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Vitamin D3 is the Best Form – And New Research Shows More Health Benefits

Vitamin D3 is better absorbed than D2, but new research shows that the difference is striking. According to a study conducted at Creighton University in Omaha, Nebraska, vitamin D3 is absorbed almost twice as well as D2.

Doctors have often debated the differences between vitamin D3 (cholecalciferol) and D2 (ergocalciferol). Both types are converted by the liver and kidneys to the biologically active form of the vitamin.

Robert P. Heaney, MD, and his colleagues asked 33 healthy men and women to take 50,000 IU of vitamin D – one form or the other – daily for 12 weeks. Blood levels of the vitamin were measured during the study. Nine subjects allowed the doctors to obtain a small fat biopsy at the beginning and end of the study to assess vitamin D tissue storage.

By the end of the study, people taking vitamin D3 had 87 percent higher blood levels of the vitamin, compared with people taking vitamin D2. In addition, people taking vitamin D3 stored two to three times more of the vitamin, compared with those taking vitamin D2.

D3 is produced commercially from sheep lanolin, whereas vitamin D2 comes from nonanimal sources.

In other recent research, Eduardo Villamor, MD, of the University of Michigan in Ann Arbor, and his colleagues tracked the vitamin D levels and health of 479 schoolchildren. The children ranged from five to 12 years old at the beginning of the study, and they were followed for an average of 2.5 years.

During this time, children with low or deficient levels of vitamin D were more likely to become fatter and remain shorter, compared with children who had normal levels of the vitamin. Body fat was measured using body mass index, skinfold thickness, and waist circumference.

Meanwhile, John M. Brehm, MD, of the Harvard Medical School, and his colleagues analyzed the relationship between vitamin D levels and severe asthma reactions as part of a drug study involving 1,024 children. The subjects had been diagnosed with mild-to-moderate persistent asthma.

Thirty-five percent of the children had marginal to serious deficiencies of vitamin D. Over four years, those with low vitamin D levels were 50 percent more likely to visit an emergency room or to be hospitalized because of severe asthma reactions. "Even in those already receiving inhaled steroids, vitamin D insufficiency increased the risk [of severe asthma reactions]," wrote Brehm and his colleagues.

References: Heaney RP, Recker RR, Grote J, et al. Vitamin D3 is more potent than vitamin D2 in humans. *Journal of Clinical Endocrinology*, 2011: epub ahead of print. Gilbert-Diamond D, Baylin A, Mora-Plazas M, et al. Vitamin D deficiency and anthropometric indicators of adiposity in school-age children: a prospective study. *American Journal of Clinical Nutrition*, 2010;92:1446-1451. Brehm JM, Schemann B, Fuhlbrigge AL, et al. Serum vitamin D levels and severe asthma exacerbations in the childhood asthma management program study. *Journal of Allergy and Clinical Immunology*, 2010; 126:52-58.e5. ❑

Perspectives

Huh? Stop Taking Supplements?

A nutrition client recently related a conversation he had with a dietitian working at his gym. He had told her about the supplements he was taking, which had led to significant improvements in his blood sugar and cardiovascular risk factors. And the dietitian responded by suggesting that maybe he has been taking supplements for too long and should stop.

This kind of thinking on the part of the dietitian reflects an old-school view of nutrition: It focuses more on foods than nutritional biochemistry, and it's based on a lot of unsubstantiated assumptions.

First, the biochemical basis of our bodies derives from nutrition. Ignoring this is tantamount to ignoring the fact that plants don't need sunlight and water to grow. Even our genes depend on nutrients,

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such as amino acids and B vitamins, to function normally. We even need vitamins C and E to prompt stem cells to turn into actual functional cells.

Second, if someone takes vitamin supplements and his cholesterol, blood sugar, and homocysteine levels improve, that's pretty good empirical evidence of their benefits. Why would anyone want to stop taking natural substances (nutrients) that improve their risk factors for disease?

Third, there's a 50-year-old idea that people can get all of the nutrition they need from a healthy diet. Even assuming that were the case, how many people really eat healthy diets? Even with the best diet, only a relatively small percentage of nutrients actually get absorbed and put to use, and people tend to do better with larger rather than smaller amounts of vitamins and many other types of micronutrients. That's because our biochemistry functions best when there is an ample amount of "nutritional substrate" for all of the other biochemicals and chemical reactions.

Linus Pauling, PhD, once phrased it this way: why would you want to live with mediocre nutrition and mediocre health when you could live with optimal nutrient levels and optimal health? *–JC*

Whey Better than Milk and Soy Proteins for Boosting Metabolism

Researchers have long known that the body has to burn far more calories digesting, absorbing, and metabolizing protein, compared with breaking down carbohydrates (including sugars). Protein also has the advantage, through a variety of mechanisms, to decrease appetite.

But little is know about how different types of protein might affect thermogenesis, or fat burning, according to Kevin J. Acheson, PhD, of the Nestlé Research Center in Switzerland.

Acheson tested the effects of various meals on 23 thin, healthy men and women in their late twenties and early thirties. One of the meals was rich in whey protein, while the others contained casein (milk protein), soy protein, or primarily carbohydrate.

Based on an analysis of blood and urine samples, the thermogenic effect of whey protein was greater than that of casein or soy protein or carbohydrate.

However, the whey protein led to a lower sense of satiety – the subjects felt empty and more hungry – faster than after eating the casein, soy protein, or carbohydrate. Despite this effect, the subjects indicated that they "liked" the whey protein much more than the other meals.

According to Acheson, the digestion, absorption, and metabolism should burn about 23 percent more calories compared with carbohydrate (~6 percent) and fat (~3 percent) – at least based on theoretical calculations of metabolism.

Reference: Acheson KJ, Blondel -Lubrano A, Oguey-Araymon, et al. Protein choices targeting thermogenesis and metabolism. *American Journal of Clinical Nutrition*, 2011: doi 10.3945/ajcn.110.005850. ❑

Blueberry Antioxidants May Help Prevent High Blood Pressure

Eating a lot of blueberries might help you avoid hypertension, or high blood pressure.

Aedin Cassidy, PhD, of East Anglia University, United Kingdom, along with her colleagues at Harvard University, analyzed the dietary habits of 156,957 men and women and their risk of developing high blood pressure.

The researchers focused on dietary intake of anthocyanins, a family of antioxidant flavonoids. Anthocyanins are found in dark fruits and vegetables, such as blueberries, strawberries, raspberries, and eggplant skins.

After 14 years of follow up, Cassidy reported that people who consumed the most anthocyanins were 8 percent less likely to develop high blood pressure. Most of the dietary anthocyanins came from blueberries and strawberries. In terms of food, people who ate one or more servings of blueberries each week were about 10 percent less likely to develop high blood pressure.

Reference: Cassidy A, O'Reilly EJ, Kay C, et al. Habitual intake of flavonoid subclasses and incident hypertension in adults. *American Journal of Clinical Nutrition*, 2010: doi 103945/ajcn.110.006783. ❑

Type of Dairy Fat May Protect Against Diabetes, Heart Disease

Trans fats made from the hydrogenation of vegetable oils are known to increase the risk of overweight, type 2 diabetes, and cardiovascular disease. But a type of naturally occurring trans fat, found in dairy products, may help prevent these health problems.

Dariush Mazaffarian, MD, DrPH, of Harvard University's School of Public Health, and his colleagues tracked 3,736 men and women participating in the Cardiovascular Health Study. The participants, who were 65 years of age or older, completed a detailed dietary questionnaire at the beginning of the study, and three years later they had blood samples drawn to measure levels of different types of fats.

People who had indicated that they ate substantial amounts of whole-fat dairy products were later found

to have high blood levels of trans palmitoleic acid (TPA). TPA is found only in dairy products.

People with the highest blood levels of TPA were 61 percent less likely to develop type 2 diabetes. They were also a little thinner, had healthier cholesterol and triglyceride levels, lower insulin, and lower C-reactive protein levels, compared with people who had the least amount of TPA in their blood.

A similar form of palmitoleic acid is produced in the liver, and some research suggests that it too may have health benefits.

Reference: Mozaffarian D, Cao H, King IB, et al. Trans-palmitoleic acid, metabolic risk factors, and new-onset diabetes in U.S. adults. *Annals of Internal Medicine*, 2010;153:790-799.❑

Homocysteine, Vitamin B12 Impact Risk of Alzheimer's

High levels of homocysteine and low levels of vitamin B12 may increase the risk of Alzheimer's disease.

Babak Hooshmand, MD, and his colleagues at the Karolinska Institute, Sweden, measured blood levels of homocysteine and "holotranscobalamin," the active form of vitamin B12, in the blood of 271 people ages 65 to 71 years. Elevated levels of homocysteine, which can usually be controlled with supplemental folic acid and vitamin B12, are a risk factor for heart disease, stroke, and Alzheimer's.

None of the subjects had any signs of dementia at the beginning of the study. Seven years later, 17 of the subjects had been diagnosed with Alzheimer's disease. People with high levels of homocysteine and relatively low levels of vitamin B12 were more likely to develop Alzheimer's disease.

Reference: Hooshmand B, Solomon A, Kårehold I, et a. Homocysteine and holotranscobalamin and the risk of Alzheimer disease. *Neurology*, 2010;75:1408-1414. ❑

Ginger Reduces Chemo-Induced Nausea and Vomiting in Patients

Considerable research has shown that ginger root can reduce pregnancy-related nausea and vomiting. In a new study, researchers reported that ginger-root capsules have the same benefit for cancer patients undergoing chemotherapy.

Kamlesh K. Sharma, MD, of the All India Institute of Medical Sciences, New Dehli, and his colleagues treated children and young adults with bone sarcoma, giving them chemo drugs and anti-nausea medications. Some of the patients were also given capsules containing 1 to 2 grams of ginger root powder or placebos daily during up to 30 cycles of chemotherapy. The ginger dosage was based on body weight, with heavier patients receiving the larger amount.

The ginger reduced feelings of acute nausea (within 24 hours of chemo) by almost half, whereas placebos had little effect. Patients taking ginger also had about half the acute vomiting, compared with the placebo group. In addition, delayed nausea and vomiting (occuring 5-10 days after completing chemotherapy) was also greatly reduced among people taking ginger, compared with those taking placebos.

Reference: Pillai AK, Sharma KK, Gupta YK, et al. Anti-emetic effect of ginger powder versus placebo as an add-on therapy in children and young adults receiving high-emetogenic chemotherapy. *Pediatric Blood and Cancer*, 2011;56:234-238. ❑

Eating Heavily Salted Foods Affects Blood Vessel Tone

Doctors often recommend that people with hypertension reduce their salt intake. In a new study, researchers reported that eating a high-salt meal can negatively affect other aspects of the cardiovascular system.

Kacie M. Dickinson, PhD, of Australia's Commonwealth Scientific and Industrial Research Organization (CSIRO), investigated the responses of 16 healthy men and women to low- and high-salt meals. None of the subjects had hypertension.

The subjects were given meals on two different occasions. The low-salt meal contained 130 mg of sodium, whereas the high-salt meal contained 1,494 mg of sodium, which Dickinson described as the amount of sodium in a "commonly eaten meal."

Although the high-salt meal did not increase blood pressure, it did lead to a deterioration of "endothelial function," or blood vessel tone, 30 minutes after the meal. Poorer endothelial function is characterized by a stiffening of blood vessels and reduced blood flow, which may be factors leading up to hypertension.

Reference: Dickinson KM, Clifton PM, Keogh JB. Endothelial function is impaired after a high-salt meal in healthy subjects. *American Journal of Clinical Nutrition*, 2011: doi 10.3945/ajcn.110.006155. ❑

Some Dietary Fats May Ease Premenstrual Syndrome

Taking supplements containing gamma-linolenic acid and a mix of other healthy dietary fats can significantly reduce symptoms of premenstrual syndrome (PMS), according to a study by researchers from Brazil.

Edilberto A. Rocha Filho, MD, of the Federal University of Penambuco School of Medicine, and

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Quick Reviews of Recent Research

• Magnesium may protect against diabetes

Doctors from Justus-Liebeg University in Germany compared the effects of magnesium supplements and placebos on 52 men and women who had normal blood levels of magnesium, but were overweight and insulin resistant. The subjects took the magnesium supplements (providing 365 mg of the mineral) or placebos daily for six months. By the end of the study, people taking the magnesium had a significant improvement in fasting blood sugar and some reduction in insulin resistance. There was also a tendency toward lower blood pressure.

Mooren FC. *Diabetes, Obesity and Metabolism*, 2011: 10.1111/j.1463-1326.2010.01332.x

• Cinnamon also helpful in diabetes

Cinnamon has a long history of use in preventing and treating elevated blood sugar. Researchers at Thames Valley Hospital, London, asked 58 patients with type 2 diabetes to take either 2 grams of cinnamon or placebos daily for 12 weeks. People taking the cinnamon had a significant reduction in fasting blood sugar, waist circumference, and body fat, although the changes were not significant compared with the placebo group. (The study may have motivated placebo group members to eat more carefully.) However, after 12 weeks, people taking the cinnamon did have significant reductions in blood sugar (based on HbA1c levels) and systolic and diastolic blood pressure among "poorly controlled type 2 diabetic patients."

Akilen R. *Diabetic Medicine*, 2010;27:1159-1167.

• Omega-3 may serve as "clot buster"

So-called clot-buster drugs are commonly administered to stroke patients to reduce the further risk of blood clots and brain damage. In an experiment using laboratory rats, researchers at Loma Linda University, California, found that one of the key omega-3 fats, docosahexaenoic acid (DHA) led to significantly reduced post-stroke damage. DHA was provided intravenously after a stroke, and it reduced brain damage by up to 66 percent, compared with animals that did not receive DHA. DHA also led to post-stroke improvements in animal behavior.

Belayev L. *Translational Stroke Research*, 2010: doi 10.1007/s12975-010-0046-0.

• Very few Americans physically active

Nearly everyone understands that regular physical activity can reduce the risk of overweight, diabetes, cardiovascular diseases, and cancer. But a team of American researchers has found that very few people actually engage in any type of daily vigorous activity. In a study of almost 80,000 Americans, the researchers reported that only 5 percent of people exercised vigorously (not including people whose jobs involved physical activity). The most common types of exercise were using cardiovascular equipment and running. One-fourth of the subjects described food and drink preparation as their physical activities, although the researchers classified these activities as sedentary.

Tudor-Locke C. *American Journal of Preventive Medicine*, 2010;39:e13-e20.

Dietary Fats and PMS...

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his colleagues treated 120 women who had experienced a variety of PMS symptoms. The supplements contained either 1 or 2 grams of fats or placebos, and they were taken daily for six months.

Each 1-gram capsule provided 210 mg of gamma-linolenic acid, 175 mg of oleic acid, 250 mg of other polyunsaturated fats, and 20 mg of vitamin E. The 2-gram dosage had twice these amounts.

Women in the study recorded the intensity of 23 PMS symptoms, including anxiety, depression, headache, and water retention. The 1- and 2-gram supplements led to significant improvements after three and six months, with the 2-gram supplement providing the greatest benefits. The placebos led to improvements after three months, but their benefits wore off after six months.

Gamma-linolenic acid is obtained from plant oils, and it is the precursor to prostaglandin E1, a hormone-like substance that has analgesic properties.

Reference: Rocha Filho EA, Lima JC, Pinho Neto JS, et al. Essential fatty acids for premenstrual syndrome and their effect on prolactin and total cholesterol levels: a randomized double blind, placebo-controlled study. *Reproductive Health*, 2011: doi: 10.1186/1742-4755-8-2. ❑

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