

## Vitamin D: Frequently Asked Questions

### Why do we need vitamin D?

Every tissue in our bodies needs vitamin D and will not work correctly if we do not get enough. In its most extreme forms, vitamin D deficiency produces rickets in children and osteomalacia (bone softening) in adults. Growth is disrupted, and bones become malformed. This happens because the concentration of minerals in the blood stream is not adequate to support the mineralization of new bone. This deficiency occurs because efficient absorption of dietary calcium requires vitamin D.

Milder degrees of deficiency are now understood to be one of the causes of a vast array of chronic diseases, including osteoporosis, impaired immune competence, various autoimmune diseases (such as diabetes and multiple sclerosis), several cancers (breast, colon, lung, lymphoma and prostate, among others), high blood pressure, pregnancy complications and cardiovascular disease. All may develop because of, or be exacerbated by, vitamin D deficiency. Asking the body to deal with these disorders without adequate vitamin D is like asking a fighter to enter battle with one hand tied behind his/her back.

### What is vitamin D?

Vitamin D is one of the chemicals that the tissues of our body use to unlock the DNA blueprints which each tissue contains and which are needed for our cells to produce the many biochemical products required for their day-to-day functioning.

### Where do I get vitamin D?

The principal source of vitamin D is your own skin. A chemical compound naturally present in the superficial layers of skin is converted, on exposure to UV-B radiation, to cholecalciferol (vitamin D<sub>3</sub>). However, we manufacture this vitamin D only if we expose our skin to UV-B radiation. If we spend all day indoors or go out only in the early morning or late evening, then we simply do not get sufficient ultraviolet radiation from the sun to make enough vitamin D.

### What about latitude?

Those who live in northern latitudes have less chance to make vitamin D since, in wintertime, even at midday, the sunlight is so weak that it does not produce significant vitamin D synthesis in our skins.

### How long should I be outdoors?

There is no single right answer. But a light-skinned person, wearing a bathing suit, will make about 15,000 IU of vitamin D in 15–20 minutes in July at midday. Darker-skinned individuals can do the same, but it will take about twice as long.

### What is the effect of sunscreen?

Sunscreen blocks UV-B radiation and prevents the manufacture of vitamin D.

### What about skin cancer?

The brief exposure needed to produce adequate vitamin D is not enough to cause skin cancer. However, if you are worried about that risk, apply sunscreen after the first 15 minutes of exposure.

### Can I get enough vitamin D from food?

For the most part, the answer is no. The few natural exceptions include oily fish, caught in the wild, and a few sun-dried mushrooms. Today, vitamin D is also added to many foods, including milk, many yogurts and some orange juices, cheeses and breakfast cereals. Check the labels.

### Does the body have to process vitamin D before it becomes active?

The body converts vitamin D, whether taken by mouth or made in the skin, to a compound called 25-hydroxyvitamin D [25(OH)D]. This compound circulates in the blood and is the measure physicians or scientists use to assess vitamin D status. High levels of serum 25(OH)D show that you are getting enough vitamin D, while low levels indicate deficiency. The body also converts some 25(OH)D each day into calcitriol, which acts as a hormone and signals the intestine to absorb calcium more

efficiently, thus helping us get by on typical calcium intakes.

### How much vitamin D do I need?

The body needs at least 4,000 IU per day in order to maintain a healthy concentration of 25(OH)D in the blood. Because most of us don't get enough sun exposure, the little vitamin D we get that way, plus food and fortified food sources, totals no more than about 2,000 IU/day. Thus, in order to meet the body's need for about 4,000 IU/day, most adults in North America should take supplements providing 1,000 to 3,000 IU daily.

### How can I tell if I need vitamin D?

Chances are you do need more vitamin D. Most children and adults in North America and Europe need extra vitamin D. If you want to know for certain, ask your physician to request a blood test for serum 25(OH)D. Most clinical investigators today would recommend the result be at least 40 ng/mL.

A recent, informal survey of the principal clinical scientists working in the vitamin D field revealed that each of them, to a person, considered himself or herself to be vitamin D deficient and took vitamin D supplements in doses ranging from 3,000 IU/day to over 5,000 IU/day.

### Is vitamin D safe?

Vitamin D is safe, if consumed in reasonable quantities (See "How much vitamin D do I need?"). Serum 25(OH)D values as high as 200 ng/mL are safe; it is instructive to know that outdoor summer workers by the end of summer will typically have serum values of 60–80 ng/mL. However, vitamin D is an extremely potent compound, and if taken in high enough doses, can produce severe toxicity leading even to death. There have been no reported cases of vitamin D toxicity at serum levels of 25(OH)D below 200 ng/mL.

### Is there more than one form of vitamin D?

There are two main forms of vitamin D — ergocalciferol and cholecalciferol. Ergocalciferol is also known as vitamin D2 and cholecalciferol as vitamin D3. Vitamin D3 is substantially more potent than vitamin D2. Vitamin D3 is the natural form, typically made in our bodies when given the opportunity to do so. Vitamin D2 supplements are mainly a synthetic product and often require a doctor's prescription.

### Is it important to take vitamin D daily?

As long as the total dose is sufficient, vitamin D does not have to be taken every day. Some physicians prescribe weekly or monthly dosing. Unlike most medicines, vitamin D does not have to be taken in any particular fashion. The important thing is to achieve and maintain a normal level of 25(OH)D in the blood.

### How do I know if I am taking too much?

You can tell when you are getting too much vitamin D in the same way that you know when you are getting enough — by measuring the blood concentration of 25(OH)D. This is seldom necessary, as the doses discussed elsewhere in these FAQs would never produce toxicity in otherwise healthy adults, even if you are taking supplements in combination with fortified foods.

### Why are the published requirements for vitamin D so much lower than the levels mentioned in these FAQs?

The current requirements were set in the mid-1990s, before we knew most of what we now understand about vitamin D, including how much the body uses every day. These recommendations are outdated and were intended solely to prevent rickets and osteomalacia (for which they still are adequate). Currently recommended intakes presume a lot of sun exposure, which many people no longer get.

### How do I know what kind of vitamin D is in my tablet/capsule?

If it is vitamin D3, the label will usually say "vitamin D3" or "cholecalciferol." If it does not, ask your pharmacist. If he/she

cannot find that information, ask the manufacturer or switch to a product that provides those details.

### Do vitamin D supplements expire?

Yes. An expiration date will be printed on the label; look for it and use it while it is fresh. “Expire” means the supplement has lost some of its potency. If you use expired vitamin D, you won’t be harmed, but you may no longer be getting as much as the label says.

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