Abstract: Since the term Vitamin D contains the word “vitamin” most people wrongly assume adequate amounts can be obtained by eating a healthy diet. But to obtain adequate amounts these diets must contain wild-caught fatty fish, Shitake mushrooms, reindeer meat, or cod liver oil. Vitamin D promotes the reabsorption of calcium and phosphorus from the intestines and the kidneys, which is needed for bone growth and normal mineralization. Vitamin D also acts as a molecular switch, activating more than 200 target genes. Vitamin D receptors exist in most tissues of the body, like the brain, colon, prostate, and breast. This explains why Vitamin D may have a role in preventing so many different diseases such as protection against rheumatoid arthritis, psoriasis, lupus, type 1 diabetes, and multiple sclerosis. The skin’s production of Vitamin D is based on distance from the equator, season of the year, time of day, air pollution, cloud cover, melanin content of the skin, use of sunblock, age, and extent of clothing covering the body. Anyone who works indoors, lives at higher latitudes, wears excessive clothing, regularly uses sunblock, is dark-skinned (melanin acts as an effective sunscreen), obese, or who avoids the sun is at risk.

Vitamin D deficient patients display symptoms that are extremely common, difficult to treat, and easy for doctors to dismiss. Symptoms such as muscle weakness, a feeling of heaviness in the legs, chronic musculoskeletal pain, fatigue, and tiring easily are common. These symptoms are due to Vitamin D receptors present in the skeletal muscle and bone. As a result, patients with Vitamin D deficiency often complain of aches and pains in their joints and muscles. The vast majority of Vitamin D deficiency cases may appear normal on exam although frequent infection and autoimmune illness may be warning signs that a deficiency has been present for many years. Illnesses associated with Vitamin D deficiency are cancer, heart disease, multiple sclerosis, diabetes, autism, stroke, rheumatoid arthritis, inflammatory bowel disease, periodontal disease, macular degeneration, mental illness, depression, preeclampsia of pregnancy, rickets, osteomalacia, and osteoporosis. Treatment of Vitamin D Deficiency is Vitamin D supplementation, sunlight, and artificial ultraviolet B radiation. As little as 10 minutes of sunlight is thought to be enough to prevent Vitamin D deficiencies.
Vitamin D

Vitamin D is actually not a vitamin. Vitamin D is a steroid hormone with multiple functions and two forms. Vitamin D3 is produced in skin exposed to sunlight. Vitamin D2 is consumed in a healthy diet containing for example, Vitamin D fortified milk.

Since the term Vitamin D contains the word “vitamin” most people wrongly assume adequate amounts can be obtained by eating a healthy diet. But to obtain adequate amounts these diets must contain wild-caught fatty fish, Shitake mushrooms, reindeer meat, or cod liver oil. Only small amounts of Vitamin D are in fortified foods such as milk, orange juice, and cereals.

Effects of Vitamin D on the Body

Vitamin D promotes the reabsorption of calcium and phosphorus from the intestines and the kidneys, which is needed for bone growth and normal mineralization.

Vitamin D acts as a molecular switch, activating more than 200 target genes. Vitamin D receptors exist in most tissues of the body, like the brain, colon, prostate, and breast. This explains why Vitamin D may have a role in preventing so many different diseases such as protection against rheumatoid arthritis, psoriasis, lupus, type 1 diabetes, and multiple sclerosis. Vitamin D has been shown to inhibit cancer cell growth. One of the most important genes Vitamin D regulates is for cathelicidin, a protein that helps the immune system fight against bacteria, viruses, and fungi.
Factors Affecting Vitamin D Production

The skin’s production of Vitamin D is based on distance from the equator, season of the year, time of day, air pollution, cloud cover, melanin content of the skin, use of sunblock, age, and extent of clothing covering the body. A sunscreen with a sun protection of 15 absorbs 99% of the UVB radiation and when properly topically applied will decrease the synthesis of Vitamin D in the skin by 99%. Also, Vitamin D production is absent for the entire day during several wintertime months, in the early and later part of each day, and impaired anytime the skies are cloudy.

Risk Factors

Anyone who works indoors, lives at higher latitudes, wears excessive clothing, regularly uses sunblock, is dark-skinned (melanin acts as an effective sunscreen), obese, or who avoids the sun is at risk. The recommendation for the avoidance of all sun exposure has put the world’s population at risk of Vitamin D deficiency.

Vitamin D Deficiency Symptoms

Vitamin D deficient patients display symptoms that are extremely common, difficult to treat, and easy for doctors to dismiss. Symptoms such as muscle weakness, a feeling of heaviness in the legs, chronic musculoskeletal pain, fatigue, and tiring easily are common. These symptoms are due to Vitamin D receptors present in the skeletal muscle and bone. As a result, patients with Vitamin D deficiency often complain of aches and pains in their joints and muscles.

The vast majority of Vitamin D deficiency cases may appear normal on exam although frequent infection and autoimmune illness may be warning signs that a deficiency has been present for many years. Illnesses associated with Vitamin D deficiency are cancer, heart disease, multiple sclerosis, diabetes, autism, stroke, rheumatoid arthritis, inflammatory bowel disease, periodontal disease, macular degeneration, mental illness, depression, preeclampsia of pregnancy, rickets, osteomalacia, and osteoporosis.
Treatment of Vitamin D Deficiency

Three treatment modalities exist for Vitamin D deficiency:

1. Vitamin D supplementation. The treatment of choice for Vitamin D deficiency is Vitamin D, (Cholecalciferol), available over the counter.

2. Sunlight.

3. Artificial Ultraviolet B (UVB) radiation (tanning beds). Patients should avoid sunburn and understand that regular UV exposure ages the skin and increases the risk of skin cancers.

Prevention and Monitoring

As little as 10 minutes of sunlight is thought to be enough to prevent Vitamin D deficiencies. 10-15 minutes of full body exposure to summer noon-day sun or artificial UVB radiation (such as tanning beds) will input more than 10,000 IU of Vitamin D on light-skinned adults. When fair-skinned people sunbathe in the summer they produce about 20,000 IU of Vitamin D in 30 minutes. This is the equivalent of drinking 200 8 oz glasses of milk or taking 50 standard multivitamins.

800-1000 IU of supplemental Vitamin D is needed for children and adults who are unable to get adequate sun exposure. Parents should supplement breast-fed infants starting immediately after birth with at least 800 IU of Vitamin D, while formula fed infants need 400 IU per day.

The physician should screen all patients at risk for Vitamin D deficiency by obtaining a serum 25(OH)D level. This should be obtained at least twice yearly, once in the early spring and once in the late...
summer. Vitamin D levels for infants, children, pregnant women, lactating women, healthy young adults, or the elderly should be between 40-70 ng/ml year-round.

Works Cited:

