

Vitamin D, *The Sunshine Vitamin*

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In the 1930s, a vitamin D deficiency disease called rickets was a major public health problem in the United States so a milk fortification program was implemented nearly eliminating this disorder. However, the chief source of vitamin D is sunlight exposure, and dietary sources of vitamin D are low in comparison. The buzz today in healthcare is the rising levels of vitamin D deficiency. While we are thankfully not seeing increasing cases of rickets, Vitamin D serves many roles in the body. It is essential for calcium absorption from the GI tract and maintaining calcium and phosphate balance and thus bone growth and strength. More specifically many of the body's cellular processes that control immune function, nerve and muscle interaction and inflammation need vitamin D to take place. Many disorders including cardiovascular disease, fibromyalgia, osteoporosis, connective tissue disease, hypothyroidism, migraines, muscle weakness have been linked to deficiencies in Vitamin D.

The present recommendation is between 400-600 international units a day but this is in the process of being re-evaluated and many specialists are now recommending between 1000 and 2000 IU a day.

The prevailing issue today is how to meet the vitamin D deficiency. Vitamin D is a fat-soluble vitamin that is naturally present in very few foods, added to others, and available as a dietary supplement. It is also produced in the body when ultraviolet rays from sunlight strike the skin and trigger vitamin D synthesis. Vitamin D obtained from sun exposure, food, and supplements is biologically **inactive** and must undergo two chemical processes in the body for **activation**. The first occurs in the liver and converts vitamin D to 25-hydroxyvitamin D, also known as calcidiol. The second occurs primarily in the kidney and forms the physiologically active 1,25-dihydroxyvitamin D, also known as calcitriol or D3.

Exposing yourself to sunlight is the most important source of vitamin D because sunlight is far more likely to provide you with your vitamin D requirement than food is. UV rays from the sun trigger vitamin D production in your skin. Lights from your home are not strong enough to produce vitamin D. Season, geographic latitude, time of day, cloud cover, smog, and sunscreen affect UV ray exposure and vitamin D synthesis. Sunscreens with a sun protection factor (SPF) of 8 or greater will block UV rays that produce vitamin D. An initial exposure to sunlight of 10 to 15 minutes allows you adequate time for Vitamin D synthesis and should be followed by application of a sunscreen with an SPF of at least 15 to protect the skin. Ten to fifteen minutes of sun exposure at least two times per week to the face, arms, hands, or back without sunscreen is usually sufficient to provide adequate vitamin D. Certainly some foods like cod liver oil, salmon, mackerel, tuna and sardines can be reasonable sources of vitamin D.

So what is the best form of vitamin D to take. In supplements and fortified foods, vitamin D is available in two forms, D₂ (ergocalciferol) and D₃ (cholecalciferol). The two forms have traditionally been regarded as equivalent based on their ability to cure rickets, but evidence has been offered that they are metabolized differently. Vitamin D₃ could be more than three times as effective as vitamin D₂ in raising serum 25(OH)D concentrations and maintaining those levels for a longer time, and its metabolites have superior affinity for vitamin D-binding proteins in plasma . This is an important distinction because the most common prescription supplement for Vitamin D is the D₂(ergocalciferol) version and this may need to be given in higher doses as it is less bioavailable than the D₃ version.

Excessive sun exposure does not result in vitamin D toxicity because the sustained heat on the skin is thought to photodegrade previtamin D₃ and vitamin D₃ as it is formed. High intakes of dietary vitamin D are very unlikely to result in toxicity unless large amounts of cod liver oil are consumed; toxicity is more likely to occur from high intakes of supplements.

Vitamin D toxicity can cause nonspecific symptoms such as nausea, vomiting, poor appetite, constipation, weakness, and weight loss. More seriously, it can also raise blood levels of calcium, causing mental status changes such as confusion and heart rhythm abnormalities. Deposition of calcium and phosphate in the kidneys and other soft tissues can also be caused by excessive vitamin D levels.

Sometimes, we forget how powerful vitamins can be and how important they are to the basic body functions. We become so focused on the use of prescription medications we clearly underestimate the medicinal properties of vitamins.

It is possible that we have been deficient in vitamin D for some time but because we are looking more readily and it is relatively easy to test for we are becoming more focused on the role of this powerful vitamin.

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