

*Whatever you do,
DON'T give your children vitamin fortified candy!*

How vitamins can be hazardous to your health

*'Supplements should be treated as a form of medication,
and used in a very targeted, evidence-based way'*

Health

CATHY GULLI | April 9, 2008 |

Convention says calcium is good for bones. But if you read recent research you might never take calcium supplements again. They may increase the risk of heart attack in healthy post-menopausal women, according to a report by scientists at the University of Auckland in January's British Medical Journal. Incidentally, post-menopausal women are probably the group mostly taking calcium pills to prevent osteoporosis, which makes bones more breakable. Then, in March, the Harvard Health Letter announced that "high calcium may not prevent fractures." Confused?

Consumers aren't the only ones. Turns out the incessant flow of contradictory studies released daily is stumping just about everybody, says Gerry Harrington of the Ottawa-based Nonprescription Drug Manufacturers Association, whose members include vitamin and mineral supplement makers. "Health Canada struggles with it. Manufacturers struggle with it. There are even individual scientists who struggle," he concedes. Harrington's warning: "Pay attention. Don't take anything for granted."

Across the spectrum, most nutrition experts agree that vitamin and mineral pills — even ones that hold tremendous potential and do provide benefits — can actually be harmful too. Most damage happens when they're consumed in excess — at doses 10 or more times higher than the recommended daily intake. Even multivitamins can contain very high doses of certain nutrients, as vitamins and minerals are collectively known. Nutrient supplements "can have very negative human consequences" if mishandled, says Bill Jeffery of the Centre for Science in the Public Interest in Ottawa

The evidence is mounting: in January, the Mayo Clinic declared that certain nutrient pills such as beta carotene and vitamin E either had no effect or appeared to increase cancer incidence and mortality. The U.S. National Institutes of Health, in a 2006 study, concluded in part that the safety and quality of multivitamin and mineral supplements are inadequate, and uncovered "disturbing evidence of risk" associated with taking some nutrient supplements. And back in 2003, the U.K.'s Food Standards Agency studied 34 vitamins and minerals and found that one could cause cancer, six could induce "irreversible, harmful effects," and three could have "short-term harmful effects."

These cautions come at a time when vitamin and mineral supplement use is at a high — nearly half of Canadian adults have taken a multivitamin in the past month, according to Statistics Canada, and more than one in three children have too. That nutrient supplementation is so popular indicates that people are increasingly taking their health into their own hands. With five million Canadians now doctorless, who can blame them? Plus many don't eat as well as they'd like; vitamins seem to be a quick fix. With relentless media reports that this nutrient can prevent or cure that problem, it's no wonder the nutrient market in Canada is worth at least \$400 million this year, says Harrington.

What's missing, however, may be prudence. Taking too many or too much of just one, such as vitamin C, can lead to an overdose that causes diarrhea; in more serious cases, excess vitamin A can induce liver damage. Moreover, some nutrients such as E and K shouldn't be taken in combination with particular medications, including the widely prescribed blood thinner warfarin. Even a history of smoking or kidney disease can put people at more risk for illness or death if they take some vitamins or minerals. Many people don't even talk with their doctor about the nutrients they're taking. Instead they self-prescribe. And then they miss the latest study that contradicts the one that got them started on vitamin supplements in the first place.

Of course, when a person suffers a real deficiency of vitamins or minerals, the use of supplements can produce remarkable results, says Susan Whiting, a member of Dietitians of Canada, and professor and head of nutrition at the University of Saskatchewan. It's universally agreed upon that pregnant women should consume folic acid to prevent birth defects such as spina bifida. And in sun-deprived locations such as Canada in the winter, the case for vitamin D supplementation seems to make sense. Some people in the health care community even declare the use of vitamins and minerals at high doses as the future of personalized medicine, which will see supplements used as drugs in a targeted way.

The reality, however, is that for many people, deciding what vitamin or mineral pill to take is a relatively arbitrary process. Supplements, says Harrington, come in and out of fashion regularly. And some of the public, adds Jeffery, seems to be "philosophically predisposed to believe that some claims are just true," even when there is little or no scientific proof. Barry Power, an Ottawa pharmacist and director of practice development at the Canadian Pharmacists Association, says that most of us don't see health products that come without a prescription, especially vitamins, as having potentially negative effects. "You can buy them anywhere, they're natural. How harmful can they be?" he quips.

His response is blunt. "Warfarin is natural, it's derived from clover. Aspirin comes from willow bark; if you take enough, you die from it." The bottom line for Power: "Natural does not equate safe."

Unfortunately, "that led to all kinds of wild claims," he says. In the 1970s, Nobel Prize-winning chemist Linus Pauling pronounced vitamin C a cure for the common cold; in fact, he took a daily hit of it. But to this day, there's no good proof to corroborate his claim, as a meta-analysis (a study of existing research) by Australian and Finnish researchers showed in 2007. (High-level athletes may benefit.)

Come the 1980s and '90s, antioxidants such as vitamin E, C and beta carotene were all the rage with proclamations that they could prevent cancer, recalls dietitian Whiting. As it turned out, beta carotene has been shown by Finnish and American researchers to actually increase the incidence of lung cancer among smokers, former smokers, asbestos workers and others at high risk. "What's that about?" Swartzberg, a physician, remembers thinking. Until then, many cardiologists had been recommending beta carotene to patients; suddenly it all changed. Doctors, caught off guard by new and clashing studies, could only do one thing: "We renege," says Swartzberg.

To make matters worse, a meta-analysis in the *Annals of Internal Medicine* in 2005 showed that high doses of vitamin E — 400 international units (a measure of potency) or more a day — could boost all-cause mortality; that is, excessive E can increase the chance of death. "We don't know if it's a statistical fluke," concedes Swartzberg, who chairs the editorial board of the *University of California, Berkeley Wellness Letter*, an authoritative report on nutrition and prevention news, "or something more serious." But a review by the College of Family Physicians of Canada found the results credible and it recommends doctors counsel patients about the risk of excess E.

More common than these dramatic shifts, though, is the barrage of conflicting studies about vitamins and minerals — which the average person may not be aware of. In early March, Harvard Men's Health Watch warned males that multivitamins and excess folic acid may be linked to cancer and should be avoided. A few weeks later, scientists at the University of California, Berkeley published a study in the journal *Human Reproduction* that found high folic acid intake was linked to healthier sperm. What's a guy to do?

"There's a lot of misinformation out there," says Dr. Dugald Seely, a naturopathic doctor in Toronto and director of research and clinical epidemiology at the Canadian College of Naturopathic Medicine. Nutrient supplements are rarely dangerous, Seely says, but that doesn't mean there's no risk. He is calling for more research into complementary medicine. "It's important to not believe everything you hear," says Seely, who sits on Health Canada's Expert Advisory Committee for the Vigilance of Health Products.

For guidance, experts suggest sources such as the U.S. National Center for Complementary and Alternative Medicine, or the Centre for Science in the Public Interest. Berkeley and Harvard put out newsletters. And Health Canada's Natural Health Product Regulations publishes online "monographs" of nutrients that indicate the

purpose, direction for use, recommended dosage and risks for each with the U.S. Institute of Medicine.

"There are reliable sources," says industry rep Harrington. The trouble may be choosing one since they don't always agree. The Natural Health Product Regulations, established in 2004, helps make sense of emerging science because the monographs can be continuously updated, he notes. While individual studies raise concerns, to establish risks conclusively requires a lot of research and time for consensus to build.

Excess C may cause burning urination, adds Power, or diarrhea. "Too much vitamin C can change the colour of your skin," says Jeffery of the Centre for Science in the Public Interest, making it orangey. It may even interfere with your body's ability to metabolize iron and contribute to kidney stones. Excess magnesium can cause diarrhea as well. So can iron, plus constipation and vomiting. Too much vitamin E can cause blurred vision, headaches, dizziness and, of course, diarrhea. Sound bad?

There's worse. Excess zinc may impair blood cell formation, depress the immune system and reduce "good" cholesterol levels, not to mention interfere with copper absorption. (It also can upset your stomach.) B6 can induce nerve damage if over-consumed. And too much vitamin A can cause liver damage and birth defects, besides headaches, scaly skin and hair loss.

Despite the danger, we over-consume nutrient pills because of a "some-is-good-so-more-is-better" mentality that experts say is pervasive throughout North America. Since 1997, Health Canada and the Institute of Medicine have defined "upper tolerable levels" for most vitamins and minerals, which indicate the maximum amount that can be consumed with no adverse effect. But those don't usually appear on labels, and most people aren't aware they even exist.

Also unknown to many consumers are the bad combinations of nutrient supplements and prescription medications. "Vitamin E," says Power, "has interactions with blood thinners such as warfarin. It can increase the anti-coagulant effect so you're more prone to bleeding." And calcium, he says, can prevent the body from absorbing antibiotics, including commonly prescribed ones such as ciprofloxacin (Cipro) and tetracycline.

Even people who aren't on doctor-prescribed drugs but have a particular medical history can run into trouble when they take nutrient supplements. According to Health Canada and the Berkeley Wellness Letter, if you have kidney disease, magnesium isn't for you. Selenium's not great for people who have had non-melanoma skin cancer, and niacin should be avoided if you have diabetes, gout, peptic ulcers, liver disease or glaucoma. And people who have hemochromatosis, a hereditary disorder that causes them to absorb too much iron, should not take more of it or they may suffer sexual dysfunction, joint pain, headaches and diabetes. One of the most risky aspects of vitamin and mineral supplementation is that some people are indifferent or don't believe that it's important to talk to their medical doctor about natural health products before taking them, according to a 2005 Ipsos Reid survey for Health Canada. Dr. Larry Reynolds, a Winnipeg family

physician and professor at the University of Manitoba, says that physicians tend to be suspicious or dismissive of alternative health models, and supplement use can trigger a conflict between them and their patients. "There are many people who are understandably afraid of doctors," he says, "We can be scary, and the diagnosis can be scary."

Instead, people self-prescribe based on print media (76 per cent) or info from friends, family and colleagues (66 per cent), revealed a survey by the Canadian Council of Food and Nutrition. That's scary because serious conditions may go unattended for too long, says Reynolds, though he acknowledges patients' desire to feel independent. "They say, 'I'm losing weight and I have rectal bleeding, so I'll take extra iron,'" because they think it's an indigestion problem, he explains. "But we want to make sure that it's not cancer of the stomach or bowel. That's why it's important that we work together."

At Scienta Health, a private medical clinic in Toronto, the use of vitamin and mineral supplements is an essential part of keeping patients healthy. Its team of physicians, naturopaths, fitness trainers and psychologists practices nutrigenomics, which uses nutrient and food allergy blood tests and a computerized diagnostic model to determine each person's risk for diseases and nutrient deficiencies. That information gets translated into a tailored menu of high-dose, highly bioavailable (very absorbable) vitamin and mineral supplements that are taken for a time, then reevaluated and adjusted depending on changing needs.

"Supplements," say Scienta's co-founder and chief medical officer Dr. Elaine Chin, "should be treated as a form of medication, and used in a very targeted, evidence-based way." She believes that the evolution of personalized medicine will be rooted in this kind of preventative approach to health care using supplementary nutrients and lifestyle. Whiting agrees that vitamins and mineral pills can be tremendously beneficial. "If you are low in something, then you are given that nutrient, you'll have a turnaround," she explains. "For every true deficiency, the nutrient has a wondrous effect."

But for most of us, the kind of complex and attentive care offered at Scienta is unknown; three-quarters of us aren't even able to see a physician the same day we need one. And considering the current doctor shortage, many observers don't see nutritional personalized medicine becoming common any time soon. Reynolds says that his preference is to focus on the known needs of patients rather than on this growing area of medicine. "It does hold promise," he says, "but we're not there yet."

Last June, the Canadian Cancer Society began urging adults to consume during the fall and winter 1,000 international units of vitamin D supplements every day — a dose higher than even Health Canada has sanctioned. Several months earlier the government agency offered its own endorsement in the latest edition of the Food Guide; it features, for the first time, recommendations that men and women over 50 take 400 iu of vitamin D tablets daily. (Health Canada says it's premature to increase the recommended amount, and won't change it until the Institute of Medicine does too.)

Considering the promise, some ebullience is understandable. "The more I read about vitamin D, the more I get excited," says Whiting. She counts herself among the lauders, but a "moderate" one because, she says, vitamins often "get set up to work in all conditions. It's this enormous enthusiasm without tempering it a little bit."

That studies get put out as universally relevant is misleading, says Chin, who cautions people to consider many variables when reading about the latest research. "We say this all the time in our clinic: one size doesn't fit all," she says. Even in its recommendations about vitamin D, the Cancer Society points out that people who are older or have dark skin should consider taking the supplement throughout the year rather than just in the fall and winter because they are at higher risk of deficiency.

In the absence of a medical consultation, some people are taking vitamins and minerals when they don't need them or taking the wrong ones. Conversely, people who could benefit from nutrient pills — such as those who can't afford plenty of high quality food — don't take any supplements. The National Institutes of Health study that showed the safety and quality of multivitamins is insufficient also found that, "Ironically, populations at highest risk for nutritional inadequacy . . . are the least likely to use such products."

Meanwhile, all those healthy, active, educated people with enough income to purchase good food and lots of nutrient supplements may be "just throwing their money out the window," says Sherri Doak, a registered holistic nutritionist in Newmarket, Ont., who owns two health clubs. "People run blindly to pick up something and they don't know enough about it. And it's not necessarily going to do anything for them. We've become so reliant on taking the quick fix."

Sick people are also increasingly relying on nutrient supplements, especially when their doctor's prescriptions don't seem effective or when they're on a long wait-list. A 2008 study in the *Journal of the American Dietetic Association* revealed that adults with cancer or chronic conditions had a higher prevalence of supplement use than those reporting no illness. "It can happen with people who may be suspicious of the health care system, or who have a condition where the health care system might not be so helpful," says physician Reynolds. "They're understandably desperate for alleviation of symptoms or for a cure, and if traditional medicine isn't working then it's understandable they would look for healing elsewhere."

So what are consumers supposed to do? The last word across the spectrum of experts appears to be that if anyone wants to get or stay healthy, "the first thing people should do is eat well," says Swartzberg. That means whole foods, advises Doak, that are consumed in a form most similar to how they grew. If that's happening and a person is healthy, then naturopathic doctor Seely says there may well not be a need for supplementation. But that's not always possible, notes Whiting. And diet may not be the only factor to consider. So, many of them say, if someone is going to take any nonprescription pills, it's imperative she talk with her doctor or pharmacist — who is especially accessible and knowledgeable — if not a naturopathic doctor or dietitian too.

And be skeptical about the latest, greatest research. "New information is always that — new information. It stands to be corrected," says Harrington. "I'm from the industry and I believe this: if it sounds too good to be true, it probably is." In an apt metaphor for the confusing, contradictory nature of vitamin and mineral supplements, he adds, "Then again, wonderful things can happen, and to ignore that would be equally foolish."