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QUEST D3 & K2

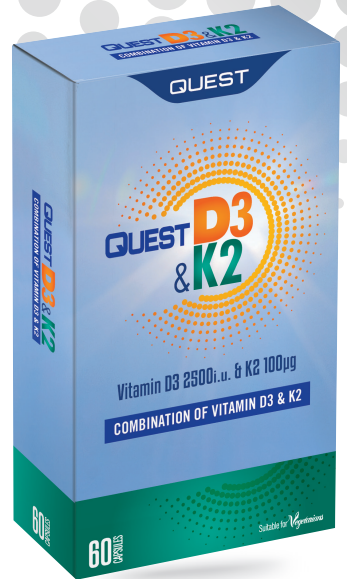
Perfect combination of vitamins D3 + K2 for bone and heart health.

Nutritional Information

One capsule provides:

Vitamin D3	2500iu	(62.5 µg)
Vitamin K2 (MK7)	100 µg	
Vitamin E	20iu	(13.4 µg)

Take one capsule daily with food. Swallow with water.



SUMMARY

- 2,500iu of vitamin D3 + 100mcg of Vitamin K2.
- Vitamin K2 is in bioactive Menaquinone-7 (MK-7) form.
- Vitamin D is in effective D3 form.
- Helps balance calcium in the body.
- Improves bone strength & density.
- Maintains cardiovascular health.

SYNERGY OF VITAMINS D3 AND K2 IN CALCIUM METABOLISM

Vitamin K2 and Vitamin D3 are closely linked to calcium metabolism with far reaching effects on both bone and cardiovascular health described in detail below.

Bone and cardiovascular health are closely connected with calcium. Calcium is required to build and maintain healthy bones, while excess calcium deposited in arteries leads to arterial stiffening, which is a risk factor for heart disease.

Vitamin D3 is naturally synthesised when the skin is exposed to sunlight. It plays a role in calcium absorption in the intestine but is also involved in the expression of two major calcium-binding proteins, osteocalcin (ucOC) and matrix GLA protein (ucMGP). Vitamin K2 on the other hand plays a synergistic role in activating these two calcium-binding proteins, turning them into a carboxylated active form to bind with calcium.

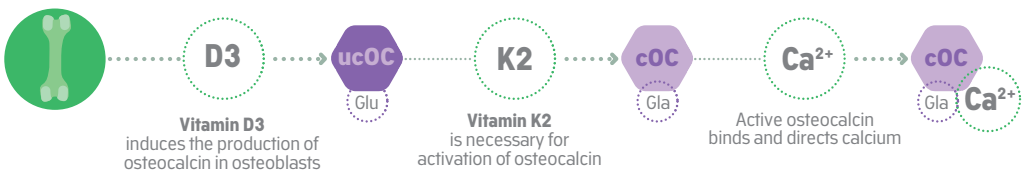
BONE HEALTH

The importance of pairing Vitamin D3 and Vitamin K2 for bone health, is due to the synergistic effect of the two vitamins.

Vitamin D3 is necessary for calcium absorption into the bloodstream and the synthesis of osteocalcin proteins (ucOC).

Vitamin K2 activates osteocalcin in the body, creating carboxylated active osteocalcin (cOC), and plays a pivotal role in bone health by incorporating calcium into the bone. Vitamin D and Vitamin K2 function together to regulate calcium metabolism from the absorption to placement of the mineral in the bone.¹

Role of vitamins D3 & K2 in bone health



KEY:

ucOC uncarboxylated inactive osteocalcin • cOC carboxylated active osteocalcin • Glu glutamate • Gla gamma-carboxyglutamate

An analysis of 8 studies with a total of 971 participants with supplementation study periods of between 6 months and 3 years showed that a combination of vitamins K2+D can significantly increase the total bone mineral density and significantly decrease uncarboxylated inactive osteocalcin in the body.²

A 5 year observational study in men and women showed that low levels of carboxylated active osteocalcin in the body (which is activated by Vitamin K2) was closely indicated with higher occurrence of fractures in men and women.³

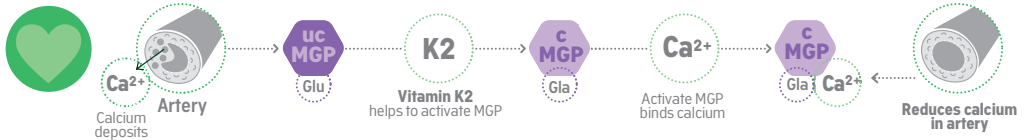
A double-blinded, randomized, placebo controlled study showed that supplementation in 244 postmenopausal women of vitamin K2 (MK-7) daily significantly increased levels of carboxylated active osteocalcin after one year, and also decreased uncarboxylated inactive osteocalcin in the same period. The same study also showed significant benefits in changes to bone mineral density over 3 years and supports the use of vitamin K2 (MK-7) daily to protect postmenopausal women from bone loss.⁴

Additional analysis of 10 studies with a total of 1,346 participants with supplementation study periods of between 6 months and 4 years have further supported the combination of Calcium with Vitamin K2 supplementation to protect bone mineral density and reduce levels of uncarboxylated inactive osteocalcin.⁵

HEART HEALTH

Vitamin D3 is necessary for the synthesis of matrix Gla protein (ucMGP) which is then activated by Vitamin K2, creating carboxylated matrix Gla-protein (cMGP) which binds with calcium and reduces calcium in the arteries of the body. Micro-calcifications in the body are associated with atherosclerosis in the coronary arteries.

Role of vitamins D3 + K2 in heart health



KEY:
 ucMGP uncarboxylated inactive MGP (matrix Gla protein) • cMGP carboxylated active MGP (matrix Gla protein)

The Rotterdam study with 4,807 male and female participants >55 years observed that a dietary intake of Vitamin K2 supports cardiovascular health and the prevention of coronary heart diseases. Vitamin K2 intake was inversely related to incidence of coronary heart disease, severe aortic calcification and cardiovascular disease.⁶

Additional studies have shown that Vitamin D3 and K2 supplementation can slow down the progression of coronary plaque, including in patients on statins.^{7,8}

Several studies have also shown that Vitamin K2 supplementation can have a beneficial impact in lowering the rate and progression of arterial stiffness progression.^{9,10}

VITAMIN K2 VERSUS K1

Quest D3 + K2 provides Vitamin K2 in the bioactive Menaquinone-7 (MK-7) form.

There are two primary forms of vitamin K. Vitamin K1 (phyllloquinone) and Vitamin K2 (menaquinones). Vitamin K2 MK-7 is the more bioavailable and active form of Vitamin K^{11,12}, and yet only 10-25% of total dietary vitamin K intake is in Vitamin K2 form.^{13,14}

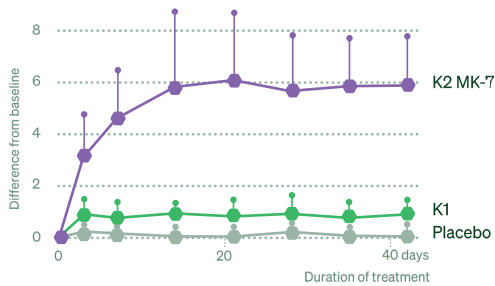
Different forms of vitamin K for different actions

	Vitamin K1	Vitamin K2 MK-7
Source	Green leafy vegetables	Fermented foods
Primary role	<ul style="list-style-type: none"> ● Activation of coagulation factors in the liver ● Activation of bone building proteins (low efficacy) 	<ul style="list-style-type: none"> ● Activation of coagulation factors in the liver and also outside the liver, including protein S which has anti-clotting effects ● Maintaining calcium balance ● Maintaining elastic fibres elasticity ● Immunomodulation ● Activation of bone building proteins (high efficacy)
Main localization	Hepatic: the liver has priority in the utilization of K vitamins. Under inflammatory situation the demand increases in and outside the liver	Extrahepatic: transport to extrahepatic tissues
Half-life	1.5 hrs	72 hrs

Vitamin K1 mainly supports blood coagulation, while Vitamin K2 (MK-7) promotes bone and heart health, and especially acts on calcium metabolism in the body. It remains biologically active in the body longer than other forms of vitamin K with a half-life of 72 hours.

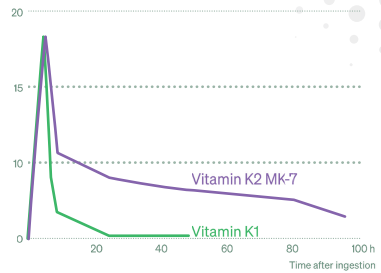
Vitamin K1 v K2 uptake & bioavailability

Serum vitamin K ($\mu\text{g/L}$)



Vitamin K1 v K2 half-life

Vitamin K serum ($\mu\text{g/ml}$)



VITAMIN D3 VERSUS D2

Quest D3 + K2 provides vitamin D3

The preferred marker of vitamin D status is 25(OH)D because it is the principal circulating form of vitamin D in the blood with a half-life of 2–3 weeks. Clinical studies show that orally-administered vitamin D3 increases and maintains total serum 25(OH)D more robustly and effectively than vitamin D2.^{15,16,17,18,19}

HEALTH NEEDS



BONES



HEART &
CIRCULATION



EVERYDAY HEALTH
& WELLBEING

SCIENTIFIC REFERENCES

1. Int J Endocrinol. 2017;2017:p. 7454376.
2. Food Funct. 2020 Apr 30;11(4):3280–3297.
3. Bone Miner Res 2000; 15(12):2473–8.
4. Osteoporos Int. 2013 Sept;24(9):2499–507.
5. Journal of Orthopedic Surgery and Research 2021 Vol. 16 Issue 1 Pages 692.
6. J Nutr. 2003;134(11): 3100–5.
7. European Heart Journal. 2022;43, Supp 2.
8. Advances 2023 Vol. 2 Issue 9 Pages 100643.
9. Nutrients 2023 Vol 15 Issue 11.
10. Am J Transplant 2023 Jan 3;51600–6135(22):30220–4.
11. Blood 2007 Vol. 109 Issue 8 Pages 3279–83.
12. Nutrition Journal 2012, 11:93.
13. Int J Mol Sci 2019 Vol.s20 Issue 4.
14. Br. J. Nut. 2013, 110, 1357 – 1368.
15. J Clin Endocrinol Metab 2013;98(7):2709–15.
16. J Clin Endocrinol Metab 2008;93(8):3015–20.
17. Am J Clin Nutr 1998;68(4):854–8.
18. J Clin Endocrinol Metab 2013;98(11):4339–45.
19. J Clin Endocrinol Metab 2016;101(8):3070–8.