

THE VITAMIN D STORY

TECHNICALLY NOT A VITAMIN

Vitamin D is a fat-soluble micronutrient that is naturally present in very few foods. Technically, it is not a vitamin. Vitamin D is metabolized in the liver and kidneys to become calcitriol, the most powerful seco-steroid hormone in the human body. There are two forms; vitamin D2 and vitamin D3. Vitamin D2 is the form made by plants from the natural sterol ergosterol while D3 is made in the skin of humans and animals from a natural form of cholesterol (7-dehydrocholesterol) and exposure to UVB rays from sunlight.

Two common ways to gain vitamin D are through the consumption of foods such as fatty fish and other foods specifically fortified with vitamin D and through sunlight when ultraviolet rays touch the skin and trigger vitamin D synthesis.^{1,2}

VITAMIN D TEAMS UP WITH CALCIUM FOR STRONGER BONES

Vitamin D is essential for promoting calcium absorption in the body and for maintaining adequate calcium and phosphate concentrations in the blood to enable normal bone mineralization and growth. Without sufficient vitamin D, bones can become thin, brittle, or misshapen. Vitamin D prevents rickets in children, osteomalacia in adults, and together with calcium, osteoporosis in older adults.^{3,4}

WHY IS VITAMIN D DEFICIENCY ON THE RISE?

As the recommended Adequate Intake (AI) amounts for vitamin D have increased, the sources of vitamin D have decreased. Very few foods contain Vitamin D naturally. The best sources are oily fish and fish liver oils (such as Cod Liver Oil) with smaller amounts in beef liver, cheese and egg yolks.⁵ Most of the vitamin D in the North American diet comes from fortified foods via milk and dairy products, breakfast cereals, and some brands of orange juice. For several health reasons including concerns about cholesterol levels, many of these foods are consumed on a restricted basis.

Vitamin D is also known as the Sunshine Vitamin, as cholecalciferol is formed in the skin when ultraviolet 'UVB' light strikes bare skin. Seasons, geographic latitude, time of day, cloud cover, smog, melanin content, and sunscreen use are among the factors that affect UV radiation exposure and vitamin D synthesis.⁶ Despite the importance of sun in vitamin D synthesis, most people now realize it is prudent to limit exposure of skin to sunlight and tanning beds due to the potential for lifetime cumulative UV damage that can lead to skin cancer.^{7,8} Also, as people age, the amount of vitamin D made in the skin after exposure to sunlight declines, and the body loses some of its ability to convert vitamin D into the active hormone needed for proper calcium metabolism.

Many experts concur that the safest way to ensure optimal vitamin D intake is through dietary supplements.

HOW MUCH VITAMIN D IS ADEQUATE?

The Food and Nutrition Board (FNB) at the Institute of Medicine established an Adequate Intake (AI) for vitamin D in 1997 at 200 IU from birth to 50 years and 400 IU for people 50+, representing the daily intake sufficient to maintain bone health and normal calcium metabolism in healthy people. Since that time, substantial new research has been published to justify a re-evaluation of adequate vitamin D intakes per the FNB's expert committee on vitamin D established in 2008. Many health experts today believe the AI for vitamin D should be increased to 1,000 IU for adults.

OTHER HEALTH RISKS ASSOCIATED WITH VITAMIN D DEFICIENCY

In addition to weaker bones, vitamin D malnutrition can be associated with an increased susceptibility to several chronic diseases, such as high blood pressure, tuberculosis, cancer, periodontal disease, multiple sclerosis, chronic pain, seasonal affective disorder, peripheral artery disease, cognitive impairment, and several autoimmune diseases including type 1 diabetes.⁹

Most People Do Not Get Adequate Amounts of Vitamin D

VITAMIN D		
Age in years	Adequate Intakes (AI, IU)	Rate of Deficiency (%)
Males & Females		
1-3	200	30
4-8	200	41
Males		
9-13	200	47
14-18	200	50
19-30	200	61
31-50	200	55
51-70	400	93
71 and over	600	>97
Females		
9-13	200	53
14-18	200	75
19-30	200	78
31-50	200	68
51-70	400	>97
71 and over	600	>97
Pregnant 19-30	200	37

According to data from the 2005-06 NHANES study and the Food & Nutrition Board, Institute of Medicine, USA.

While ongoing research points to the importance of vitamin D, the facts remain that huge portions of the population do not get nearly enough. As the above chart shows, most groups do not meet the current AI, not to mention the expected recommendations. It is this data that leads many scientists and health professionals to claim we are experiencing a vitamin D crisis.



GNLD PROVIDES MULTIPLE SOURCES OF VITAMIN D

Chelated Cal-Mag with 1,000 IU of Vitamin D₃ provides a unique amino-acid-chelated calcium to help improve absorption in a 2-to-1 ratio with magnesium. GNLD's proprietary double amino acid chelation supports maximum absorption of calcium and magnesium while including a powerful dose of vitamin D₃, the most readily absorbable and highly bioavailable form of vitamin D.

Several other GNLD products contain vitamin D, including:

- Cod Liver Oil
- Vegetarian Multi
- Vita-Squares®
- Liqui-Vite
- Formula IV® and Formula IV® Plus
- Sports 30
- Active 40+
- Stress 30
- Multi-Min
- GR² Control Meal Replacement Shakes

REFERENCES

- [1] DeLuca HF, Zierold C. Mechanisms and functions of vitamin D. *Nutr Rev* 1998;56:S4-10. [PubMed abstract]
- [2] DeLuca HF. Overview of general physiologic features and functions of vitamin D. *Am J Clin Nutr* 2004;80:1689S-96S. [PubMed abstract]
- [3] Goldring SR, Krane S, Avioli LV. Disorders of calcification: osteomalacia and rickets. In: DeGroot LJ, Besser M, Burger HG, Jameson JL, Loriaux DL, Marshall JC, et al., eds. *Endocrinology*. 3rd ed. Philadelphia: WB Saunders, 1995:1204-27.
- [4] Favus MJ, Christakos S. *Primer on the Metabolic Bone Diseases and Disorders of Mineral Metabolism*. 3rd ed. Philadelphia, PA: Lippincott-Raven, 1996.
- [5] Institute of Medicine, Food and Nutrition Board. *Dietary Reference Intakes: Calcium, Phosphorus, Magnesium, Vitamin D, and Fluoride*. Washington, DC: National Academy Press, 1997.
- [6] Holick MF. Vitamin D: the underappreciated D-lightful hormone that is important for skeletal and cellular health. *Curr Opin Endocrinol Diabetes* 2002;9:87-98.
- [7] Wolpowitz D, Gilchrist BA. The vitamin D questions: how much do you need and how should you get it? *J Am Acad Dermatol* 2006;54:301-17. [PubMed abstract]
- [8] International Agency for Research on Cancer Working Group on ultraviolet (UV) light and skin cancer. The association of use of sunbeds with cutaneous malignant melanoma and other skin cancers: a systematic review. *Int J Cancer* 2006;120:1116-22. [PubMed abstract]
- [9] Vitamin D Council Website. Accessed October 22, 2009. Available at www.vitaminDcouncil.org.