

D and K are being extensively studied and our current understanding is that vitamin D enhances vitamin K-dependent bone protein concentrations and induces bone formation by stimulating cells in charge of the production of new bone tissue.* Furthermore, it appears that vitamin K can interact with the vitamin D receptors present inside cells and affect vitamin D-related functions within cells.* More fundamental research is needed, however, to fully understand the relationship between vitamins D and K within cells with respect to the support of healthy bone tissue metabolism.* Some clinical studies comparing the effect of a combined vitamin D and K supplementation to either vitamin alone have shown better results than expected on bone mass density for the combined supplementation than either vitamin given separately, especially for postmenopausal women.* However, the exact ratio of vitamin D to K and the best form of vitamin K to be used to obtain the best results on bone health is still open for debate. ¹

When it comes to cardiovascular health, the combination of vitamins D and K has also triggered a lot of attention from the scientific research community. Vitamins D and K are also interrelated through the regulation of proteins that are powerful regulators of vascular calcification.* While it is not fully understood how vitamins D and K affect cardiovascular health at the cellular level, observational population studies have indicated that the combination of low serum vitamin D and low serum vitamin K was associated with higher systolic and diastolic blood pressure (while remaining within normal range).* This observation gives a valuable insight on how both vitamin D and K could be involved in cardiovascular health.*²

Furthermore, in an interventional study investigating the combined effect of vitamins D and K on vascular function and calcification in healthy postmenopausal women, after 3 years of supplementation with 1000 µg/d vitamin K₁ + 320 IU vitamin D, the vitamin D+K group maintained vessel wall characteristics of a healthy carotid artery, whereas the control group and the vitamin D-only group did not show any positive effect on the structure of carotid arteries.* These few studies show some potential for the combined effect of vitamins D and K versus vitamin D alone. However, it should be noted that, so far, very few clinical studies have been conducted in this field and that there is still a lot to discover – most notably, what is the optimal vitamin D to K ratio, and what is the best form of vitamin K to be used to achieve the cardiovascular benefits of combined vitamin D and K supplementation.* ¹

Other health benefits related to vitamin D and K supplementation are under investigation, especially their combined effect on insulin metabolism, endocrine function, and oxidative stress.* ¹

Lastly, recently published pre-clinical data suggest that high-dose vitamin D depletes extrahepatic vitamin K stores by strongly increasing the production of specific vitamin K-dependent proteins, leading to the acceleration of elastin fiber calcification and degradation.* Vitamin D administration in a state of vitamin K functional deficiency may thereby alter pulmonary and vascular tissues, since these tissues are naturally rich in elastin fibers.* These observations from laboratory experiments seem to correlate with observations in humans, which indicate that vitamin D supplementation could negatively impact the health of vitamin K-insufficient individuals.* It may therefore be prudent to first supplement with vitamin K before introducing vitamin D supplementation in those who are vitamin D-

deficient, and only add vitamin D when extrahepatic vitamin K status has been restored.

Current evidence supports the notion that joint supplementation with vitamins D and K might be more effective than the consumption of either alone for bone and cardiovascular health.* As more is discovered about the powerful combination of vitamins D and K, it gives a renewed reason to supplement your diet with both vitamin D₃ and K₂ alongside a healthy diet including a variety of foods such as vegetables and fermented dairy for bone and cardiovascular health.*¹ However, many questions remain open when it comes to supplementation: the right vitamin D and K ratio and which forms of vitamin K will generate the best results for cardiovascular and bone health.*

Protocol For Life Balance®, a brand of high-quality dietary supplements, offers several vitamin D and K combinations as well as several potencies of stand-alone vitamins D and K; plus several forms of vitamin K, including menaquinone-4 and -7 (MK-4 and MK-7). This wide range of products allows for customized supplementation to meet the needs of each individual seeking to support both bone and cardiovascular health.* Consulting a healthcare professional to tailor vitamin D and K supplementation is recommended to optimize the health benefits of vitamin D and K combinations.

References:

1. van Ballegooijen AJ, Pilz S, Tomaschitz A, Gröbler MR, Verheyen N. *International Journal of Endocrinology*. 2017;2017.
2. Mayer O, Jr., Seidlerova J, Wohlfahrt P, et al. *J Nutr Biochem*. 2017;46:83-89.

* These statements have not been evaluated by the Food and Drug Administration. These products are not intended to diagnose, treat, cure, or prevent any disease.