

DISCOVER

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Can Vitamin D Save Your Life? **New studies highlight the importance of the forgotten vitamin**

For years doctors believed that vitamin D, sometimes called the “sunshine vitamin” because sunlight triggers the body to produce it, was important primarily in preventing rickets (a softening of the bones) in children. Once milk became fortified with vitamin D, rickets pretty much disappeared, and the problem of vitamin D deficiency seemed to have been solved. But according to Michael F. Holick, director of the Vitamin D, Skin, and Bone Research Laboratory at Boston University Medical Center, who has spent 30 years studying the vitamin, “rickets can be considered the tip of the vitamin D–deficiency iceberg.”

Today a lack of the vitamin has been linked to a host of other maladies, including cancers of the colon, prostate, and breast; tuberculosis; schizophrenia; multiple sclerosis; hip fractures; and chronic pain. How can one vitamin play a

role in so many diverse illnesses? The answer seems to lie in the fact that most tissues and cells in the human body (and not just those in the intestine and bone that help fix calcium) have receptors for vitamin D, suggesting that the vitamin is needed for overall optimal health. In addition, some cells carry enzymes for converting the circulating form of vitamin D to the active form, making it available in high concentrations to the tissues locally.

A recent laboratory experiment at Boston University revealed that by activating the circulating form of the vitamin, prostate cells could regulate their own growth and possibly prevent the rise of cancer. Directly or indirectly, Holick points out, “the active form of vitamin D controls up to 200 different genes,” including ones responsible for cell proliferation, differentiation, and death.

The New York Times

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An Oldie Vies for Nutrient of the Decade

The so-called sunshine vitamin is poised to become the nutrient of the decade, if a host of recent findings are to be believed. Vitamin D, an essential nutrient found in a limited number of foods, has long been renowned for its role in creating strong bones, which is why it is added to milk.

Now a growing legion of medical researchers have raised strong doubts about the adequacy of currently recommended levels of intake, from birth through the sunset years. The researchers maintain, based on a plethora of studies, that vitamin D levels considered adequate to prevent bone malformations like rickets in children are not optimal to counter a host of serious ailments that are now linked to low vitamin D levels.

To be sure, not all medical experts are convinced of the need for or the desirability of raising the amount of vitamin D people should receive, either through sunlight, foods, supplements or all three. The federal committee that establishes daily recommended levels of nutrients has resisted all efforts to increase vitamin D intake significantly, partly because the members are not convinced of assertions for its health-promoting potential and partly because of time-worn fears of toxicity.

This column will present the facts as currently known, but be fore-

warned. In the end, you will have to decide for yourself how much of this vital nutrient to consume each and every day and how to obtain it.

Where to Obtain It

Through most of human history, sunlight was the primary source of vitamin D, which is formed in skin exposed to ultraviolet B radiation (the UV light that causes sunburns). Thus, to determine how much vitamin D is needed from food and supplements, take into account factors like skin color, where you live, time of year, time spent out of doors, use of sunscreens and coverups and age.

Sun avoiders and dark-skinned people absorb less UV radiation. People in the northern two-thirds of the country make little or no vitamin D in winter, and older people make less vitamin D in their skin and are less able to convert it into the hormone that the body uses. In addition, babies fed just breast milk consume little vitamin D unless given a supplement.

In addition to fortified drinks like milk, soy milk and some juices, the limited number of vitamin D food sources include oily fish like salmon, mackerel, bluefish, catfish, sardines and tuna, as well as cod liver oil and fish oils. The amount of vitamin D in breakfast cereals is minimal at best. As for supplements, vitamin D is found in prenatal vitamins,

multivitamins, calcium-vitamin D combinations and plain vitamin D. Check the label, and select brands that contain vitamin D3, or cholecalciferol. D2, or ergocalciferol, is 25 percent less effective.

Vitamin D content is listed on labels in international units (I.U.). An eight-ounce glass of milk or fortified orange juice is supposed to contain 100 I.U. Most brands of multivitamins provide 400 a day. Half a cup of canned red salmon has about 940, and three ounces of cooked catfish about 570.

Myriad Links to Health

Let's start with the least controversial role of vitamin D — strong bones. Last year, a 15-member team of nutrition experts noted in *The American Journal of Clinical Nutrition* that “randomized trials using the currently recommended intakes of 400 I.U. vitamin D a day have shown no appreciable reduction in fracture risk.”

“In contrast,” the experts continued, “trials using 700 to 800 I.U. found less fracture incidence, with and without supplemental calcium. This change may result from both improved bone health and reduction in falls due to greater muscle strength.”

A Swiss study of women in their 80s found greater leg strength and half as many falls among those who took 800 I.U. of vitamin D a day

for three months along with 1,200 milligrams of calcium, compared with women who took just calcium. Greater strength and better balance have been found in older people with high blood levels of vitamin D.

In animal studies, vitamin D has strikingly reduced tumor growth, and a large number of observational studies in people have linked low vitamin D levels to an increased risk of cancer, including cancers of the breast, rectum, ovary, prostate, stomach, bladder, esophagus, kidney, lung, pancreas and uterus, as well as Hodgkin's lymphoma and multiple myeloma.

Researchers at Creighton University in Omaha conducted a double-blind, randomized, placebo-controlled trial (the most reliable form of clinical research) among 1,179 community-living, healthy postmenopausal women. They reported last year in *The American Journal of Clinical Nutrition* that over the course of four years, those taking calcium and 1,100 I.U. of vitamin D3 each day developed about 80

percent fewer cancers than those who took just calcium or a placebo.

Vitamin D seems to dampen an overactive immune system. The incidence of autoimmune diseases like Type 1 diabetes and multiple sclerosis has been linked to low levels of vitamin D. A study published on Dec. 20, 2006, in *The Journal of the American Medical Association* examined the risk of developing multiple sclerosis among more than seven million military recruits followed for up to 12 years. Among whites, but not blacks or Hispanics, the risk of developing M.S. increased with ever lower levels of vitamin D in their blood serum before age 20.

A study published in *Neurology* in 2004 found a 40 percent lower risk of M.S. in women who took at least 400 I.U. of vitamin D a day.

Likewise, a study of a national sample of non-Hispanic whites found a 75 percent lower risk of diabetes among those with the highest blood levels of vitamin D.

Vitamin D is a fat-soluble vitamin

that when consumed or made in the skin can be stored in body fat. In summer, as little as five minutes of sun a day on unprotected hands and face can replete the body's supply. Any excess can be stored for later use. But for most people during the rest of the year, the body needs dietary help.

Furthermore, the general increase in obesity has introduced a worrisome factor, the tendency for body fat to hold on to vitamin D, thus reducing its overall availability.

As for a maximum safe dose, researchers like Bruce W. Hollis, a pediatric nutritionist at the Medical University of South Carolina in Charleston, maintain that the current top level of 2,000 I.U. is based on shaky evidence indeed — a study of six patients in India. Dr. Hollis has been giving pregnant women 4,000 I.U. a day, and nursing women 6,000, with no adverse effects. Other experts, however, are concerned that high vitamin D levels (above 800 I.U.) with calcium can raise the risk of kidney stones in susceptible people.

Vitamin D Lowers Diabetes Risk

Giving children vitamin D supplements in infancy may shear their risk of developing type 1 diabetes later in life. In an analysis of previously published studies, British researchers found significant evidence that supplements of the vitamin were associated with a 29% reduced risk of the disease.

Participants in the studies were given vitamin D supplements from birth onward, for a variable time period, and were tracked for some 15 to 30 years, according to Dr. Christos Zipitis, a pediatrician with the Stockport NHS Foundation Trust and lead author of the new paper, which appears online this week in the Archives of Disease in Childhood. Types and doses of vitamin D supplements varied, and were not always reported, but Zipitis says supplementation was roughly 10 mcg, or 400 I.U., of vitamin D daily — the amount typically found in infant multivitamins. Based on data from three case-control studies involving 6,455 participants, the new paper found that infants who were given supplements were 29% less likely to develop type 1 diabetes compared with infants who never got extra vitamin D. Zipitis, who reviewed a total of five studies, also found evidence that the vitamin's protective effect increased with larger doses and more regular supplementation. "[Our study] provides the strongest evidence to date that vitamin D might be protective against type 1 diabetes in later life,"

says Zipitis. "Obviously we're based on other studies, so this has come up before. The new thing with our study is the strength of the association and the confidence with which we can talk about it."

Given the limits of the available data, however, the paper was unable to say how much vitamin D the children were getting from sources other than supplementation, or whether they were deficient to begin with. But Zipitis says children who had rickets, a bone disorder caused by extreme vitamin D deficiency, "were at a much higher risk of developing type 1 diabetes — I think about three times higher than the rest of the population, which would suggest that the higher the level of vitamin D in your body, the less likely you are to develop type 1 diabetes."

Past research has come to the same conclusion. Countries with lots of sunshine, which triggers vitamin D production in the body, for example, have a lower incidence of type 1 diabetes than sunnier places. Studies have also shown that new cases of type 1 diabetes crop up more often in winter, when there is less sunshine all around, than in summer. In addition, says Zipitis, when doctors check vitamin D blood levels of newly diagnosed type 1 diabetes patients, they are generally lower than average. "In the U.K. and other European countries, we haven't got the right UV radiation for most of the year," he says, adding that vitamin

D deficiency is a re-emerging problem in the U.K., and that doctors are seeing a resurgence of rickets in children. "With all the scares about skin cancer, when people go outside, they're covered with sunblock, which doesn't allow the conversion of UV light into vitamin D. That's where the supplements come in."

Insufficient blood levels of vitamin D have been linked to several health problems aside from rickets and type 1 diabetes, including other autoimmune diseases such as rheumatoid arthritis and multiple sclerosis, along with some rare but serious heart problems like cardiomyopathy. Indeed a host of recent studies has shown myriad benefits of taking supplements. Beyond better bone health, stronger muscles and fewer fractures in adults, research also suggests vitamin D can reduce the risk of various cancers. A study of 1,179 postmenopausal women published in the American Journal of Clinical Nutrition last year found that women who took calcium and 1,100 I.U. of vitamin D daily had 80% fewer cancers than women who took a placebo or calcium alone.

For infants, the American Academy of Pediatrics (AAP) currently recommends a supplement of 200 I.U. of vitamin D per day, starting at two months of age for breastfed babies. Once infants are weaned to vitamin-D fortified formula, however, supplements are no longer necessary.

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Don't Forget Your Vitamins

More than half the U.S. population—including about 70 percent of the elderly and 90 percent of minorities—is vitamin-D deficient, according to Dr. James E. Dowd, author of “The Vitamin D Cure.” The nutrient helps maintain normal levels of calcium and phosphorus in the blood. It also helps the body absorb calcium and keeps bones strong. Vitamin D may also protect against osteoporosis, hypertension, cancer and other diseases, according to the Mayo Clinic.

Vitamin D is mostly produced in the skin after UV exposure from the sun, but it can also be derived from milk, fish, egg yolks and vitamin supplements. It's harder for the obese and people with more melanin in their skin to absorb vitamin D. It doesn't help that we've become a nation of sunscreen wearers who eat low-vitamin processed foods and work mostly indoors; that all leads to D deficiency, which can cause susceptibility to seasonal affective disorder, fatigue, headaches and a variety of immune-related diseases, according to Dowd.

Luckily, the cure is hardly painful: the National Institutes of Health prescribes a balanced diet and weekly sun exposure in order to produce the body's natural requirement of vitamin D. Other easy sources of the nutrient include cod-

liver oil, salmon and milk. Raw fish is even better. Some doctors recommend an additional vitamin supplement, available at health stores, but go easy on those. Overzealous pill-popping can result in vitamin-D toxicity, for which the side effects include nausea, vomiting, constipation and an increase of calcium in the blood. That, in turn, can lead to mental confusion. Check online at dietary-supplements.info.nih.gov for NIH's recommended daily intake levels; the older you are, the more you require.

Doctors say keeping track of your vitamin-D intake is especially important for people at risk of deficiency—those with dark skin, the elderly, the overweight, those who suffer from diseases that interfere with the body's absorption of fat, and infants who were exclusively breast-fed.

Surprisingly, people who wear sunscreen whenever they go out are at risk, too. Although sunscreen protects your skin from UV damage, SPF numbers as low as 8 can reduce vitamin-D absorption by 95 percent, according to the Linus Pauling Institute at Oregon State University.

Although most doctors balk at suggesting that Americans cut back significantly on sunscreen usage, many recommend 10 to 15 minutes of sunshine, three times a week—without the lotion.