500%
Vitamin K2 (as mixed menaquinones)	80 mcg 100%

Other Ingredients: Sorbitol, fructose, rice bran, stearic acid, (vegetable source), cellulose, natural flavors, magnesium stearate (vegetable source), silicon dioxide.

DIETARY SOURCES OF K2
Menaquinone is vitamin K2 and there are multiple varieties, which are designated as MK-4 to MK-14. The most commonly discussed and supplemented variety is the short chain MK-4, which is found in meat. The longer chain menaquinones are attracting more attention as supplements and include MK-7, MK-8, MK-9, which are found in fermented foods such as cheese. MK-7 is also found abundantly in a fermented soybean product called natto. While vitamin K2 influences coagulation proteins like K1, menaquinones uniquely influence calcium metabolism in relation to bone and cardiovascular health.

DUAL ROLE OF K2 - BONE & VASCULAR HEALTH
Unlike other nutrients, which often have multiple and often complicated functions, understanding vitamin K is straightforward because it has a single known major function. It is a cofactor for one enzyme, gamma-glutamylcarboxylase, which is located in the endoplasmic reticulum of certain tissues[1]. This enzyme functions to add a COOH group to the glutamic acid residue of certain proteins during protein synthesis via a process called posttranslational modification. In short, vitamin K is required by various cells to activate key proteins, such as osteocalcin, and vacular matrix Gla protein.

K2 & BONE HEALTH
In osteoblasts, osteocalcin is first formed in ribosomes and then its glutamic acid residues undergo posttranslational modification [or activation] in the endoplasmic reticulum by vitamin K-dependent gamma-glutamylcarboxylase. The gamma-carboxylated glutamic acid in osteocalcin functions to bind calcium, such that when osteoblasts release carboxylated osteocalcin, it binds to hydroxyapatite in bone to increase bone mineral density (BMD)[1,2]. In contrast, under-carboxylated osteocalcin, due to a lack of vitamin K2, does not bind as efficiently to calcium and is not as readily incorporated into the boney matrix. The blood level of under-carboxylated osteocalcin is thought to be a marker of BMD as it is correlated with hip bone mineral density and fracture risk in elderly women[2]. Supplemental MK-7 has a very long half-life induces a more complete carboxylation ofosteocalcin[10], and presumably vascular MGP and clotting factors.

K2 & VASCULAR HEALTH
In arterial walls, matrix gamma-carboxyglutamate (Gla) protein (MGP) is produced in vascular smooth muscle cells by the same ribosomal-endoplasmic reticulum posttranslational modification process. Vascular MGP is a strong inhibitor of vascular calcification[6] and in contrast, significantly increased levels of under-carboxylated MGP have been identified in atherosclerotic vessels[7]. MK-7, MK-8, and MK-9 appear to be cardio-protective[8]. Research suggests that MK-7 is the preferred cofactor for the vascular gamma-glutamycarboxylase enzyme and animal studies suggest that vitamin K2 supplementation can lead to a regression of arterial calcification[11]. It is known that most subjects in the healthy population are not optimally protected against vascular calcification due to the presence of uncarboxyalted MGP, suggesting that MK-7 supplementation may be an effective interventional strategy[9].

Recent studies suggest that dietary-derived longer chain menaquinones may be protective [11,12], and it appears not to be related to gamma-carboxylation. A considered mechanism is an inhibitory effect on proto-oncogenes, which fosters cell cycle arrest and apoptosis[11].

NATURAL VITAMIN D3
Modern research now confirms vitamin D's function as a unique hormone, which helps to modulate pain and inflammation, and supports proper blood sugar regulation, cardiovascular health, joint health, bone health, mental health, and immune health. The new research now demonstrates that we need much higher amounts of supplemental vitamin D3 (2,000-10,000 IU) to raise 25(OH)D in our body to acceptable levels for prevention. These higher amounts of required supplemental vitamin D3 are directly related to lack of sun exposure.

CONTRAINDICATIONS FOR K2 & D3
Patients on anticoagulant therapy should not take MK-7 or other K2 varieties without supervision and monitoring by their attending physician. Researchers suggest that 50 mcg is safe upper limit of MK-7 and other longer menaquinones (MK-8, MK-9) for properly monitored patients taking anti-coagulants[12]. Vitamin K2 should not be confused with Phylloquinone, or vitamin K1. K1 is found in green leafy vegetables, and its primary function is to activate prothrombin and other clotting factors.

REFERENCES
1. McCann JC, Ames BN. Vitamin K, an example of triage theory: is micronutrient inadequacy linked to diseases of aging? Am J Clin Nutr 2009;90:889–907.
2. Emaus N, Gjesdal CG, Almas B et al. Vitamin K2 supplementation does not influence bone loss in early menopausal women: a randomised double-blind placebo-controlled trial. Osteoporos Int. 2009 Nov 25. [Epub ahead of print].
3. Ikeda Y, Iki M, Morita A et al. Intake of fermented soybeans, natto, is associated with reduced bone loss in postmenopausal women: Japanese Population-Based Osteoporosis (JPOS) Study. J Nutr. 2006; 136:1323-28.
4. van Summeren MJ, Braam LA, Lilien MR et al. The effect of menaquinone-7 (vitamin K2) supplementation on osteocalcin carboxylation in healthy prepubertal children. Brit J Nutr. 2009; 102(8):1171-78.
5. Forli L, Bollerslev J, Simonsen S, et al. Dietary vitamin K2 supplement improves bone status after lung and heart transplantation.
Transplantation. 2010;89:458-64.
6. Cranenburg EC, Vermeer C, Koos R et al. The circulating inactive form of matrix Gla protein (ucMGP) as a biomarker for cardiovascular calcification. J Vasc Res. 2008;45:427-36.
7. Schurgers LJ, Teunissen KJ, Knapen MH et al. Novel conformation-specific antibodies against matrix gamma-carboxyglutamic acid (Gla) protein: undercarboxylated matrix Gla protein as marker for vascular calcification. Aterioscler Thromb Vasc Biol. 2005; 25(8):1629-33.
8. Gast GC, de Roos NM, Sluijs I et al. A high menaquinone intake reduces incidence of coronary heart disease in women. Nutr Metab Cardiovas Dis. 2009;19:504-10.
9. Schurgers LJ, Cranenburg EC, Vermeer C. Matrix Gla-protein: the calcification inhibitor in need of vitamin K. Thromb Haemost. 2008; 100:593-603.
10. Schurgers LJ, Teunissen KJ, Hamulyak K et al. Vitamin K-containing dietary supplements: comparison of synthetic vitamin K1 and natto-derived menaquinone-7. Blood. 2007; 109(8):3279-83.
11. Nimptsch K, Rohrmann S, Kaaks R, Linseisen J. Dietary vitamin K intake in relation to cancer incidence and mortality: results from the Heidelberg cohort of the European Prospective Investigation into Cancer and Nutrition (EPIC-Heidelberg). Am J Clin Nutr. 2010; Mar 24 [Epub ahead of print as doi: 10.3945/ajcn.2009.28691]
12. Nimptsch K, Rohrmann S, Nieters A, Linseisen J. Serum undercarboxylated osteocalcin as a biomarker of vitamin K intake and prostate cancer risk: a nested case-controlled study in the Heidelberg cohort of the European Prospective Investigation into Cancer and nutrition. Cancer Epidemiol Biomarkers Prev. 2009;18:49–56.