



Hi-Po Emulsi-D3™

HIGH POTENCY, NATURALLY-EMULSIFIED LIQUID VITAMIN D3 FOR BONE HEALTH AND IMMUNE SUPPORT

30 ML LIQUID | NPN80111003 | EMD10Z-CN

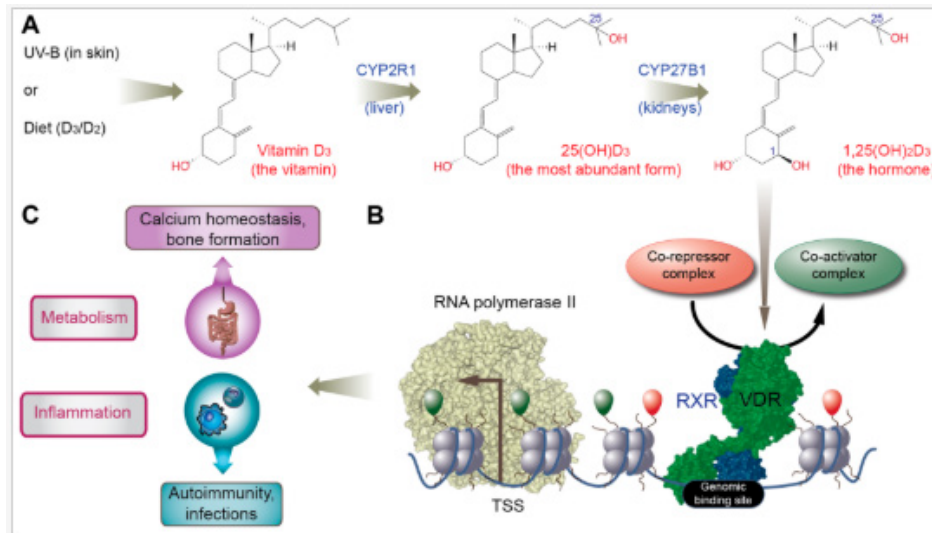
Hi-Po Emulsi-D3™ is a concentrated, highly bioavailable liquid vitamin D formulation offering a broad range of dosage and titration possibilities. Unlike many other liquid vitamin D products available, Hi-Po Emulsi-D3™ is a convenient, pleasant-tasting and easily mixable formula. It can be dropped into any beverage or simply on the tongue, and provides accurate dosing one drop at a time. A natural emulsion technology allows for the production of a 50 mcg (2,000 IU) per drop formula that quickly and completely disperses in liquid. This innovative technology provides enhanced bioavailability, utilizing only naturally-derived ingredients that are free of preservatives and synthetic surfactants.

Although it is classified as a vitamin, vitamin D more closely resembles and functions like a steroid hormone that contributes in multiple ways to the optimal function of human physiology.¹ This fat-soluble vitamin is widely recognized for its critical role in maintaining optimal bone and arterial health, and for supporting proper immune function; however, its function far surpasses this, with many facets likely yet to be identified and elucidated. For example, vitamin D helps regulate phosphorus balance, is needed for cell differentiation, and may also play a role in insulin secretion.² Vitamin D receptors are found throughout the body and have been shown to influence the expression of thousands of genes.^{3,4} It also plays a role in brain development in early life as well as brain function in adults, which may explain in part the associations between vitamin D deficiency, depressed moods, seasonal disorders, and impaired cognition,^{5,6} and the improvements some patients report in these symptoms upon supplementation. In a study that looked at 290 patients with mental illness, 272 (94%) showed clinical vitamin D inadequacy or deficiency (VDID), indicating that deficiency is greater in patients with mental illness than in the general population.⁷

Vitamin D3 (cholecalciferol) is synthesized in the skin from cholesterol in response to absorbing UVB rays. It then gets converted in the liver to 25-hydroxycholecalciferol, known as 25(OH)D3, which is the best biomarker for vitamin D status as it is the most stable and abundant vitamin D metabolite in human serum. It finally gets converted into its active hormonal form 1,25 dihydroxycholecalciferol - 1,25 (OH)D3 - in the kidneys.¹ Most holistically-oriented health care practitioners aim for serum vitamin D levels between 50-100 ng/mL as optimal. However, vitamin D deficiency (a level \leq 20 ng/mL) is a major global public health concern, with epidemiological findings showing nearly 1 billion people worldwide to be deficient, while 50% of the population present with vitamin D insufficiency.⁸ Many patients will require a higher dose of vitamin D in order to achieve optimal vitamin D status.

Several factors contribute to the high incidence of deficiency, such as avoidance of sun exposure, older age (the elderly have reduced capacity to synthesize vitamin D in skin upon exposure to UVB radiation and are more likely to stay indoors or use sunscreen), inadequate dietary intake (common among vegans), chronic kidney or liver diseases, malabsorption syndromes such as celiac disease, gastric bypass, cystic fibrosis, inflammatory bowel disease (IBD), chronic medication and alcoholic use, and obesity.⁸ Individuals with darker skin color may be genetically adapted to require more sun exposure than those with lighter skin; individuals of African, Middle Eastern, and Hispanic ancestry have higher rates of deficiency compared to Caucasians.⁸ In fact, vitamin D deficiency in African Americans was 82% compared to the U.S. national average of 42%.⁹ Additionally, modern diets are typically lower in vitamin D-rich foods that were once a more regular part of people's diets, such as fatty fish, cod liver oil and lard from pasture-raised pigs. Prolonged and severe vitamin D deficiency leads to rickets in children and osteomalacia in adults. Vitamin D2 (ergocalciferol) is the form typically used in food

fortification, but evidence indicates that D3 is far more effective for raising and maintaining serum 25(OH)D concentration and that D2 should not be considered equivalent.^{10,11}



Graphic source: Carlberg, C. (2019). Nutrigenomics of vitamin D. *Nutrients*, 11(3), 676. DOI: <https://doi.org/10.3390/nu11030676>

Vitamin D and Bone Health

Vitamin D assists with proper bone and tooth health and is important for cellular metabolism, as it controls calcium homeostasis. Vitamin D facilitates intestinal calcium absorption and reduces calcium excretion by the kidneys, providing calcium necessary for bone mineralization. Vitamin D is vital for normal growth and development in children and adolescents with peak bone mass occurring in the late teenage years, increasing about 40 times from birth to adulthood.¹² The risk of osteoporosis has its roots in childhood and adolescence, as the rate of cortical bone remodeling is as high as 50% per year in young children.¹² A recent meta-analysis suggests that older adults who are at increased risk for fractures and/or vitamin D deficiency would benefit from supplementing with 800 - 1,000 IU vitamin D per day.¹³ In healthy postmenopausal women with low 25(OH)D and high parathyroid hormone (PTH) levels, 3 months of 2,800 IU of daily vitamin D3 significantly increased serum vitamin D levels, reduced PTH levels, and significantly improved bone strength and trabecular thickness in the tibia, and volumetric bone mineral density in the trochanter and femoral neck compared to the placebo group.¹⁴

BENEFITS OF VITAMIN D:

- Supports bone and hard tissue health
- Helps reduce the risk of osteomalacia/osteoporosis
- Helps regulate gene expression and cellular differentiation
- Helps regulate phosphorus balance in the body
- Supports neurological health and brain development
- Helps maintain immune system balance

Vitamin D and Healthy Immune Function

Vitamin D is essential for immunity, as it modulates the response of the innate and adaptive immune system via vitamin D receptor (VDR). VDR is the key transcription factor in differentiating lymphocytes within the bone marrow into monocytes and granulocytes.¹⁵ Via toll-like receptors and macrophages, vitamin D stimulates the recognition of bacterial pathogens in monocytes and inhibits *M. tuberculosis* proliferation.¹⁵ Vitamin D is able to regulate Th1 and Th2 lymphocyte balance and downregulate the expression of inflammatory cytokines overall. 1,25(OH)2D3 has been shown to heavily influence and shift dendritic cells' and macrophages' intracellular metabolism, metabolically reprogramming their role in inflammation and autoimmunity by altering these cells' phenotypic expression.¹⁶ In fact, research shows that priming of naive CD4+ T cells with vitamin D-treated tolerogenic dendritic cells induces T-regulatory cells that dampen chronic inflammation that could prevent or reverse autoimmune processes.¹⁷

Medicinal Ingredients (per drop):

Vitamin D3 (Cholecalciferol) 50 mcg (2000 IU)

Non-Medicinal Ingredients: Glycerin, Water, Medium chain triglycerides, Vitamin E. **Recommended Dose:** Adults 18 years and older: Take 1 drop per day or as directed by your health care practitioner. To be taken with an adequate intake of calcium.

REFERENCES

For a list of references cited in this document, please visit: http://catalog.designsforhealth.com/assets/itemresources/Hi_Po_Emuls_D3_References.pdf

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FOUNDATIONAL HEALTH



Hi-Po Emulsi-D3™ is a concentrated, highly bioavailable liquid vitamin D formulation. Unlike many other liquid vitamin D products available, Hi-Po Emulsi-D3™ is a convenient, pleasant-tasting and easily mixable formula. It can be dropped into any beverage or simply on the tongue and provides accurate dosing one drop at a time. Its liquid form makes it an ideal choice for those that have difficulty swallowing pills, such as the elderly and children.

A natural emulsion technology allows for the production of a 50 mcg (2,000 IU) per drop formula that quickly and completely disperses in liquid. This innovative technology provides enhanced bioavailability, utilizing only naturally-derived ingredients that are free of preservatives and synthetic surfactants.

Although it's considered a vitamin, vitamin D acts more like a hormone in the body, with influences on a broad array of tissues and biochemical processes. This nutrient is critical for a healthy immune system and strong bones, but its functions go far beyond this. Vitamin D receptors are found throughout the body and have been shown to influence the expression of thousands of genes, as well as having an influence on healthy brain function, including playing a role in cognitive function

Recommended Dose

Adults 18 years and older: Take 1 drop per day or as directed by your health care practitioner. To be taken with an adequate intake of calcium.

and supporting balanced moods and a positive mental outlook. Vitamin D helps regulate the body's calcium levels. When calcium levels are low, vitamin D stimulates calcium absorption and reduces calcium excretion, thereby encouraging healthy bones and teeth. Healthy prostate, colon, and breast tissues are also supported by vitamin D.

A significant proportion of people in North America have suboptimal levels of vitamin D. Several factors contribute to this, such as avoidance of sun exposure, older age (the elderly have reduced capacity to synthesize vitamin D in the skin upon exposure to UVB radiation and are more likely to stay indoors or use sunscreen), gastrointestinal and digestive conditions that affect the absorption of fat-soluble vitamins, and various health and lifestyle issues that interfere with vitamin D absorption or increase the need for vitamin D.

Additionally, modern diets are typically low in vitamin D-rich foods that were once a more regular part of people's diets, such as fatty fish, cod liver oil and lard from pasture-raised pigs. Vitamin D2 is the form typically used in fortified foods, but evidence indicates that D3 (as is found in Hi-Po Emulsi-D3™) is more effective for increasing and maintaining a healthy vitamin D level in the blood.

Highlights

- Supports bone and hard tissue health
- Helps regulate phosphorus balance in the body
- Supports brain health and development
- Helps maintain immune system balance

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Consult with your health-care practitioner about your specific circumstances and any questions you may have about this product.
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