

Supplementation of Vitamin D

Vitamin D is a fat-soluble vitamin that acts as a steroid hormone. The body makes vitamin D from cholesterol through a process triggered by the action of the sun's ultraviolet B rays on the skin. Factors such as skin color, age, amount and time of sun exposure, and geographic location affect how much vitamin D the body makes. Vitamin D influences the bones, intestines, immune and cardiovascular systems, pancreas, muscles, brain, and the control of cell cycles. Its primary functions are to maintain normal blood concentrations of calcium and phosphorus and to support bone health.

Current studies suggest that we may need more vitamin D than presently recommended to prevent chronic disease. Emerging research supports the possible role of vitamin D in protecting against cancer, heart disease, fractures and falls, autoimmune diseases, influenza, type 2 diabetes, and depression.

Risk factors for vitamin D deficiency include living in northern latitudes (in the U.S., above the line from San Francisco to Philadelphia), failing to get at least 15 minutes of direct sun exposure daily, being African American or dark-skinned, being elderly, or being overweight or obese. Rickets and osteomalacia are the well-known diseases of severe vitamin D deficiency. Musculoskeletal pain and periodontal disease may also indicate a significant vitamin D deficiency. Subtle symptoms of milder deficiency include loss of appetite, diarrhea, insomnia, vision problems, and a burning sensation in the mouth and throat. Drawing a blood calcidiol concentration is the standard test for vitamin D status, since calcidiol has a longer half-life.

Sufficient or deficient?

Deficiency	less than 15 ng/ml
Insufficient	15-34 ng/ml
Adequate	greater than 35 ng/ml

Only a few foods are a good source of vitamin D. These include fortified dairy products and breakfast cereals, fatty fish, beef liver, and egg yolks. Besides increasing sun exposure, the best way to get additional vitamin D is through supplementation. Traditional multivitamins contain about 400 IU of vitamin D, but many multivitamins now contain 800 to 1,000 IU. A variety of options are available for individual vitamin D supplements, including capsules, chewable tablets, liquids, and drops. Cod liver oil is a good source of vitamin D, but in large doses there is a risk of vitamin A toxicity

The two forms of vitamin D used in supplements are D₂ (ergocalciferol) and D₃ (*cholecalciferol*). D₃ is the preferred form, as it is chemically similar to the form of vitamin D produced by the body and is more effective than D₂ at raising the blood concentration of vitamin D. Since vitamin D is fat soluble, it should be taken with a snack or meal containing fat. In general, 100 IU of vitamin D daily can raise blood concentrations 1 ng/mL after 2 to 3 months

Expected Increase in Blood Concentration

100 IU	1 ng/mL
200 IU	2 ng/mL
400 IU	4 ng/mL
800 IU	8 ng/mL
1,000 IU	10 ng/mL
2,000 IU	20 ng/mL