Vitamin D – to supplement or not
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The following information has been extracted from the Cornell University Plant Based Nutrition certification course, taught by Dr. Matt Lederman, a board-certified internist who specializes in nutrition and lifestyle medicine. I have not included references, but can do so upon request.

Dr. Lederman states, "Our bodies were designed to get their nutrients from food. Supplements are not food. We absorb vitamins and minerals from our food better than we do from a supplement."

Key points from Dr. Lederman's lecture:

1. Supplements do not cure disease
2. Supplements do not improve health unless one has a proven deficiency.
3. Isolated nutrients/protein powders are producing a single vitamin or mineral in a lab and putting it into a bottle. These powders are not necessary for good health or athletic performance. If you prefer to use them, use minimally, i.e., a seasoning to whole plant foods
4. Whole food supplements often have isolated nutrients added to them.
5. Fortified foods are processed foods that have supplements or isolated nutrients added and are packaged as such to entice consumers, labeled such as "high in calcium" or "contains vitamin D."
6. Supplements became popular to make up for nutritional deficiencies due to people poisoning themselves with fat, cholesterol, protein, environmental contaminants, etc from the American diet that are deficient in vitamins, minerals and phytochemicals that nature intended us to get from whole food.
7. Our guts absorb what they need from the nutrients we eat.

Vitamin D
Vitamin D functions as a hormone in the body and is responsible for regulating over 200 genes in the human body. Vitamin D levels often fluctuate due to geographical location, UV index and temperature, which indirectly affect our skin exposure.

Adequate exposure entails 50% to 75% of your skin's being exposed between 10:30am and 2 to 3pm, about three to four times per week when the local UV index is 3 or higher. Early or late in the day only provides UVA radiation, which does not help us make vitamin D, but can still cause skin damage.

Adequate sun exposure also depends on UV index and your skin type. The following table shows how much exposure is needed based on your local UV index and your skin type.

Adequate sun exposure also depends on the UV index (UVI) and your skin type:

Skin Type	UVI 0-2	UVI 3-5	UVI 6-7	UVI 8-10 & Tanning	UVI 11+
Always Burn & Never Tan	None	10-15 min	5-10 min	2-8 min	1-5 min
Easily Burn & Rarely Tan	None	15-20 min	10-15 min	5-8 min	2-8 min
Occas. Burn & Slowly Tan	None	20-30 min	15-20 min	10-15 min	5-10 min
Rarely Burn & Rapidly Tan	None	30-40 min	20-30 min	15-20 min	10-15 min
Never Burn & Always Dark	None	40-60 min	30-40 min	20-30 min	15-20 min

The best source of vitamin D is that which we make in our skin from sunlight exposure when the UV index is 3 or greater. Most people can create up to 10,000 units of vitamin D if they meet the chart requirements.

UV index link - http://www.epa.gov/sunwise/uvindex.html Enter your zip code

The UV index takes into account the UVA and UVB rays that penetrate the ozone layer. Three must be UVB rays for vitamin D benefits, which is typically during the two to four-hour period surrounding solar noon. When the UV index does not get over 2, the sun damages the skin without any UVB benefit. UVA and UVB changes with latitude, time of day and season of the year.

Vitamin D deficiencies occur for the following reasons:

1. Inadequate sun exposure
2. Geographic location
3. Skin color
4. Application of sunscreen – SPF 15 can block 99% of vitamin D synthesis
5. Diseases of liver and kidneys
6. Obesity
7. If you're over the age of 50 you may need almost twice the amount of skin exposure.

Deficiencies of vitamin D can lead to:

1. Increased rate of overall death
2. Myalgias (muscle aches and pains)
3. Congestive heart failure
4. Impaired bone mineralization
5. Osteomalcia and osteoporosis
6. Autoimmune conditions – rheumatoid arthritis, MS and lupus
7. Depression and seasonal affective disorder, among others

Studies have shown that vitamin D lowers risk of colorectal cancer, improvements in breast cancer, and lowers risk of heart disease.

Since overexposure to the sun may cause skin cancer, it is recommended that people get their adequate sun exposure based on the UV index, then use sunblock, shirts, hats, etc. Sun block lotions prevent skin burns, however, there are theoretical risks of certain types of sun block causing cancer due to things called reactive oxygen species.

Tanning Beds – The UVA and UVB emitted from tanning salon bed bulbs vary and are not often measured or regulation. Until further studies are made use caution when using tanning beds.

Optimum Vitamin D levels improve absorption of calcium, however, excess calcium impairs vitamin D conversion. Supplementing with one vitamin or another affects the absorption of other vitamins and minerals. However, when we consume whole plant foods, they work together instead competing for absorption.

So, how much?

Should we supplement? Whenever possible, we should get our vitamin D from sunlight exposure. It is not proven that supplementation can raise vitamin D levels to the same level as the sun and supplementation depends on the individual. Currently it is recommended that people get their levels up as high as they can with sun, without getting sun burned, then if levels are still below 20 nanograms per milliliter, use supplements to get their levels to 20 nanograms per milliliter, the low level of normal range.