

# THE ABCs OF D

## ALMOST EVERYONE NEEDS MORE OF THE SUNSHINE VITAMIN

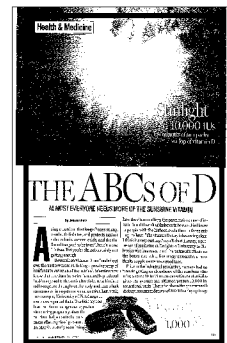
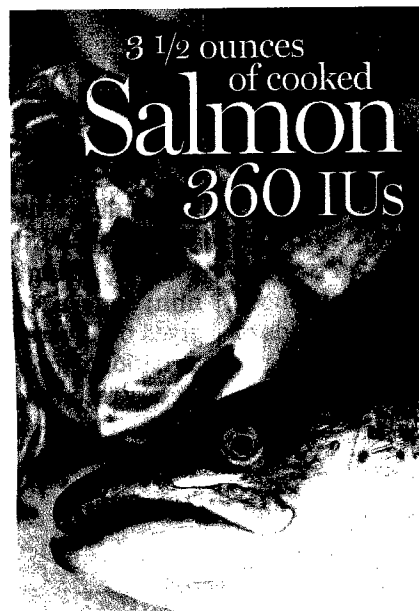
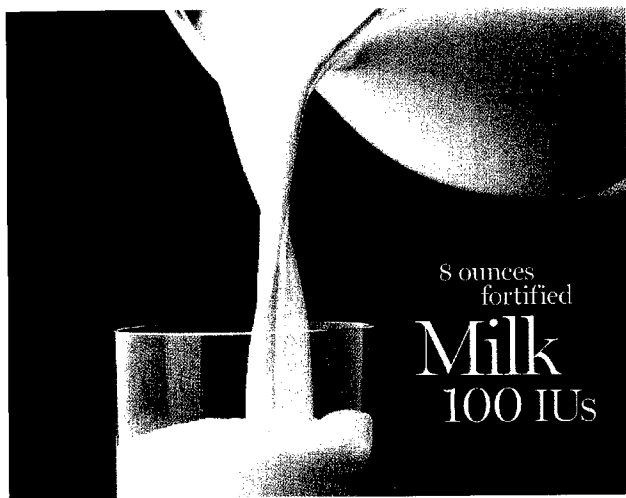
By Deborah Kotz

single nutrient that keeps bones strong, wards off diabetes, and protects against tuberculosis, cancer, colds, and the flu. Sound too good to be true? There's more: It's free. But you're almost certainly not getting enough.

Research on vitamin D has flooded out over the past few months, linking a growing array of health ills to low levels of the nutrient. Scientists now know that the vitamin, which is naturally produced in skin exposed to the sun's ultraviolet rays, binds to cell receptors throughout the body and that a lack can cause various systems to malfunction. Last week, for example, University of Pittsburgh researchers reported that a D deficiency doubles the risk of dangerous hypertension during pregnancy, since the nutrient helps control a hormone affecting blood pressure. In March, a study examining

how the vitamin affects the pancreas's release of insulin found the risk of diabetes to be one-third lower in people with the highest levels than in those getting the least. "The vitamin D story is becoming clear. I think it's very exciting," says Robert Heaney, a professor of medicine at Creighton University in Nebraska who has researched the nutrient's effects on the bones and who, like many researchers, now thinks supplements are a good idea.

Prior to the industrial revolution, humans had no trouble getting an abundance of the sunshine vitamin; a mere 10 to 15 minutes outdoors at midday gives the average fair-skinned person 10,000 international units. That's far above the government's dietary recommendations of 200 IUs a day up to age



50, 400 IUs to age 70, and 600 IUs over 70. But most people nowadays spend little time outdoors, and food sources such as milk and salmon contain relatively modest amounts. What's more, the rash of new findings suggests to the experts that the guidelines are way too low. "There's no one working in the field who thinks these levels still make sense," says Walter Willett, a professor of epidemiology and nutrition at Harvard University whose recent studies have focused on the connection between vitamin D and cancer.

Many people run particularly short during the winter, says vitamin D researcher Michael Holick, a professor of medicine at Boston University School of Medicine. That's because anyone living north of Atlanta makes little, if any, from the sun when the UV rays fall at too low an angle to penetrate the atmosphere.

**Beyond bones.** Vitamin D is best known for promoting bone health. It was first added to the milk supply in the 1930s to prevent the bone-deforming disease rickets, and it defends against osteoporosis by triggering the absorption of calcium into bone cells. New evidence indicates that many people suffering symptoms of chronic fatigue syndrome and fibromyalgia actually have a painful softening of the bones that is caused by a D deficiency.

But having too little appears to cause the immune system to weaken as well. A landmark study published in the March issue of *Science* found that cells from African-Americans (whose dark skin doesn't efficiently absorb UV rays)

churned out 63 percent less of a protein needed to fight off tuberculosis than expected. When added to the cells, vitamin D appeared to signal the cells to produce normal levels of the protein.

An immune system link might explain why the flu seems to strike only during the winter. A review of more than 100 studies on vitamin D and respiratory diseases, published in the current *Epidemiology and Infection*, found that low levels probably allow the viruses to penetrate the immune system. "It's the first comprehensive theory set forth to explain the seasonality of influenza," says vitamin D expert and lead author John Cannell, president of the Vitamin D Council and staff psychiatrist at Atascadero State Hospital in California. What's now needed, he says, is a trial to see if those exposed to flu viruses are less likely to come down with an infection if they take supplements.

The possibility intrigues researchers bracing for an outbreak of avian flu, which quickly kills by triggering an excessive immune response. Victims often suffocate when an onslaught of disease-fighting cells, known as a cytokine storm, results in a rapid buildup of fluid in the lungs. Experts think vitamin D might rev up the part of the immune system that prevents the germs from gaining entry to cells in the first place. "This puts a damper on the part of the immune system that releases the cytokine storm," says Michael Zasloff, an immunologist and vitamin D researcher at Georgetown University in Washington, D.C. Research shows that the mechanism also seems to protect

against multiple sclerosis and rheumatoid arthritis, in which the immune system attacks the body's own healthy tissue.

With cancer, it's thought that vitamin D might prevent tumors from rapidly growing by controlling the expression of certain genes that regulate cell division. In a study of more than 46,000 men and 75,000 women reported in September, Harvard University researchers led by Walter Willett found that people who took in the highest amounts of vitamin D cut their risk of pancreatic cancer almost in half, compared with those with the lowest intakes. Earlier, they'd found a similar degree of protection against colon cancer in women. Other researchers are examining vitamin D in breast and prostate cancers. "The epidemiological evidence is very strong; we know there has to be something going on," says Anthony Norman, a professor of biochemistry at the University of California-Riverside who has extensively researched the vitamin D receptor. Is the evidence strong enough to recommend supplements for cancer prevention? "Unequivocally yes," he says.

How much to take? The government last year suggested that African-Americans and the elderly might want more than the guidelines suggest, but it has set 2,000 IUs as its ceiling for safety. Most experts think the limit is too conservative, noting that there's no evidence of toxicity at much higher doses and that 2,000 IUs is a worthy goal for everybody. Consuming 3 ounces of tuna, two glasses of milk, and a glass of fortified orange juice will get you to 500 IUs, and a supplement or two will get you the rest. ●

