

PREVENTION

The Vitamin D Difference

BY DIANA STEELE

Cancer prevention is examined in a new light.

Plain old vitamin D might finally be ready for its day in the sun. New research is shedding light on the leading role that this vitamin may play in preventing cancer and in keeping tumors in check.

Vitamin D isn't technically a vitamin, since it's produced in the body as a result of exposure to sunlight ("vitamins" are essential to life but by definition can be obtained only outside the body, through diet or supplements). It's only when we don't get enough sun that our bodies don't make enough vitamin D and we need to get it from other sources. But while one of those sources, milk, is fortified with enough vitamin D to prevent the bone disease rickets in children, dietary sources—even a multivitamin—don't provide nearly enough D to help prevent cancer, many scientists now say.

New findings are showing that vitamin D acts as a sentinel to help regulate cell growth and prevent a cell from becoming malignant, says Boston University Medical Center researcher Michael Holick, PhD, MD. "And that's why we think that you need an adequate vitamin D level throughout your entire life, and that [anytime] you become vitamin D-deficient, you put yourself at increased risk of potentially developing a malignancy later in life, because you've lost the policing ability of vitamin D to help keep cell growth in check."

The prescription? Sensible sun exposure for your skin type, plus vitamin D supplements. The payback? Greatly reduced risk of colon, breast, prostate, and other cancers, a growing body of research is showing.

Changes in Latitudes

As early as the 1940s, scientists noticed that people who lived in northern states—like Vermont, New Hampshire, and Massachusetts—were more likely to die of malignancies other than skin cancer than people who lived in Texas, South Carolina, or Georgia, says Holick. The implication even then, he adds, was that "there is some immunity provided by the sun."

But only in the last decade or so have researchers begun to zero in on vitamin D as the source of that immunity. One clue was that prostate cancer is twice as deadly among African-Americans as Caucasians in the United States; the only other place in the world with as high a death rate from that disease is Norway.

“A question you really have to ask yourself is, ‘How are African-Americans like Norwegians?’ ” says cancer biologist and epidemiologist Gary Schwartz, PhD, because they have almost the same rate of death from one of the most common cancers in the world.

Schwartz, a researcher at Wake Forest University School of Medicine, says, “They don’t look a lot alike, and they’re not genetically alike,” but it turns out that members of both groups tend to have low levels of vitamin D in their blood.

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The skin pigment melanin hinders African-Americans in synthesizing vitamin D; at the same time, Norwegians—and other Scandinavians—far from the equator, have difficulty getting enough sunlight to produce adequate vitamin D. Schwartz says that in terms of vitamin D synthesis, “African-Americans are essentially Scandinavians all year round.”

He adds, “The reason that it’s potentially so interesting is that it’s something that’s completely remediable.” No one can go back and remove a past exposure to a toxin, or alter a genetic susceptibility, but people can readily change their blood levels of vitamin D.

Insights from Research

Other studies have implicated vitamin D in incidence or survival rates for colon, breast, endometrial, and lung cancers, among others.

In a study of health professionals published last year by the *Journal of the National Cancer Institute*, men with highest blood levels of vitamin D (10 nanograms per milliliter higher than those with the lowest levels) had about two-thirds the risk of dying from cancer—and even more dramatic protection from cancers of the digestive system. Other work, published last September by the American Association for Cancer Research, showed that higher intake of vitamin D was associated with a lower risk for pancreatic cancer. And rates of kidney cancer are greater at northern latitudes than among people who live near the equator, according to research published in December in the *International Journal of Cancer*.

In a seeming paradox, multiple studies have suggested that people who get regular exposure to the sun on the job have a decreased risk of melanoma. And according to a 2005 study published in the *Journal of the National Cancer Institute*, people who had the most sun exposure as a child and young adult are less likely to die of melanoma even if they do get it.

Beyond Protection

Not only does vitamin D play a role in who gets cancer, but it seems to also help keep cancers from being as aggressive.

For example, patients with higher levels of vitamin D when they first receive a diagnosis of lung cancer may survive longer. In one recent study of patients with early-stage, non-small cell lung cancer at Massachusetts General Hospital, “individuals who had higher vitamin D levels had a better prognosis even up to 10 years later,” says Edward Giovannucci, MD, ScD, a professor of epidemiology and nutrition at the Harvard School of Public Health. That study was published last November in the journal *Cancer Epidemiology, Biomarkers & Prevention*.

In other work, published last year in the journal *Anticancer Research*, mice fed a vitamin D–deficient diet developed more aggressive, faster-growing colon tumors than did mice who had adequate vitamin D when the tumors were induced.

Some research has been less conclusive. Participants in the Women’s Health Initiative study seemed to gain no protection from taking 400 units of vitamin D a day for seven years and had about the same rates of colon cancer as women who took a placebo. But Holick says that he pointed out to the authors of the research, published early last year in *The New England Journal of Medicine*, that women who entered the study with the lowest levels of vitamin D in their blood had about 2½ times the risk of developing colon cancer during the next eight years compared with women who had the highest blood levels.

Increasing Intake

The state of knowledge of how much vitamin D is enough to protect against cancer has changed a lot since that study began. Unfortunately, the amount of vitamin D that women in the study took was probably not enough to make an impact, says Giovannucci. “When the study was designed probably 10 years ago or so, the understanding was that 400 or even 200 units of vitamin D would be sufficient. But our understanding now is that we probably need much more vitamin D to have any influence.”

How much vitamin D? “We all need to increase our vitamin D intake,” says Holick.

“I personally, and most of my family members, now take 1,000 International Units of vitamin D3 a day. That’s what we think you need to satisfy your requirement if you’re not getting enough of it from sun exposure.”

He says he takes a supplement in that amount daily, year round, even though he plays tennis and cycles in the summertime. And when he is outside in the summer, he spends part of the time—15 minutes or so—without sunscreen.

Sunscreen blocks DNA-damaging UVB radiation, but those are the same wavelengths of light that help synthesize vitamin D. “You don’t want to get a sunburn, ever,” Holick says. “But I typically will go out, get some sun exposure, and then put sunscreen on, so I take advantage of the beneficial effect and

prevent the damaging effects due to excessive exposure.” Recommendations for adequate vitamin D supplements depend somewhat on a person’s lifestyle, skin color, age, and overall health. A light-skinned lifeguard in a bathing suit on a sunny summer day probably synthesizes as much as 20,000 or 30,000 units of vitamin D, says Giovannucci. People with very dark skin probably need about 10 times as much sun exposure to synthesize the same amount of vitamin D as people with very light skin—or may need more from supplements if they aren’t getting that much sun exposure.

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Obese people may need more vitamin D (because the vitamin is sequestered in fat), and so do people who can’t readily absorb nutrients from their gut into their bloodstream. Also, people need more supplementary vitamin D as they age, because their skin and kidneys gradually become less efficient at synthesizing vitamin D and converting it into its active form.

Gauging Vitamin D Levels

Holick recommends getting blood levels of vitamin D measured once a year, in late fall. (The amount of vitamin D you make from sunlight from spring into fall determines your stores for the year.) “If you are deficient then, you will remain so throughout the winter,” he says.

But there is still controversy about what makes for an adequate blood level. Blood tests measure not vitamin D itself, but a compound that is made from vitamin D by the liver, called 25-hydroxyvitamin D, or calcidiol. Doctors had thought that levels of 16 to 20 nanograms of 25-hydroxyvitamin D per milliliter of blood were adequate. But researchers are finding that even for bone health—and probably also for cancer prevention—levels of around 30 to 40 are optimal.

“So someone with 25, which would not be considered deficient by current standards, would do better to get his or her levels up to 30 at least,” says Giovannucci. However, “unless your physician is very up on vitamin D literature,

if your values are even like 15 or 20, the lab is likely to say ‘normal’ and your physician is not going to worry about it and say your vitamin D level is fine.”

[View Illustration: Vitamin D in the Body](#)

Deficiencies in Diet

Relying on dietary sources alone probably won’t work to get your vitamin D levels high enough. “There’s essentially no vitamin D naturally occurring in our diet, and very few foods are fortified with vitamin D,” says Holick, “and it’s so little that it’s inadequate to satisfy your requirement.”

Milk or orange juice fortified with vitamin D have only about 100 International Units in a glass. And Holick has found that milk very often doesn’t have as much as it says it does on the label. Salmon contains high levels of vitamin D, perhaps as much as 1,000 units a serving, but that’s only in wild salmon, he says, and “you’d have to eat it every day.” Taking 1,000 units a day in the form of a supplement will never be too much, Holick says. Even if you get outside a lot in the summertime, the body knows how much you’re making in your skin, and it destroys any excess.

Giovannucci says the guidelines for dietary intake—200 to 600 units a day, depending on age—need to be revised, and that some people may need as much as 2,000 units a day of vitamin D to get their blood levels up to adequate amounts. Sun exposure is the most efficient way to make vitamin D, he says, although he finds it impractical to make specific recommendations. “But at the same time, I think that sometimes the messages of avoiding sun and always putting on sunscreen are too extreme.”