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WELL

Vitamin Pills: A False Hope?

By TARA PARKER-POPE

Ever since the Nobel Prize-winning biochemist Linus Pauling first promoted “megadoses” of essential nutrients 40 years ago, Americans have been devoted to their vitamins. Today about half of all adults use some form of dietary supplement, at a cost of \$23 billion a year.

But are vitamins worth it? In the past few years, several high-quality studies have failed to show that extra vitamins, at least in pill form, help prevent chronic disease or prolong life.

The latest news came last week after researchers in the Women’s Health Initiative study tracked eight years of multivitamin use among more than 161,000 older women. Despite earlier findings suggesting that multivitamins might lower the risk for heart disease and certain cancers, the study, published in The Archives of Internal Medicine, found no such benefit.

Last year, a study that tracked almost 15,000 male physicians for a decade reported no differences in cancer or heart disease rates among those using vitamins E and C compared with those taking a placebo. And in October, a study of 35,000 men dashed hopes that high doses of vitamin E and selenium could lower the risk of prostate cancer.

Of course, consumers are regularly subjected to conflicting reports and claims about the benefits of vitamins, and they seem undeterred by the news — to the dismay of some experts.

“I’m puzzled why the public in general ignores the results of well-done trials,” said Dr. Eric Klein, national study coordinator for the prostate cancer trial and chairman of the Cleveland Clinic’s Glickman Urological and Kidney Institute. “The public’s belief in the benefits of vitamins and nutrients is not supported by the available scientific data.”

Everyone needs vitamins, which are essential nutrients that the body can’t produce on its own. Inadequate vitamin C leads to scurvy, for instance, and a lack of vitamin D can cause rickets.

But a balanced diet typically provides an adequate level of these nutrients, and today many popular foods are fortified with extra vitamins and minerals. As a result, diseases caused by nutrient deficiency are rare in the United States.

In any event, most major vitamin studies in recent years have focused not on deficiencies but on whether high doses of vitamins can prevent or treat a host of chronic illnesses. While people who eat lots of nutrient-rich fruits and vegetables have long been known to have lower rates of heart disease and cancer, it hasn’t been clear whether ingesting high doses of those same nutrients in pill form results in a similar benefit.

In January, an editorial in The Journal of the National Cancer Institute noted that most trials had shown no cancer benefits from vitamins — with a few exceptions, like a finding that calcium appeared to lower the recurrence of precancerous colon polyps by 15 percent.

But some vitamin studies have also shown unexpected harm, like higher lung cancer rates in two studies of

beta carotene use. Another study suggested a higher risk of precancerous polyps among users of folic acid compared with those in a placebo group.

In 2007, The Journal of the American Medical Association reviewed mortality rates in randomized trials of antioxidant supplements. In 47 trials of 181,000 participants, the rate was 5 percent higher among the antioxidant users. The main culprits were vitamin A, beta carotene and vitamin E; vitamin C and selenium seemed to have no meaningful effect.

“We call them essential nutrients because they are,” said Marian L. Neuhouser, an associate member in cancer prevention at the Fred Hutchinson Cancer Research Center in Seattle. “But there has been a leap into thinking that vitamins and minerals can prevent anything from fatigue to cancer to Alzheimer’s. That’s where the science didn’t pan out.”

Everyone is struggling to make sense of the conflicting data, said Andrew Shao, vice president for scientific and regulatory affairs at the Council for Responsible Nutrition, a vitamin industry trade group. Consumers and researchers need to “redefine our expectations for these nutrients,” he said. “They aren’t magic bullets.”

Part of the problem, he said, may stem from an inherent flaw in the way vitamins are studied. With drugs, the gold standard for research is a randomized clinical trial in which some patients take a drug and others a placebo. But vitamins are essential nutrients that people ingest in their daily diets; there is no way to withhold them altogether from research subjects.

Vitamins given in high doses may also have effects that science is only beginning to understand. In a test tube, cancer cells gobble up vitamin C, and studies have shown far higher levels of vitamin C in tumor cells than are found in normal tissue.

The selling point of antioxidant vitamins is that they mop up free radicals, the damaging molecular fragments linked to aging and disease. But some free radicals are essential to proper immune function, and wiping them out may inadvertently cause harm.

In a study at the University of North Carolina, mice with brain cancer were given both normal and vitamin-depleted diets. The ones who were deprived of antioxidants had smaller tumors, and 20 percent of the tumor cells were undergoing a type of cell death called apoptosis, which is fueled by free radicals. In the fully nourished mice, only 3 percent of tumor cells were dying.

“Most antioxidants are also pro-oxidants,” said Dr. Peter H. Gann, professor and director of research in the department of pathology at the University of Illinois at Chicago. “In the right context and the right dose, they may be able to cause problems rather than prevent them.”

Scientists suspect that the benefits of a healthful diet come from eating the whole fruit or vegetable, not just the individual vitamins found in it. “There may not be a single component of broccoli or green leafy vegetables that is responsible for the health benefits,” Dr. Gann said. “Why are we taking a reductionist approach and plucking out one or two chemicals given in isolation?”

Even so, some individual vitamin research is continuing. Scientists are beginning to study whether high doses of whole-food extracts can replicate the benefits of a vegetable-rich diet. And Harvard researchers are planning to study whether higher doses of vitamin D in 20,000 men and women can lower risk for cancer and other chronic diseases.

“Vitamin D looks really promising,” said Dr. JoAnn E. Manson, the chief of preventive medicine at Brigham

and Women's Hospital and an investigator on several Harvard vitamin studies. "But we need to learn the lessons from the past. We should wait for large-scale clinical trials before jumping on the vitamin bandwagon and taking high doses."