


# DEFEND

## Foundational Combination of Vitamins A, D, and K2\*

Vitamins A, D, and K2 are essential nutrients that play important roles in various biological processes. Vitamin A is vital for vision, immune function, and cellular growth and differentiation. Vitamin D is essential for bone health, and immune function, and has been linked to numerous other health benefits. Vitamin K2 is necessary to support bone health and cardiovascular health. Since these three nutrients work together and depend on one another, their combination in a dietary supplement is key. **AstraGin®**, a proprietary blend of Astragalus membranaceus and Panax notoginseng extracts, serves to improve nutrient absorption and enhance the bioavailability of certain compounds, these vitamins included. When combined these nutrients and AstraGin® can create a synergistic effect, potentially enhancing their benefits and improving overall health.



### DEMOGRAPHIC & CLINICAL APPLICATIONS

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| <p><b>MEN &amp; WOMEN</b></p>  | <p><b>PATIENTS REQUIRING</b></p> <ul style="list-style-type: none"> <li>• Cardiometabolic Support</li> <li>• Bone Building &amp; Strengthening Aid</li> <li>• Immune System Support</li> <li>• Sex Hormone Metabolism Support</li> </ul> |
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**DIRECTIONS:** Take 1 capsule daily or as directed by your healthcare practitioner.

### BENEFITS



Supports Healthy Calcium Deposition in Bones & Teeth



Promotes Broad Immune System Activation



Supports Healthy Levels of Oxidation within Blood Vessels



Aids in the Metabolism of Lipids

### DEFEND

| SUPPLEMENT FACTS  |                    |      |
|---|--------------------|------|
| Serving Size: 1 Capsule   Servings Per Container: 60                    |                    |      |
|   | Amount Per Serving | %DV  |
| Vitamin A (as retinyl palmitate)(5,000 IU)                              | 1515 mcg           | 168% |
| Vitamin D (as Vitamin D3, cholecalciferol) (5,000 IU)                   | 125 mcg            | 625% |
| Vitamin E (as d-alpha tocopherol succinate) (121 IU)                    | 100 mg             | 667% |
| Vitamin K2 MK-7 (as K2VITAL® DELTA All-Trans Menaquinone-7)             | 200 mcg            | *    |
| AstraGin® (Astragalus membranaceus and Panax notoginseng) Root Extracts | 50 mg              | *    |

\* Daily Value Not Established

Other Ingredients: Nuflow, Vegetable Capsule (Hypromellose)

### DEFEND PRO

| SUPPLEMENT FACTS  |                    |       |
|---|--------------------|-------|
| Serving Size: 1 Capsule   Servings Per Container: 60                    |                    |       |
|   | Amount Per Serving | %DV   |
| Vitamin A (as retinyl palmitate)(5,000 IU)                              | 1515 mcg           | 168%  |
| Vitamin D (as Vitamin D3, cholecalciferol) (10,000 IU)                  | 250 mcg            | 1250% |
| Vitamin E (as d-alpha tocopherol succinate) (121 IU)                    | 100 mg             | 667%  |
| Vitamin K2 MK-7 (as K2VITAL® DELTA All-Trans Menaquinone-7)             | 300 mcg            | *     |
| AstraGin® (Astragalus membranaceus and Panax notoginseng) Root Extracts | 50 mg              | *     |

\* Daily Value Not Established

Other Ingredients: Nuflow, Vegetable Capsule (Hypromellose)





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Vitamins A, D, and K2 are fat-soluble vitamins that play essential roles in various physiological processes, and they are interrelated in several ways. While they have distinct roles in the body, these vitamins depend on each other to some extent.

One example of their interdependence is their relationship with bone health. Vitamin D helps to regulate calcium and phosphorus levels in the body, which are necessary for bone mineralization. Vitamin K2 activates proteins that help to transport calcium into bones, while vitamin A helps to regulate bone cell activity. Together, these vitamins work synergistically to support bone health. Another example is their role in immune function. Vitamin A is essential for the development and maintenance of immune cells, while vitamin D helps to regulate the immune response. Vitamin K2 also supports immune function by activating proteins that help to fight infection.

## HEART HEALTH

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Vitamin A plays a crucial role in the synthesis and metabolism of cholesterol, which is necessary for producing hormones, cell membranes, and bile acids. Vitamin A also has antioxidant properties, which can help to protect the heart from oxidative damage. Oxidative stress can lead to inflammation and damage to the blood vessels, which can contribute to the development of cardiovascular disease. Moreover, vitamin A has been shown to have a regulatory effect on cardiac cell activity. Vitamin A can regulate the proliferation and differentiation of cardiac cells, essential for maintaining heart function. One review article published in the *Journal of Clinical Medicine* in 2020 highlighted the role of vitamin A in regulating lipid metabolism and promoting arterial integrity.<sup>1</sup>

Vitamin D has been shown to have cardioprotective effects by supporting endothelial function. Vitamin K2 has also been shown to have cardioprotective effects; a study showed that combined supplementation with vitamin K2 and D improved arterial health in postmenopausal women.<sup>2</sup>

## IMMUNE HEALTH

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Vitamins A and D play essential roles in immune system regulation. Vitamin A is involved in the production and maintenance of healthy epithelial tissues, which act as a barrier against infection. Vitamin D has been shown to have immunomodulatory effects, and vitamin D deficiency is associated with an increased incidence of autoimmune tendencies.<sup>3</sup>

As for vitamin D, a review article published in *Nutrients* in 2020 highlighted the role of vitamin D in regulating immune function via regulation of immune cell proliferation and differentiation, including T cells, B cells, and dendritic cells, modulation of cytokine production and regulation of antimicrobial peptide production.<sup>4</sup>

Vitamin K2, a fat-soluble vitamin, plays an essential role in immune function. It does so by activating specific proteins that regulate the immune response. A study published in the *British Journal of Nutrition* in 2020 found that vitamin K2 supplementation improved immune function in elderly individuals by increasing circulating regulatory T cells (Tregs). One such protein is osteocalcin, produced by bone cells and has been shown to have immunomodulatory effects. Studies have shown that vitamin K2 helps to activate osteocalcin, which in turn stimulates the production of white blood cells known as macrophages. These macrophages help to fight off infections by engulfing and destroying invading pathogens.



## SEX HORMONE METABOLISM

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Vitamins A and D are both involved in the regulation of sex hormone metabolism. Vitamin A is vital for producing sex hormones, while vitamin D is crucial in regulating sex hormone levels.

Retinoic acid, a derivative of vitamin A, is involved in the synthesis of sex hormones such as testosterone and estradiol. Retinoic acid regulates the activity of the enzymes that convert cholesterol into sex hormones. In particular, it supports the activity of the enzyme CYP17A1, which synthesizes androgens such as testosterone. It also regulates the activity of the enzyme CYP19A1, which synthesizes estrogens such as estradiol.

Vitamin D is also involved in the regulation of sex hormone levels. It acts on the hypothalamus and pituitary gland to regulate the production of luteinizing hormone (LH) and follicle-stimulating hormone (FSH), essential for producing sex hormones. Vitamin D deficiency has been associated with low levels of testosterone and high levels of sex hormone-binding globulin (SHBG), which can lead to reduced bioavailability of testosterone.

## BOOST ABSORPTION

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**AstraGin®** is a proprietary blend of *Astragalus membranaceus* and *Panax notoginseng* extracts that have been shown to have several potential health benefits. While the effects of AstraGin® specifically on heart health and immune health have not been extensively studied, the individual components of AstraGin® have shown potential benefits for the cardiovascular system through antioxidant support, vessel relaxation, and lipid metabolism. But perhaps more importantly, AstraGin® has been shown to improve nutrient absorption and enhance the bioavailability of specific compounds. One prime example of this is the increase in the expression of the glucose transporter GLUT4, which is involved in the transport of vitamin K2 as well as other nutrients across the intestinal lining.

All in all, Defend and Defend Pro, featuring vitamins A, D, and K2, along with Astragin, offers a unique combination of nutrients that synergistically support heart, bone, immune, and hormone health, improving nutrient absorption and utilization for overall wellness.

## REFERENCES

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1. Zalaket J, Hanna-Wakim L, Matta J. Association between HDL Cholesterol Levels and the Consumption of Vitamin A in Metabolically Healthy Obese Lebanese: A Cross-Sectional Study among Adults in Lebanon. *Cholesterol*. 2018 Jun 3;2018:8050512. doi: 10.1155/2018/8050512. PMID: 29971161; PMCID: PMC6008699.
2. Maresz K. Proper Calcium Use: Vitamin K2 as a Promoter of Bone and Cardiovascular Health. *Integr Med (Encinitas)*. 2015 Feb;14(1):34-9.
3. Dupuis, M.L., Pagano, M.T., Pierdominici, M. et al. The role of vitamin D in autoimmune diseases: could sex make the difference?. *Biol Sex Differ* 12, 12 (2021).
4. Martens PJ, Gysemans C, Verstuyf A, Mathieu AC. Vitamin D's Effect on Immune Function. *Nutrients*. 2020 Apr 28;12(5):1248.