

Dietary supplements for the support of cardiovascular health*



How's your cardiovascular supplement literacy? Your life may depend on it! Here's everything you need to know about CoQ10, vitamin K2, vitamin D3, carnitine, hawthorn, and grape seed extract and why they might be essential additions to your supplement regimen. From my friends at Protocol for Life Balance.

-Dr. Ronald Hoffman

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A couple years ago, we published on this platform a review of ingredients found in dietary supplements that can help to support cardiovascular health.* In this article we will continue the review, outlining the cardiovascular supporting properties of ubiquinol and ubiquinone (CoQ₁₀), vitamin K₂ combined with vitamin D₃, as well as carnitine, hawthorn, and grape seed extract.*

Ubiquinol and CoQ₁₀ share the same biological properties, where ubiquinol is a reduced active form of CoQ₁₀. At the molecular level, the ability of ubiquinol/CoQ₁₀ to exchange electrons is central to cellular energy production.* Its powerful free radical neutralizing activity is important for the protection of biological

membranes against oxidative stress, as well as for regenerating antioxidants such as vitamin C and E.*

Scientific studies indicate that ubiquinol, which has a superior bioavailability to other forms of CoQ₁₀, can help to support normal cardiovascular function.* Indeed, in a randomized, double-blind, single-center trial with 51 individuals receiving 100 mg or 200 mg ubiquinol daily, the authors observed that ubiquinol significantly improved endothelial function as measured by flow-mediated dilation of the brachial artery.^{1*}

CoQ₁₀ is also regularly used in dietary supplements aiming to support cardiovascular health.* However, CoQ₁₀ is relatively poorly absorbed by the gastrointestinal tract. This issue can be partially resolved by taking CoQ₁₀ with a fat-containing meal.² In clinical studies, oral dosages as low as 60 mg/day resulted in greater than baseline concentrations and improvements in certain hemodynamic parameters.^{3*}

Vitamins D and K are both fat-soluble vitamins that play central roles in calcium metabolism.* Vitamin D intake promotes the production of proteins that require activation by vitamin K in order to function properly.*¹

Vitamin K₂ is important for cardiovascular health.* Prospective observational studies have shown that higher intakes of dietary vitamin K₂ are associated with healthier cardiovascular systems.* Randomized clinical trials have shown that menaquinone-7 (MK-7) supplementation (up to 360 mcg daily) results in significant improvement in markers of arterial stiffness.^{4-6*}

Among ingredients found in cardiovascular supporting supplements, vitamin D₃ is often added as a synergistic agent with vitamin K₂.* Preclinical research suggests that vitamin D may be involved in regulating blood pressure via the renin-angiotensin-aldosterone system, as well as in insulin metabolism, and it may directly impact vascular tissue.* It has been hypothesized that these proposed functions of vitamin D could explain the observed correlation between vitamin D deficiency and cardiovascular risk.^{7*}

Furthermore, vitamins D and K are interrelated through the regulation of proteins that are involved in 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.*⁸

In an interventional study investigating the combined effect of vitamins D and K on vascular function and calcification in healthy post-menopausal 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?*

Other health benefits related to vitamin D and K supplementation are under investigation, especially as related to their combined effect on insulin metabolism,

endocrine function, and oxidative stress.*⁹

Current evidence supports the notion that joint supplementation with vitamins D and K might be more effective than the consumption of either alone for 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.*⁹

However, many questions remain open when it comes to supplementation: what is the optimal vitamin D/ K ratio, and which forms of vitamin K will generate the best results for cardiovascular health?*

Carnitine is a nutrient often found in cardiovascular supporting supplements.* It has been chosen for its ability to support energy production.* It facilitates the transport of fatty acids across the inner mitochondrial membrane for subsequent β -oxidation, a process also known as the "carnitine shuttle."* Fatty acids are the predominant substrate for energy production in skeletal and cardiac muscles.* In a double-blind, randomized clinical trial with 14 healthy adult volunteers, 24 weeks of supplementation with L-Carnitine Tartrate (Carnipure™, 2 g twice daily with 80 g of simple carbohydrates per intake) resulted in a significant increase in the total muscle carnitine content (21% as compared to baseline confirmed by biopsy), while it remained unchanged in the control group (80 g of carbohydrates twice daily).* When subjected to a standardized cycling exercise challenge, the carnitine group increased work output by 11% while the control group showed no change.* Additionally, the carnitine group utilized 55% less muscle glycogen ($P < 0.05$) during the challenge, which is consistent with an increase in lipid utilization for energy production.*

In addition to vitamins and nutrients, botanicals such as hawthorn and grape seed extract are ingredients commonly found in cardiovascular supporting supplements.*

Hawthorn has a long traditional use in herbalism. Its extract has free radical scavenging and cardio-protective properties.* It regulates coronary blood flow and enhances oxygen flow and utilization by the heart.* Hawthorn is known for its ability to enhance heart contraction and it has vasodilatory properties.*

Grape seed extract possesses naturally occurring polyphenols that have been shown to have free radical neutralizing properties. Numerous studies have demonstrated its positive effects on cardiovascular health.* However, not all grape seed extracts are created equal. MegaNatural®-BP™ is a grapeseed extract standardized to a minimum of 90% polyphenols. This proprietary grape seed extract has been extensively investigated in laboratory settings and in randomized clinical studies. Results from these investigations show that MegaNatural®-BP™ has powerful free radical scavenging properties and an ability to contribute to endothelial relaxation in laboratory settings.* It may also affect platelet aggregation.* In a randomized, placebo-controlled clinical trial in 24 adult volunteers receiving 150 mg or 300 mg grape seed extract daily for four weeks, healthy blood pressure was significantly lowered in the grape seed group after four weeks versus baseline.*

As described above, MK-7, ubiquinol, MegaNatural®-BP™ grape seed extract, L-carnitine are clinically evaluated compounds working at different levels of the structure and function of blood vessels and the heart and cardiovascular system.*

Protocol For Life Balance® offers a wide range of cardiovascular supporting supplements using the ingredients described above, from MK-7 alone or in combination with other ingredients at dosages of up to 300 mcg per capsule, to ubiquinol at 100

mg and 200 mg per softgel. We have also combined these ingredients in botanical-nutrient blends such as in **Clinical Cardio-6**. Protocol For Life Balance® also has an extensive line of additional products that are useful for cardiovascular support, allowing you to tailor your supplementation program to your unique cardiovascular health needs.*

References:

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