D3 50,000

Once Weekly High-Potency Vitamin D

Available in 30 capsules

Clinical Applications

- Supports Bone Health and Musculoskeletal Comfort*
- Supports Modulation of Immune Function*
- Supports Neurologic and Cognitive Health*
- Supports Cardiovascular Health*
- Supports Healthy Blood Sugar Metabolism*
- Supports Vitamin D Repletion*

D3 50,000 *IU is a convenient once-per-week solution for individuals whose healthcare practitioner has recommended a high-dose supplement to support the repletion of their vitamin D level. Vitamin D is a crucial nutrient to support immune function, musculoskeletal comfort, healthy blood sugar metabolism, and cardiovascular, bone, cognitive, and neurologic health.**

Discussion

Vitamin D has numerous critical roles in human physiology and is imperative for supporting overall health from gestation to senescence. Vitamin D is unique because it can be synthesized in the skin. When 7-dehydrocholesterol reacts to sunlight, it is transported to the liver and converted into the metabolically active form 1α,25-dihydroxyvitamin D.[1] This process may be inefficient in those with darker skin tones and is dependent on sunlight intensity, which varies with latitude, season, and other factors.*

Vitamin D insufficiency may occur more frequently in older adults, people with gastrointestinal (GI) issues that can impair vitamin D absorption, individuals with obesity or those who have undergone gastric bypass surgery, and those with limited sun exposure and extensive sunscreen use, which can limit vitamin D synthesis. Additionally, individuals consuming a low-cholesterol diet, those on medications that bind fats, or those with fat malabsorption issues are at risk for insufficiency as cholesterol is a precursor to vitamin D formation.[2]*

According to the Dietary Guidelines for Americans and data from the National Health and Nutrition Examination Surveys (NHANEs), vitamin D consumption falls short in many Americans' diets.[3,4] Most dietary vitamin D comes from fortified foods; however, food sources naturally containing vitamin D are limited to fatty fish, egg yolks, and small amounts in other animal-source foods.[2]* Therefore, assessing average intake levels of vitamin D is somewhat difficult.

Growing awareness of the functional role and health consequences associated with the lack of dietary vitamin D has prompted many healthcare practitioners to include a regular assessment of serum vitamin D as part of their standard order for lab work. Vitamin D levels below 20 ng/mL are considered deficient, and between 21 and 29 ng/mL are insufficient.[2,5,6]*

The dose of vitamin D required to correct a deficiency and maintain a serum level above 30 ng/mL may be impacted by age and clinical circumstances. These factors also contribute to the wide variation in daily recommended intake levels. For example, the baseline recommended daily allowance for adults aged 19 to 50 set by the Institute of Medicine is 600 IU with an upper limit of 4,000 IU. Whereas the Endocrine Practice Guidelines Committee recommends an intake of 1,500 to 2,000 IU with an upper limit of 10,000 IU for individuals of this same age group *who are at risk for deficiency*, and daily-dose recommendations ranging from 6,000 to 10,000 IU daily or 50,000 IU weekly to reach 30 ng/mL in those *who are deficient*.[1,5]*

Immune Health

Vitamin D works as a modulator of immune function. Deficiency has been linked to compromised immune system integrity and insufficient immune responses.[7,8] Vitamin D has multiple functions in immune cells, including increasing the antimicrobial activity of neutrophils, promoting apoptosis of immunoglobulin-producing B cells, suppressing T-cell proliferation, and differentiation of monocytes to macrophages, which increases their activity against pathogens and reduces the secretion of pro-inflammatory factors.[1]*

In a study designed to better understand the molecular response to vitamin D in deficient subjects (N = 100), serum samples were analyzed to describe changes in blood transcriptome after administration of 50,000 IU of vitamin D weekly. Vitamin D supplementation resulted in the downregulation of the cytokine signaling pathways, regulation of NF-kB activity, and impacted other immune signaling pathways.[7]*

A meta-analysis of data from 25 randomized clinical trials concludes a significant overall protective effect on respiratory immune health in deficient individuals given a daily dose of 400 to 1,000 IU of vitamin D for up to 1 year.[8] Within that meta-analysis, 1 study assessed the immune status of rural Indian children (N = 135) over 6 months and reported that those given vitamin D experienced fewer immune challenges, which correlated with improved vitamin D status.[9]*

Musculoskeletal Comfort

Vitamin D is essential for developing muscle fibers and modulating healthy inflammatory processes, affecting muscle function. Insufficient vitamin D levels can adversely affect muscle strength and comfort.[2,10,11]*

In a trial designed to assess the modulating effect of vitamin D on muscle cells after excessive exercise, male volunteers (N = 60) were subjected to exercise testing before and 3 months after supplementation. At a dose calculated based on body mass and baseline levels, vitamin D was found to be effective in restoring optimal serum D levels and significantly contributing to reduced post-exercise muscle damage markers compared with baseline.[12] Additionally, an in vitro analysis of the muscle cell migration dynamics from a similar study suggests a role for vitamin D in human skeletal muscle regeneration, repair, and subsequent hypertrophy.[13]*

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A randomized, open-label trial with vitamin D doses ranging from 2,500 IU daily to 50,000 IU weekly suggested a significant role in supporting musculoskeletal comfort in those with deficiency or insufficiency.[14] Additionally, daily supplementation of 4,000 IU of vitamin D for 12 weeks in subjects (N = 80) with musculoskeletal discomfort resulted in a significant decline in visual analogue scale scores of pain and a decrease in pro-inflammatory cytokines.[15] Results from these trials challenge those of several previous studies that did not suggest a benefit for vitamin D in easing musculoskeletal comfort; additional research is needed to elicit this role further.*

Blood Sugar Metabolism
Vitamin D plays a role in blood sugar metabolism by stimulating insulin secretion via vitamin D receptors in pancreatic beta cells. It can also ease insulin resistance through its impact on muscle and liver receptors. In a systematic review of 20 randomized clinical trials, vitamin D supplementation increased serum D levels and reduced insulin resistance, which was prominent with large doses for a short time in patients who were deficient.[16]*

In a trial examining the effect of weekly high-dose vitamin D supplements on serum D levels and insulin resistance, subjects (N = 120) were supplemented with 25,000 or 50,000 IU of vitamin D weekly. Serum D was assessed at baseline and again after 3 months, and insulin resistance was measured using homeostatic model assessment for insulin resistance (HOMA-IR). The higher dose of vitamin D was more effective in correcting blood levels and improving insulin sensitivity.[17]*

Cardiovascular Health
Vitamin D is functional in regulating the renin-angiotensin system, which is important in controlling blood pressure.[18] There is also evidence that vitamin D deficiency contributes to a lack of arterial elasticity and vascular function and issues such as hyperlipidemia and left ventricular hypertrophy.

In a double-blind, randomized clinical study, researchers assessed the differential effects of vitamin D supplementation in a high-risk cardiovascular disease group. Subjects (N = 70) with deficient serum D levels were randomized to receive 600, 2,000, or 4,000 IU/d of vitamin D or placebo for 16 weeks. Supplementation resulted in dose-dependent increases in serum D concentrations, with 2,000 or 4,000 IU/d reducing arterial stiffness, as measured by carotid-femoral pulse wave velocity, which was significantly reduced in the 4,000-IU/d group.[20]*

A systematic review and meta-analysis analyzed data from 41 randomized trials to assess the effect of vitamin D supplementation on serum lipid profiles. A beneficial effect was concluded for serum total cholesterol, low-density lipoprotein cholesterol, and triglyceride reduction but not for high-density lipoprotein cholesterol, suggesting supplementation was useful in individuals with vitamin D insufficiency who are also at high cardiovascular disease risk. Improvements in total cholesterol and triglycerides were more pronounced in subjects with vitamin D deficiency at baseline.[21]*

Bone Health
The role of vitamin D in skeletal health and bone density is well-established. Vitamin D is intricately involved in calcium homeostasis. If calcium levels are low, parathyroid hormone (PTH) is secreted. The PTH stimulates vitamin D to balance serum calcium levels by increasing dietary calcium absorption, increasing reabsorption of calcium filtered by the kidney, and mobilizing calcium from bone when dietary levels are insufficient, putting bone health at risk. Vitamin D and PTH also regulate homeostasis of serum phosphorus, which is involved in bone and teeth formation.[22]*

Research indicates that vitamin D deficiency coexists with low bone mineral density, and vitamin D insufficiency is a common risk factor for osteoporosis associated with increased bone remodeling and low bone mass.[23] A pooled analysis evaluating 11 randomized, double-blind, placebo-controlled trials concluded that vitamin D supplementation (>800 IU daily) was favorable in maintaining hip and nonvertebral bone integrity in individuals 65 and older.[24]*

Additionally, vitamin D deficiency has been linked to poor oral health and defective tooth mineralization, which may increase the risk of the onset and progression of dental caries.[22] In a randomized clinical trial in subjects (N = 96) with mild to moderate gingivitis, a safe and effective healthy inflammatory response was provoked in those who supplemented with 500 to 2,000 IU of vitamin D daily for 12 weeks.[25]*

Neurologic Health
Vitamin D supports neurologic health by regulating growth factors for neural and glial cells and neurotransmitter synthesis, including acetylcholine, dopamine, and GABA. Research has linked these biochemical effects and vitamin D insufficiency to the onset and progression of neurological conditions.[1]*

In a double-blind, randomized, placebo-controlled pilot trial, subjects (N = 30) with optic neuritis and low serum D levels were given 50,000 IU of vitamin D weekly for 1 year. Supplementation decreased the risk of a definitive conversion to multiple sclerosis (MS).[26] In another trial in subjects (N = 40) with relapsing-remitting MS, a daily vitamin D dose of 10,400 IU was concluded to be safe and tolerable and to exhibit in vivo pleiotropic immunomodulatory effects.[27]*

Individuals who regularly experienced migraines and were deficient or insufficient in D were given 50,000 IU of vitamin D per week in a 10-week trial. The intervention group (N = 39) had lower mean headache frequency when compared with placebo.[28]*

In a trial of subjects (N = 60) with diabetic neuropathy who received 50,000 IU of D per week for 12 weeks, supplementation was associated with improved vitamin D serum levels and a significant decrease in neuropathy symptoms.[29]*

Cognitive Health
Animal, in vitro, and observational studies have suggested an association between vitamin D and improvement of cognition in those at risk for decline. In a randomized clinical trial assessing the effect of vitamin D supplementation on cognitive function in subjects (N = 30) with type 2 diabetes, participants received either a weekly vitamin D dose of 50,000 IU or a comparator of 5,000 IU for 3 months. Upon comparison, there were no significant cognitive findings, but cognitive function test improvements were observed for several parameters for both dose groups. The authors suggested further research is warranted with a larger subject pool, a placebo group, and the inclusion of only participants with serum D levels below 20 ng/mL.[30]*

D3 50,000 IU is a weekly vitamin D supplement for individuals whose healthcare practitioner has recommended a high dose to support the repletion of their vitamin D level. Although several studies have supported the safety and efficacy of a high weekly dose without the risk of toxicity,[6,31,32] it is recommended that a 50,000-IU dose only be used under the supervision of a healthcare professional. This formula is not intended for daily or long-term use.*

Blood Sugar Support

Bone Health Support

Cardiovascular Support

Immune System Support

Joint & Muscle Support

Neurologic & Cognitive

D3 50,000 Supplement Facts

Serving Size: 1 Capsule

	Amount Per Serving	%Daily Value
Vitamin D3 (cholecalciferol)	1,250 mcg (50,000 IU)	6,250%

Other Ingredients: Capsule (hypromellose and water), microcrystalline cellulose, ascorbyl palmitate, silica, and hydroxypropyl cellulose.

DIRECTIONS: Take only one capsule per week. Do not exceed one capsule per week unless directed by your healthcare professional.

CAUTIONS: Consult your healthcare professional before use. Individuals taking medication should discuss potential interactions with their healthcare professionals. This product contains a high dose of vitamin D that is not intended for daily or long-term use or use by children or pregnant/nursing women. Do not use if tamper seal is damaged.

STORAGE: Keep tightly closed in a cool, dry place out of reach of children.

FORMULATED TO EXCLUDE: Wheat, gluten, yeast, soy, dairy products, fish, shellfish, peanuts, tree nuts, egg, sesame, ingredients derived from genetically modified organisms (GMOs), artificial colors, and artificial sweeteners.

VEGETARIAN CAPS

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Additional references available upon request

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