

The Benefits of Vitamin D3 & Vitamin K2

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Bone Health & Cardiovascular Support



1,000 IU's Vitamin D



5,000 IU's Vitamin D



5,000 IU's Vitamin D
180mcg. Vitamin K2
200mg. Magnesium

Vitamin D: The History

Vitamin D may be the “oldest” pro-hormone on the planet, synthesized by a micro-organism which is estimated to have lived in the ocean 750 million years ago. Approximately 150 years ago, it was recognized that people, especially children, who worked and lived in urban areas with little light were especially susceptible to rickets, a softening of the bones leading to fractures and deformity. The predominate cause of rickets is a deficiency of vitamin D.

As early as 1849, cod liver oil was used in the treatment of tuberculosis (TB). We now know that the vitamin D in cod liver oil activates the immune system cells that can fight TB. In 1970, Adolf Windaus, a German scientist, was awarded the Nobel Prize for his synthesis of vitamin D by replicating the photoactivation process that occurs in the skin.

In the 1930s, the U.S Federal Government began recommending to parents, especially those in the Northeast, that they send their children outside to play in order to increase vitamin D levels. In addition, milk was fortified with vitamin D.

Today we know that vitamin D has many critical metabolic functions, yet much of the population is still at risk of deficiency. It is estimated that at least 30%, and as much as 80%, of the US population is deficient in vitamin D. In the latitudes north of Atlanta, Georgia (USA), the skin does not photo-convert any vitamin D from November through March. During this season, the angle of the sun is too low to allow ultraviolet B light to penetrate the atmosphere. Instead, it is absorbed by the ozone layer. In late Spring, Summer, and early Fall, most vitamin D is synthesized by the skin between 10 am and 3 pm when UVB from the sun penetrates the atmosphere and reaches the earth's surface.

The Importance of Sun Exposure:

Vitamin D is produced by a phyto-reaction of exposure to ultraviolet B light from the sun (wavelength 270-300 nm, with peak synthesis occurring between 295-297 nm). These wavelengths are present in sunlight when the UV index is greater than 3. This solar elevation occurs daily within the tropics, daily during the spring and summer seasons in temperate regions, and almost never within the arctic circles. Sufficient amounts of vitamin D3 can be made in the skin after only ten to fifteen minutes of adequate sun exposure to the face, arms, hands, or back (without sunscreen) at least two times per week. With longer exposure to UVB rays, an equilibrium is achieved in the skin, and the vitamin simply degrades as fast as it is generated. Even dietary sources of vitamin D are ultimately derived from organisms, from mushrooms to animals, which are not able to synthesize it except through the action of sunlight at some point. For example, fish contain vitamin D only because they ultimately exist on a diet of ocean algae which synthesize vitamin D in shallow waters from the action of solar UV.



Vitamin D3: The Chemistry

Vitamin D exists in several forms, however, the primary forms of vitamin D are D2 (ergocalciferol) and D3 (calciferol), which is more than three times as effective as D2 in raising serum concentrates of vitamin D. These are known collectively as calciferol. Vitamin D is a fat-soluble vitamin derived from the diet, or synthesized in the body after exposure to ultraviolet rays from the sun.

Vitamin D is also referred to as a pro-hormone, meaning that it has no hormone activity itself, but is converted to the active hormone 1,25-D through a tightly regulated synthesis mechanism. The liver and kidney help convert vitamin D to its active hormone form.

Activation of Vitamin D3:

Once present in the body, vitamin D is transported to the liver where it is hydroxylated to form 25-hydroxyvitamin D[25(OH)D], the major circulating form of vitamin D and currently, the most useful indicator of your vitamin D nutritional status. This form of vitamin D has a half life of about 3 weeks and must be converted to the more active 1,25-(OH)2D for utilization the body.

In the kidney, the 25(OH)D is further catalyzed, resulting in the formation of 1,25-(OH)2D, the most potent form of vitamin D. Most of the physiological effects of vitamin D in the body are related to the activity of 1,25-(OH)2D. 1,25-(OH)2D is highly active metabolically and its levels are tightly controlled. Plasma concentrations are mainly dependent on renal function, appropriate parathyroid hormone levels, and the supply of calcium and phosphate. The blood levels of this metabolite decline only after vitamin D depletion is virtually complete.

Vitamin D3 and Bone Health:

Probably the most important effect of vitamin D is to facilitate absorption of calcium from the small intestine and the re-sorption of calcium within the kidney, minimizing the loss of calcium in the urine. Vitamin D also enhances fluxes of calcium out of bone.

Vitamin D does this in concert with parathyroid hormone. Because of its important regulatory role, a vitamin D deficiency can contribute to the bone weakening diseases of osteomalacia and osteoporosis.

Vitamin D3 and Cancer†:

Between 2006 & 2008, researchers at the University of California, San Diego (UCSD) and the Department of Family and Preventive Medicine, using data available on worldwide cancer incidence, have shown a clear association between deficiency in exposure to sunlight, specifically (UVB), and breast cancer, kidney cancer, lung cancer, ovarian cancer, and endometrial cancer.

The International Journal of Cancer (June 2008) identified vitamin D's anti-oxidant activity in prostate cells. Researchers believe that this antioxidant activity may be part of the reason for vitamin D's anti-cancer activity. More than 1000 laboratory and epidemiological studies have been published concerning the association between vitamin D and its metabolites and cancer. Long-term studies have demonstrated the efficacy of moderate intake of vitamin D in reducing cancer risk and, when administered with calcium, in reducing the incidence of fractures.

Benefits of Vitamin D3†:

- **Maintains Calcium Balance** for normal functioning of the nervous system, bone growth, and maintenance of bone density.
- **Aids Cell Differentiation.** Vitamin D is known to regulate cell proliferation and gene expression in a variety of epithelial cells.
- **Boosts Your Immunity.** The active form of vitamin D (1,25-(OH)2D) has been shown to inhibit the development of autoimmune diseases, including inflammatory bowel disease (IBD).
- **Modulates Insulin Secretion.** Vitamin D plays a role in insulin secretion under conditions of increased insulin demand.
- **Decreases risk of Cardio Vascular Disease.** Moderate D deficiency plus high blood pressure has been shown to nearly double the risk of myocardial infarction, stroke and heart failure. (Framingham Heart Study). Adequate vitamin D levels may be important for decreasing the risk of high blood pressure.

Health Consequences Associated with a Vitamin D Deficiency†:

Bone disorders, Joint Disorders, Muscular weakness, Cardiovascular disorders, Psychoneurological disorders, Endocrine disorders, Polycystic ovary syndrome, Inflammatory bowel disease, Periodontal disease, Irritable Bowel Disease, Crohn's, Ulcerative Colitis. Heart Disease, Hypertension, Arthritis, Chronic Pain, Depression, Inflammatory Bowel Disease, Obesity, Premenstrual Syndrome, Fibromyalgia, Crohns Disease, Multiple Sclerosis, Autoimmune Illness, and Cancer.



Optimal Levels of Vitamin D3†:

Daily Intake	Associated Effects
100 IU	Prevents rickets, nutritional disease. Amount in one glass of milk or fortified orange juice.
200 IU	“Adequate intake” per RDA (pre-1997)
400 IU	“Adequate intake” per RDA (post-1997). Reduces risk of rheumatoid arthritis in women by 50%.
1000 IU	Reduces risk of cancer (breast, colorectal, ovarian, prostate) by 50%.
2000 IU	Reduces risk of Type 1 diabetes by 80% reduces upper respiratory tract infections in elderly by 90%
30,000 IU	Minimum to develop toxicity over several months/years.

Recommended Levels†:

Many nutritionist recommend 1,000-2000 IU per day. Therapeutic Use: up to 5,000 IU per day is generally considered safe. At this level it is best to check with your physician or health care practitioner.

Contraindications†:

People with chronic granulomatous disorder, such as histoplasmosis, sarcoidosis or tuberculosis, should use Vitamin D at levels recommended by their physician. Blood levels above 30ng/ml can cause hypercalcemia and hypercalciuria.

Vitamin K2 MK-7†

THE MOST BIOLOGICALLY ACTIVE FORM OF VITAMIN K

Vitamin K₂ (MK-7)* is a highly bioavailable extract of Natto, a traditional food used in Japan for over 1,000 years! Derived from fermented soybeans, a significant amount of MK-7 is produced during a proprietary fermentation process. There are generally two forms of Vitamin K: K₁ and K₂. Vitamin K₁ is obtained in the diet primarily from dark leafy vegetables (lettuce, spinach and broccoli). Unfortunately, Vitamin K₁ is tightly bound to the chlorophyll in green plants, thus, aging humans are not always able to benefit from ingested K₁-containing plants. While Vitamin K₁ is not absorbed particularly well from food, it is absorbed from supplements provided that the supplements are taken with meals.

Vitamin K₂ (MK-7) is found only in small quantities in the diet, primarily in dairy products. Human studies show that **Vitamin K₂ (MK-7)** is absorbed up to ten times more than Vitamin K₁. **Vitamin K₂ (MK-7)** remains biologically more active in the body far more than Vitamin K₁. For instance, Vitamin K₁ is rapidly cleared by the liver within 8 hours, whereas measurable levels of **Vitamin K₂ (MK-7)** have been detected 72 hours after ingestion. Our **Vitamin K₂ (MK-7)** is naturally produced and does not contain genetically modified microorganisms (GMO-Free).

Our bones change every seven years Bone is comprised of a hard outer shell and a spongy inner tissue matrix which is a living substance. The entire skeleton is replaced every seven years. This process is regulated by osteoblasts cells that build up the skeleton and osteoblasts cells that break down the skeleton. As long as the bone forming activity (absorption) is greater than the bone-breakdown (resorption) the process of maintaining health bones will be under control.

Osteoblasts produce a vitamin K-dependent protein called osteocalin. This protein helps bind calcium in the bone matrix lending to increased bone mineral content. Consequently the skeleton becomes more resistant and less susceptible to fracture. Osteocalin needs natural **Vitamin K₂ (MK-7)** to function optimally. Long-term vitamin K deficiency will lead to significantly reduced density and quality of bone.

Vitamin K₂ (MK-7) helps keep calcium from hardening and blocking arteries while redirecting it to maintain bone strength. Vitamin K deficiency can also be caused by diseases such as biliary disease, cystic fibrosis, celiac disease, liver disease and Crohn’s disease. New research is being performed to link Vitamin K₂ with preventing and/or improving kidney disease, liver disease, neurological disorders and even certain cancers. It is important that we supplement our diets with the proper amount of our all natural, allergen free, Non GMO and Kosher certified **Vitamin K₂ (MK-7)**.



Vitamin K₂ MK-7†:

- According to the World's Health Organization (WHO), 200 million people are susceptible to bone fractures due to poor bone metabolism. This condition is characterized by loss of bone mineral density which leads to bone that is weaker and with loss of density more susceptible to fractures.
- One in three men is expected to incur bone fractures.
- Nearly one in two women has lifetime risk of fractures.
- Women in general have less bone mass than men.
- Annual loss of bone mass in women accelerates after menopause.
- Beneficial to anyone interested in healthy bone metabolism.

Allergen Free†:

Our **Vitamin K₂ (MK-7)** is free of all known allergen sources including milk, eggs, wheat, soy, peanuts, tree nuts, fish, shellfish, sesame seeds, mustard, celery, lupin, sulfates, yeast, sugar artificial colors/sweeteners, sugar, alcohols, preservatives, corn, gluten, animal materials or other allergens.

Key Features†:

- Contain greater than 95% pure menaquinone-7
- 100% trans-form – the most usable form for human consumption
- Highly stable and highly bioavailable
- No solvents/Preservatives
- Kosher Certified, non-GMO. Free of allergens
- Vitamin D is more effectively utilized by the body when it is combined with Vitamin K.

Frequently Asked Questions

Q: Why is **Vitamin K₂ (MK-7)** necessary?

A: MK-7 regulates calcium through an amino acid that is part of the matrix glaprotein (a calcium-regulating protein) which is dependent on MK-7 to function properly. If the protein does not contain enough MK-7, it will not be able to retain calcium through carboxylation. Without MK-7. Calcium does not get directed to the areas where it is needed, such as bones, but instead calcium moves out into the bloodstream and deposits in arteries and other soft tissue. MK-7 ensures that the calcium is directed and retained in the bones at normal, healthy levels.

Q: How will **Vitamin K₂ (MK-7)** benefit me?

A: MK-7 helps promote a healthy cardiovascular system and may help to maintain healthy joints and arteries. MK-7 is unique unlike synthetic vitamin K₃ and does not concentrate in the liver or display toxicity.

Q: How does **Vitamin K₂ (MK-7)** support healthy bones?

A: Bone mineral density is directly related to the amount of MK7 that is present in the body. With the addition of MK-7 to the diet, the onset of osteoporosis might be avoided and the risk of any bone loss or fractures may be diminished.

Q: Can **Vitamin K₂ (MK-7)** be taken with **OsteoFlex** and **New Spirit Naturals High Grade Calcium Complex**?

A: Yes, **Vitamin K₂ (MK-7)** is required for Calcium utilization – the key factor in maintaining both bone and cardiovascular health. Taken in tandem with these nutrients is recommended for maximum efficiency and supporting bone, joint and artery health through all natural means.

†These statements have not been evaluated by the FDA. Information contained in this bulletin is for informational purposes only and is not intended to diagnose, treat, cure, or prevent any disease. In all cases, it is recommended that you consult with your healthcare professional before initiating a supplement program.