MEGA D Vit. D3 1,000 I.U.

DESCRIPTION: One softgel provides 1000 IU of vitamin D3 100 count bottle of easily swallowed light beige softgels.

FORMULA: One softgel provides Vitamin D3 of 1000 IU (250% daily value). Other ingredients: rice bran oil, gelatin, glycerin and purified water.

DIRECTIONS: One capsule per day; recent investigations into the safety and efficacy of vitamin D3 indicate more vitamin D3 is required during the winter months and periods of cloud cover. It is advisable to raise the daily dose to 1000 IU, year round.

BACKGROUND: Structure and physical properties: Vitamin D3 is a three-ringed hydrocarbon, containing a single hydroxyl group and structurally related to cholesterol. For full activity, D3 is further hydroxylated by the enzyme cytochrome P-450 in the liver, biosynthesizing the active vitamin D3, di-hydroxyD3. Human plasma seems to acts as the storehouse for vitamin D3 because no repository organ has been identified. The lifetime of di-hydroxyD3 in the bloodstream is several weeks1. A small portion of the circulating di-hydroxyD3 is removed by the kidney for yet another hydroxylation, forming the important vitamin D hormone, calcitriol. This final hydroxylation is stimulated by the parathyroid hormone (PTH) when calcium levels are low. An overabundance of calcitriol is prevented, in the presence of plentiful calcium, under the direction of PTH, to "incorrectly" hydroxylate excess D3 into an inactive form. Hence, the levels of vitamin D3 and calcitriol are rigorously controlled in the body and overdoses are very uncommon.

Physiology: The di-hydroxyD3 (1α,25-(OH)2D3) is the form of vitamin D3 with the highest bloodstream concentration. It has been shown to rapidly signal the release of calcium from intracellular stores in bone-forming osteoblasts and from extra-cellular stores into these cells in a manner of minutes2. It also modulates levels of cyclic AMP, protein kinase signaling activities, phosphate transport and skeletal muscle cell calcium content. Though calcitriol and di-hydroxyD3 are known to interact with transcription promoters within the nucleus, much like steroid hormones, many forms of stimulation like cyclic AMP, protein kinase and calcium transport occur much too rapidly to be the result of new protein synthesis. These enhanced activities must occur through direct interaction of D3 with these signaling enzymes. Circulating levels of vitamin D3 and calcitriol are inversely correlated with levels of the PTH, and high PTH damages the body by stimulating bone catabolism and degenerative joint disease.

Intake: Much Vitamin D is synthesized in the human skin from the organic fatty precursor, 7-dehydrocholesterol and sunlight, converting this form of cholesterol into previtamin D3. Less than an hour per day of sunshine is thought sufficient for this transformation and no overdose of D3 from sunlight exposure has been documented. Synthesis is reduced in darkly pigmented skin or for people with minimal skin exposure. Vitamin D3 is slowly synthesized from this intermediate over a period of days then released from the skin into the bloodstream in a measured fashion3 to be further modified in the liver and kidney. While this unique and "free" biosynthesis is adequate for humans at low latitudes and good weather, increasing latitude, cloud cover and our indoor life style enormously decrease the effectiveness of the photosynthetic biosynthesis. During digestion vitamin D3 is rapidly assimilated by a specific calcium transport protein located in the duodenal and intestinal epithelia. This is the protein responsible for vitamin D assisted calcium transport from lunch into the bloodstream. Again, this stimulation of calcium transport occurs much too quickly to be the result of gene transcription and then protein synthesis and is thought to be another case of vitamin D directly stimulating enzyme activity. Oral

vitamin D3 results in a 70% higher level of vitamin D in the bloodstream4 when compared to dosing with oral D2. (Vitamin D2 is a product from fungi fermentation.)

Insufficiency and deficiency: Vitamin D3 deficiency has become a problem of epidemic proportions for the elderly and blacks of all ages across North America5. This deficiency has lead to a rise in reports of rickets in small children with dark skin in the US and Canada. Elderly folks, bedridden or confined to rest homes, also suffer low levels of circulating vitamin D and as many as 40% are now considered insufficient in circulating D3. It seems that people in North America, spending the most time indoors, cannot generate enough vitamin D in the summer to sustain an adequate level through the winter months and many people are deficient in vitamin D for many months. Therapy for clinical osteoporosis now includes liberal amounts of vitamin D36. Clinicians in sunny Australia now consider the deficiency problem so serious as to study routine injection of massive doses of vitamin D37.

Symptoms of vitamin D deficiency: osteopathy – can lead to loss of spinal minerals in women of any age and hip fractures in the aged. Studies of vitamin D and bone density concluded the low dosage given during these studies, was not enough to be efficacious. Myopathy – insufficient vitamin D impedes calcium transport in muscles creating musculoskeletal pain and is even suspected for causing heart weakness8. Immune weakness – vitamin D deficiency is correlated with increased respiratory infections and is strongly correlated to tuberculosis and multiple sclerosis. Inflammation– lack of vitamin D is correlated with rheumatoid arthritis and irritable bowel syndrome9.
Food sources: Few food sources provide natural vitamin D3; egg yolk and fish oils. Much of our dietary vitamin D3 is provided by fortified milk and margarine. Children on high rice diets low in protein and fats can develop severe vitamin D deficiency manifesting as rickets. Replacing milk with soft drinks in our adolescent diets exacerbates the problem. There is a growing consensus among those immersed in vitamin D research and clinical work that the current US government recommendation is much too low for the general public welfare1.

References

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