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Super Nutrients

Are you really getting all the vitamins, minerals and fatty acids you need?

BY ANNE UNDERWOOD

IT SOUNDS LIKE A SIMPLE QUESTION OF LOGIC. IF BONES REQUIRE CALCIUM, then people who eat a lot of calcium-rich dairy products should have extra-strong bones, right? So why are hip fractures uncommon in Singapore, where adults don't drink milk, while they soar in dairy-loving Scandinavia? "Countries with higher calcium intakes have the highest fracture rates, not the lowest," says Dr. Walter Willett, chair of nutrition at the Harvard School of Public Health. It's the Calcium Conundrum.

Scientists have identified nearly 40 vitamins and minerals that the body needs for various tasks, from shoring up bones to bolstering the immune system and repairing cellular damage. But as the Calcium Conundrum suggests, they work more subtly than drugs. Instead of delivering predictable effects at particular doses, they team up in complex ways that we're just beginning to understand. Forgo your daily orange for a vitamin C pill, and you will miss out on other compounds that protect the heart, fight cancer and combat infections. "You can't just pop vitamin E over hot-fudge sundaes and expect to get any benefit," says nutritionist Alice Lichtenstein at Tufts University.

But don't mistake the subtlety of these compounds for a lack of power. Exciting new findings are pouring out of the nation's research labs, linking long-neglected nutrients to everything from brain function to cancer risk. And it's increasingly clear that, despite our abundant food supply, we're still getting too little of some crucial vitamins and minerals. Here are some of the latest insights on how eating well can help us live well—and target some of our most common dietary deficiencies.

CALCIUM

AS IT TURNS OUT, THIS MINERAL REALLY IS CRITICAL TO bone strength. But as scientists are now learning, it doesn't work by itself. Healthy bones require a mix of calcium, phosphorus and magnesium. They also need adequate protein to form their basic framework, vitamin K to maintain structural proteins, and two other bone strengtheners that we're probably even shorter on than calcium: vitamin D (for calcium absorption) and exercise (to stimulate bone-building cells). Put it all together, and one potential explanation for the calcium paradox jumps out. Though doctors say genetic differences

are partly responsible, vitamin D levels must be playing a role too. If you consider that we get most of our vitamin D from sunshine striking the skin, it's logical that people who live near the sun-drenched equator absorb their calcium better and suffer fewer bone fractures.

But calcium does more than build strong bones. It is crucial for transmitting nerve impulses and maintaining a regular heartbeat. It stimulates hormone secretions and activates enzymes. It may even help protect against colon cancer. And most of us could stand to consume more. "Only half of Americans are getting the required amount," says Dr. Felicia Cosman of the National Osteoporosis Foundation. Recommended intake is 1,000 milligrams a day for adults—1,200 for women older than 50 and 1,300 for teens.

VITAMIN D

WHEN EPIDEMIOLOGISTS CEDRIC AND FRANK GARLAND began mapping the incidence of colon cancer in the United States back in the 1970s, they noted a curious pattern. People in the South were half as likely to die of the disease as those in the Northeast. Could the reason be the sunshine vitamin—D? Since then the research has grown, linking vitamin D with lower risks of not just colon cancer but also breast, prostate and ovarian cancers. That's not all. People with higher levels of D are less likely to suffer autoimmune diseases, including type 1 diabetes and multiple sclerosis. They may even have less heart disease and better lung function. "I'm not an alternative-medicine nut who says one nutrient is good for everything," says biochemist Reinhold Vieth at the University of Toronto. "But vitamin D might be."

It clearly does far more than aid calcium absorption.

Inside: A Guide to Vitamins, Minerals and Your Health

VITAMIN AND MINERAL KEY

Water-soluble vitamins: Many are not stored in the body, so you need to get a consistent amount on a regular basis.

Major minerals: Important roles include regulating body fluids and maintaining healthy bones.

Fat-soluble vitamins are stored in body fat, where they can build up to toxic levels if you take too much.

Trace minerals: These are needed in smaller amounts than major minerals. Roles include blood clotting and cavity prevention.

Your Daily Allowance



WE ALL KNOW VITAMINS KEEP THE body running, but a growing list of studies suggests they also help prevent conditions like cancer and heart disease. While conclusive evidence is tough to come by, it's a good bet to take a multivitamin and get as many nutrients as possible from food. —JOSH ULICK

FINDINGS & CONCERNS

DOSAGE

FOOD SOURCES

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VITAMIN B₆

B vitamins have been shown to reduce blood levels of homocysteine, a chemical associated with artery damage. But studies conflict over whether B supplements actually reduce heart-disease risk.

Men and women, 31-50: 1.3mg/day; **51+:** M: 1.7; W: 1.5

Meat, poultry, fish; legumes such as beans, tofu and other soy products; noncitrus fruits such as bananas and watermelons.

VITAMIN B₁₂

Protects nerve cells. Studies have found that older adults with low levels of B₁₂ perform poorly on memory tests. Seniors have trouble absorbing B₁₂. About 25% of people over 66 don't get enough.

Men and women, 31+: 2.4mcg/day

Animal products such as meats and dairy, plus fortified cereal. Vegans and strict vegetarians may need a supplement.

VITAMIN C

Evidence suggests that diets rich in vitamin C may cut the risk of breast, stomach and other cancers, but not all studies agree. Supplements may lower the risk of cataracts.



Men, 31+: 90mg/day; **women, 31+:** 75mg; **smokers:** add 35mg

Oranges, grapefruits plus other citrus fruits and juices. Also, broccoli, bell peppers, cabbage and strawberries.

FOLIC ACID

Can prevent birth defects when taken in pregnancy, so it is essential for women of childbearing age. Supplements may help prevent colon cancer and Alzheimer's.

Men and women, 31+: 400mcg/day; **pregnant:** 600mcg

Fortified breads, pastas and breakfast cereals; legumes such as beans and peas; spinach, broccoli and orange juice.

VITAMIN A

Helps protect vision. Some studies find that diets high in carotenoids (which form vitamin A) reduce the risk of cataracts. Many people get too much vitamin A from supplements, which can damage bones.

Men, 31+: 3,000 IU;* **women 31+:** 2,333 IU

Make sure a large portion of your vitamin A comes from carotenoids. Good sources: carrots, sweet potatoes, mangoes.

VITAMIN D

Can reduce fractures when taken with calcium. Mounting evidence suggests higher doses help prevent colon, breast and ovarian cancers.

Men and women, 31-50: 200 IU/day; **51-70:** 400 IU/day

Women, older adults and blacks are at risk for deficiencies. Found in fortified milk and cereals, plus some fish and margarine.



VITAMIN E

Neutralizes molecules that can damage cells. Some studies hint that it protects against prostate cancer and may help prevent or delay Alzheimer's.

M&W, 31+: 22 IU from natural sources or 33 IU synthetic E

Vegetable oils are the best source, including corn and cottonseed. Also found in leafy greens, nuts and grains.

VITAMIN K

Essential for blood clotting. Encourages the maintenance of bones while blocking substances that help break them down. Studies show that people who get more vitamin K in their diets are less likely to break a hip.

Men, 31+: 120 mcg/day; **women, 31+:** 90mcg/day

Green, leafy vegetables such as spinach, broccoli and kale; dairy foods such as milk and eggs; also cereals, sprouts and liver.

CALCIUM

Vital for bones. But some studies link very high calcium to prostate cancer. To protect your heart, try getting some of your calcium from nondairy sources.

M&W, 31-50: 1,000mg/day; **51+:** 1,200mg/day

Milk, cheese and yogurt. Nondairy sources include kale, broccoli and bok choy, as well as fortified orange juice.



MAGNESIUM

Several studies have shown that this mineral can help protect the heart and lower blood pressure. Yet many Americans don't get adequate amounts.

Men 31+: 420mg/day; **women:** 320mg

Green vegetables such as broccoli and spinach, nuts such as cashews and pecans; whole-wheat spaghetti, grains and legumes.

*IU = INTERNATIONAL UNIT

New Options

Eating the right vitamins and minerals isn't the only way to improve your health. Recent research has found benefits from other natural sources, including plant chemicals, fats, amino acids, and even bacteria.

PLANT CHEMICALS
Fruits and vegetables contain hundreds of potentially helpful compounds. Studies suggest that lycopene from tomatoes can help cut prostate-cancer risk. Light cooking helps free the chemical for absorption.



FATTY ACIDS
Omega-3 fatty acids, mainly from fish oils, may help promote heart health. The compounds help keep clots from forming in arteries. Several studies have found that people who eat fish regularly have reduced rates of heart attacks and strokes.

AMINO ACIDS
These small molecules are essential for development. A recent study found that rats given supplements of leucine broke down muscle-building proteins at a lower rate. If the finding applies to humans, the amino acid might be used to slow muscle loss in older adults.

PROBIOTICS
Bacteria in yogurt can help maintain populations of helpful bacteria in the gut. These beneficial bugs crowd out harmful types, helping treat infant diarrhea as well as bouts caused by antibiotics.



Special Needs

Age and gender affect your dosage requirements for certain vitamins and minerals.

WOMEN
• Vitamin D and calcium: Some multivitamins don't give enough of either nutrient, so depending on your age, you may need supplements.
• Iron: Among women who menstruate, one in 10 has deficiencies that can cause weakness and fatigue.

OLDER ADULTS
• Vitamin B₁₂: It's harder to absorb as you age, so seniors may need extra amounts.
• Vitamin D: Older adults have trouble synthesizing it from sunlight, so dosage needs rise after 70.
• Calcium: Dosage climbs 20% after 50.



POTASSIUM	SODIUM	IRON
Research suggests that diets high in the mineral can reduce the risk of hypertension. One study found that getting enough potassium (along with magnesium) boosted bone-mineral density.	Though sodium is needed to regulate blood pressure, most Americans get up to twice the recommended dosage. Reducing intake can cut the risk of hypertension.	Helps ferry oxygen in the bloodstream throughout the body. Women lose iron from menstruation; as a result, many of childbearing age don't get enough. Vegetarians may need extra iron.
Men and women, 31+: 4,700 mg/day	Men and women, 19-50: 1,500 mg/day	Men, 31-50: 8mg/day; women, 31-50: 18mg
Meats, poultry, fish, milk, as well as okra, bananas, tomatoes, bell peppers and oranges.	Salt, soy sauce. Processed products can have high sodium, so focus on fresh foods.	Red meat, poultry, fortified breads and cereals, eggs, pumpkin seeds, bran, prune juice and spinach.
SELENIUM	ZINC	OTHERS
There's some evidence that it helps cut the risk of certain cancers. More study is needed, but men at high risk for prostate cancer may benefit from a daily supplement.	One study found that zinc combined with antioxidants delayed the progression of age-related macular degeneration. Vegetarians may need extra.	Iodine: part of the thyroid hormone, which helps regulate energy use. Deficiencies can cause goiter. Fluoride: Aids bone formation and prevents tooth decay.
Men and women, 31+: 55mcg/day	Men, 31+: 11 mg/day; women, 31+: 8mg/day	Iodine: M&W: 150 mcg. Fluoride: M: 4mg; W: 3mg/day†
Seafood and liver. Grains and seeds contain the mineral if they're grown in selenium-rich soil.	Animal products including red meat and poultry; seafood such as oysters and crab. Also: wheat germ, sunflower seeds.	Neither is widely available naturally, except in certain fish, so iodine is added to salt and fluoride to drinking water.



†FOR PEOPLE 31 AND OLDER. SOURCES: HARVARD MEDICAL SCHOOL, AMERICAN DIETETIC ASSOCIATION
FOOD PHOTOGRAPHY: GETTY IMAGES. VITAMIN PILL: CORBIS

Vitamin D helps mobilize and modulate the immune system—which explains its effect on autoimmune diseases. Biochemical studies suggest that it helps keep cells from becoming malignant—and when cells do go bad, it encourages them to self-destruct. Scientists suspect the vitamin has still other functions. “Tissues throughout the body have receptors for vitamin D,” says Dr. Michael Holick of Boston University. “Why would they be there if they had no purpose?”

Just how much vitamin D we need is a matter of debate. The government recommends 200 to 600 international units a day, but a growing scientific consensus says that’s too low. In a paper last month, the Garlands wrote that 1,000 units a day could cut colon cancer in half and reduce the rates of breast and ovarian cancer by 25 percent. Holick has stirred the ire of his fellow dermatologists by suggesting that the best source in the summer is five to 10 minutes of sunshine on the arms and legs two to three times a week, without sunblock. But in the winter, the sun’s oblique rays are not strong enough in most of the United States to stimulate D production. For help, turn to supplements of vitamin D₃, fatty fish and fortified foods, including milk and certain brands of orange juice and soy milk.

Foods rich in potassium provide a basket of other nutrients, too.

OMEGA-3 FATTY ACIDS

IN 2001 A SERIES OF ADS APPEARED IN Boston newspapers. “Are you extremely moody? Do you often feel out of control? Are your relationships painful and difficult?” The ads came from Harvard psychologist Mary Zannarini, one of the nation’s leading researchers in borderline personality disorder. She was seeking volunteers to test a potential treatment for the ailment—a fish-oil component called EPA.

Fish oil? As medical treatments go, it may sound more like snake oil. But a growing body of research suggests the omega-3 fatty acids in fish oil benefit not just the heart but also a range of psychiatric and neurological problems, from bipolar disorder and schizophrenia to depression, ADHD, Alzheimer’s and, yes, borderline personality disorder. The brain is an astonishing 60 percent fat, and it needs omega-3s for optimal function. Studies suggest they help build

The fatty acids in fish may help ward off depression.

cell membranes, boost levels of the brain chemical serotonin and increase the number of connections between neurons. “It’s like neuronal fertilizer,” says Dr. Joseph Hibbeln, a psychiatrist at the National Institutes of Health. “Brain cells given omega-3s grow more synapses.”

Omega-3s may even be good for bone. Nutritionist Bruce Watkins at Purdue University has found that they stimulate bone-building cells in the periosteum, the membrane that covers the long bones. “It’s the part that hurts when you bang your shin,” says Watkins. “I call it ‘the brain of the bone’ because it contains a lot of nerve tissue and controls a lot of bone metabolism.” Nourish it with omega-3s, he advises, because its bone-building cells lay down the protein matrix on which calcium and other minerals are deposited.

Where can you find omega-3s? Food contains two basic varieties—the short-chain version (called ALA) found in walnuts, flaxseed, canola oil and leafy greens, and the long-chain versions (EPA and DHA) in seafood and omega-3-enriched eggs. The long-chain forms appear to have the greatest benefits, particularly for the brain. The American Heart Association also recommends eating fatty fish at least twice a week for the prevention of heart disease. For patients who already have heart trouble, it prescribes one gram of EPA and DHA a day, from fatty fish or supplements.

CHROMIUM

UNLESS DIETARY TRENDS DO AN ABRUPT about-face, the world is heading for a dramatic increase in type 2 diabetes. According to the World Health Organization, the global caseload will more than double by 2025—to 300 million, up from 143 million in 1997. Want to avoid becoming a statistic? A good place to start is reducing your intake of white flour and sugar. But emerging evidence suggests you should also consider boosting your chromium.

Why? Scientists have long known that chromium is involved in sugar metabolism. Whenever your body mobilizes stored glucose, it requires chromium to do that. Now research is showing that the mineral may help diabetic and

pre-diabetic patients boost their insulin sensitivity by increasing both the number of insulin receptors on cells and the activity of those receptors. “In almost every study where we gave chromium, we got better control of glucose with less insulin,” says biochemist Richard Anderson at the USDA’s Human Nutrition Research Center in Beltsville, Md.

Since we need only trace amounts of chromium, it should be easy to get enough from the diet. Yet research suggests that many of us are falling short—perhaps because we’re eating so many refined carbohydrates. So try consuming more chromium-boosting broccoli, apples and other produce while cutting down on chromium-depleting sugar. As a fallback, consider a supplement of chromium picolinate. (Multivitamins contain chromium, but in a less absorbable form.) The current recommendation is 25 to 35 micrograms a day, but trials have used 200 or more.

POTASSIUM

POTASSIUM GETS ALMOST NO PRESS, yet it’s remarkably effective at lowering blood pressure—and even a 1 to 2 percent reduction translates into a reduced risk of strokes. Potassium also helps prevent kidney stones and heart arrhythmias. It even appears to benefit bones by neutralizing acids in the bloodstream that leach calcium from bone deposits. “Unless you have kidney disease, potassium is one of those things, like love and money, that you just can’t get too much of,” says University of Mississippi physiologist David B. Young.

The current guidelines call for 4,700 milligrams a day, but most Americans don’t even get close. It’s not that hard. A single cup of sweet potato has 950 milligrams. Four figs boast 540; a cup of cantaloupe, 500, and a glass of OJ, 450. “If you can consume 8,000 milligrams a day in your diet—the level we evolved to eat—chances are you’ll get everything else you need, too,” says Dr. Steven Pratt of San Diego’s Scripps Memorial Hospital. That would include fiber and thousands of beneficial plant chemicals, such as the cancer-fighting compounds in broccoli.

In the end, there are few shortcuts to optimal health. Much as we would like to rely on pills, fitness requires regular exercise and a healthy diet—one that’s rich in fruits, vegetables and whole grains, along with smaller amounts of fish, nuts and dairy. “The amazing thing is, the same dietary pattern helps everything from cancer to heart disease and diabetes,” says Lichtenstein. There’s no conundrum there. Bring on the vegetables. ■

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mineral health with
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