

Liquid Sun™



CLINICAL APPLICATIONS

- Bone/Dental Health
- Support Musculoskeletal Comfort
- Repletion for Diet/Drug-Related Deficiency/Limited Sunlight Exposure
- Modulation of Immune Function/Chemoprotection
- Support Cardiovascular Health/Healthy Blood Sugar
- Support Healthy Inflammatory Response

Liquid Sun is cholecalciferol derived from lanolin and provided in a convenient liquid base of sunflower oil and purified water. The vitamin D and sunflower oil is combined using a special micro-emulsification process designed to create a natural micellized matrix once coated by the stomach bile to encourage absorption. Vitamin D3 has been demonstrated to be three times as potent as vitamin D2.

All 360 Medicine® Formulas Meet or Exceed cGMP quality Standards

DISCUSSION

Vitamin D deficiency, seemingly underestimated in the older literature, is now recognized as being very prevalent and is implicated in what appears to be an increasingly wide array of conditions and diseases. This is no wonder when one considers that the secosteroid hormone targets about 200 or more genes. Indeed, recent studies have linked low levels of 25-hydroxy vitamin D to many kinds of cancer,^[1] cardiovascular disorders,^[2] autoimmune conditions,^[3] poor balance,^[4] depression,^[5] birth defects,^[6] diabetes,^[7] chronic musculoskeletal pain,^[8] periodontal disease,^[9] and inflammatory bowel disease.^[10] According to one theory deficiency may be a piece of the autism puzzle;^[11] another theory is that deficiency may explain why some people are more susceptible to the flu.^[12] A 2007 meta-analysis of 18 RTCs concluded that total mortality can be reduced with even low levels of supplemental vitamin D.^[13]

Cholecalciferol is the form in which vitamin D is derived in the body from cholesterol and synthesized by sunlight on the skin. Ergocalciferol (D2) and cholecalciferol (D3) are very similar biochemically; however, vitamin D2 is one-third the potency and has shorter duration of action relative to vitamin D3.^[14] Both forms of the vitamin have to undergo two sequential hydroxylation reactions in vivo to make them biologically active. The kidneys and other cells throughout the body convert D3 into the hormone, calcitriol which affects bone, intestine, muscle, brain, skin and immune system cells. Calcitriol is important for healthy cell differentiation.

The active metabolites of cholecalciferol increase plasma levels of calcium and phosphorous by increasing the amount of calbindin, the protein responsible for binding calcium in the intestine, and by stimulating transfer of calcium and phosphorus from the bone to the plasma.

The consensus of scientific understanding at this time appears to be that vitamin D “deficiency” is reached at serum 25-hydroxyvitamin D (25(OH)D) levels less than 20 ng/mL (50 nmol/L), “insufficiency” in the range from 20-32 ng/mL, and “sufficiency” in the range from 33-80 ng/mL, with “normal” in sunny countries being considered 54-90 ng/mL, and “excess” greater than 100 ng/mL. The maximal 25(OH)D concentration produced by natural UV exposure appears to be approximately 60 ng/ml. Thus, it seems prudent to use this value as an upper limit when prescribing vitamin D supplementation.^[15] Note: 25(OH)D levels are reported in the literature as either ng/ml or nmol/l (1 ng/ml equals 2.5 nmol/l).



Supplement Facts

Serving Size: 1 drop (0.0394 mL)
Servings Per Container: ~ 1,500

	Amount Per Serving	% Daily Value
Vitamin D3 (as cholecalciferol)	1000 IU	250%

Other Ingredients: Sunflower oil and purified water.

DOSING:

Shake well before using. Take one to five drops (plain or in liquid) or as directed by your healthcare practitioner. Although still under scrutiny, current understanding is that the physiological requirement may be as high as 4000 iu/day for adults.^[13] Although the Food and Nutrition Board established the Upper Tolerable Level (UL) at 2000 iu/day for adults, newer research demonstrates this is very conservative and it appears unlikely that toxicity would occur in healthy people with doses less than 10,000 iu/day, the amount that could be synthesized daily with full-body exposure to sunlight.^[15,16] For adolescents, 2000 iu daily for a year has proven safe and efficacious.^[17]

NOTE:

One microgram of cholecalciferol has 40 iu of Vitamin D activity. A practitioner can reasonably expect to see a 10 ng/l increase in serum 25(OH)D in 3-4 months in a patient supplementing with 1000 iu of cholecalciferol daily.^[13]

REFERENCES

1. Garland CF, et al. The role of Vitamin D in cancer prevention. Am J Public Health. 2005 Dec 27; [Epub ahead of print] [PMID: 16380576]
2. Vitamin D and blood pressure connection: update on epidemiologic, clinical, and mechanistic evidence. Nutr Rev. 2008 May;66(5):291-7 [PMID: 18454816]
3. Mouyis M, et al. Hypovitaminosis D among rheumatology outpatients in clinical practice. Rheumatology (Oxford). 2008 May 22 [PMID: 18499714]
4. Moylan KC, Binder EF. Falls in older adults: risk assessment, management and prevention. Am J Med. 2007 Jun;120(6):493.e1-6 [PMID: 17524747]
5. Berk M, Vitamin D deficiency may play a role in depression. Med Hypotheses. 2007;69(6):1316-9. Epub 2007 May 11 [PMID: 17499448]
6. Thomson K, et al. Postnatal evaluation of vitamin D and bone health in women who were vitamin D-deficient in pregnancy, and in their infants. Med J Aust. 2004 Nov 1;181(9):486-8 [PMID: 15516192]
7. Knekt P, et al. Serum Vitamin D and Subsequent Occurrence of Type 2 Diabetes. Epidemiology. 2008 May 20. [PMID: 18496468]
8. Turner MK, et al. Prevalence and Clinical Correlates of Vitamin D Inadequacy among Patients with Chronic Pain. Pain Med. 2008 Mar 11. [PMID: 18346069]
9. Naito M, Association between vitamin D receptor gene haplotypes and chronic periodontitis among Japanese men. Int J Med Sci. 2007 Aug 22;4(4):216-22
10. Martinesi M, Vitamin D derivatives induce apoptosis and downregulate ICAM-1 levels in peripheral blood mononuclear cells of inflammatory bowel disease patients. Inflamm Bowel Dis. 2008 May;14(5):597-604 [PMID: 18200516]
11. Cannell JJ. Autism and vitamin D. Med Hypotheses. 2008;70(4):750-9. [PMID: 17920208]
12. Cannell JJ, et al. Epidemic influenza and vitamin D. Epidemiol Infect. 2006 Dec;134(6):1129-40. [PMID: 16959053]
13. Cannell JJ, Hollis BW, Zasloff M & Heaney RP. Diagnosis and treatment of vitamin D deficiency. Opin. Pharmacother. (2008) 9(1):1-12
14. Armas LA, Hollis BW, Heaney RP Vitamin D2 is much less effective than vitamin D3 in humans. J Clin Endocrinol Metab. 2004 Nov;89(11):5387-91
15. Binkley N, et al. Low Vitamin D Status despite Abundant Sun Exposure. J Clin Endocrinol Metab. 2007 Jun;92(6):2130-5 [PMID: 17426097]
16. Heaney RP. Vitamin D in health and disease. Clin J Am Soc Nephrol. 2008 Sep;3(5):1535-41 [PMID: 18525006]
17. Maalouf J, et al. Short-term and long-term safety of weekly high-dose vitamin D3 supplementation in school children. J Clin Endocrinol Metab. 2008 Apr 29. [PMID: 18445674]

CAUTIONS

Vitamin D3 is highly lipid-soluble, has a plasma half-life of about 19-25 hours, and a terminal half-life of weeks to months. Its kinetics are not linear, with greater increases in serum levels when baseline is low. High doses, (100,000 iu/day) for weeks or months can cause thirst, appetite loss, nausea and stupor. Toxicity of vitamin D causes abnormally high calcium levels. There are certain medical conditions for which vitamin D supplementation is contraindicated.

STORAGE:

Refrigerate after opening.

*These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.



360° Medicine