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Vitamin D, in Food or Supplements, May Protect Against Autoimmune Diseases

Adequate intake of vitamin D may help prevent a variety of autoimmune diseases, including rheumatoid arthritis, multiple sclerosis, and type 1 diabetes. Each of these disorders involves the immune system attacking the body's own tissues.

Kenneth G. Saag, MD, of the University of Alabama, Birmingham, and his colleagues investigated the eating and supplement habits of 29,368 women and their risk of developing rheumatoid arthritis. The women, ages 55-69 years, had no medical history of arthritis when they began participating in the study. During 11 years of follow up, the researchers identified 152 cases of rheumatoid arthritis.

Saag reported in the journal *Arthritis & Rheumatism* that women consuming the most dietary vitamin D were 28 percent less likely to develop rheumatoid arthritis. Women who took the most supplemental vitamin D were 34 percent less likely to develop the disease.

In a separate study focusing on multiple sclerosis, Kassandra L. Munger, MSc, of the Harvard School of Public Health, and her colleagues analyzed data collected from two long-term studies of women nurses. One group of 82,253 women was tracked from 1980 to 2000, while the other group, consisting of 95,310 women, was followed from 1991 to 2001. A total of 173 cases of multiple sclerosis were diagnosed in the two groups.

Munger found that women consuming the most vitamin D from foods were 33 percent less likely to develop multiple sclerosis. Meanwhile, women who consumed vitamin D supplements (400 IU or more daily) were 41 percent less likely to develop multiple sclerosis. In addition, women who routinely took multivitamin supplements were less likely to develop multiple sclerosis.

Finally, Jill M. Norris, PhD, of the University of Colorado Health Sciences Center, Denver, and her colleagues studied the eating habits of 233 mothers of children at high risk for developing type 1 diabetes. The children had either a family history of type 1 diabetes or an known genetic predisposition.

Norris and her colleagues tracked the children for an average of four years and tested them for several specific antibodies. The presence of these antibodies would indicate an autoimmune attack on the pancreas before clinical symptoms of diabetes became apparent. Sixteen children developed at least one of these antibodies during the study.

Next, Norris analyzed the diets of the children's mothers during their pregnancy. She found that children were 63 percent less likely to develop an autoimmune reaction if their mothers had consumed large amounts of dietary vitamin D.

References: Merlino LA, Curtis J, Mikuls TR, et al. Vitamin D intake is inversely associated with rheumatoid arthritis. *Arthritis & Rheumatism*, 2004;50:72-77. Munger KL, Zhang SM, O'Reilly E, et al. Vitamin D intake and incidence of multiple sclerosis. *Neurology*, 2004;62:60-65. Fronczak CM, Baron AE, Chase HP, et al. In utero dietary exposures and risk of islet autoimmunity in children. *Diabetes Care*, 2003;26:3237-3242.

Antioxidant Carotenoids May Slow Development of Cardiovascular Disease

High blood levels of lutein and several other antioxidant carotenoids appear to slow the progression of cardiovascular disease, according to a study conducted at the University of Southern California, Los Angeles.

Using ultrasound technology, James H. Dwyer, PhD, and his colleagues measured the intima-media thickness (IMT) of the carotid artery in 573 middle-age men and women. An abnormal IMT indicates a thickening of the inner artery wall, which reduces blood flow and increases the risk of heart attack and stroke.

Dwyer and his colleagues also measured blood levels of several carotenoids and vitamins in the men

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and women. Eighteen months later, they measured the subjects' IMT a second time, and then looked for relationships with specific antioxidants.

They found that higher blood levels of lutein, zeaxanthin, cryptoxanthin, and alpha-carotene were associated with a significant 21 to 31 percent lower IMT progression. Blood levels of lycopene, beta-carotene, and vitamins A, C, and E were also correlated with slower IMT progression, but the relationships were not statistically significant.

Dwyer also reported that higher blood levels of carotenoids and vitamin C were associated with lower blood levels of C-reactive protein (CRP). CRP is a marker of inflammation and a risk factor for heart cardiovascular disease.

Reference: Dwyer JH, Paul-Labrador MJ, Fan J, et al. Progression of carotid intima-media thickness and plasma antioxidants: the Los Angeles atherosclerosis study. *Arteriosclerosis, Thrombosis and Vascular Biology*, 2004;24:313-319. ▯

Neurologists Report that the Atkins Diet May Reduce Epileptic Seizures

The "ketogenic" diet has long been used as a treatment for people with epilepsy who have not been helped by anti-seizure medications. The diet is high in fat, with low to moderate levels of protein, and very little carbohydrate. The large amount of dietary fat provides ketones as an alternative to glucose as a fuel for the brain.

However, the ketogenic diet is difficult to follow because it restricts both food choices and calories. In children, the diet may also slow physical and mental development.

"The Atkins diet can also induce a ketotic state, but has fewer protein and calorie restrictions, and has been used safely by millions of people worldwide for weight reduction," wrote Eric H. Kossoff, MD, a neurologist at the Johns Hopkins Hospital, Baltimore, in the journal *Neurology*.

In a small study, Kossoff and his colleagues treated six intractable epileptic patients, ranging from seven to 52 years of age, with the high-protein, high-fat, low-carb Atkins diet. Three of the subjects improved.

In his report, Kossoff described some of the case histories. In one case, a seven-year-old girl had been experiencing 70-80 seizures daily, and medications provided only limited benefits. Three days after starting the Atkins diet, her seizures stopped, and she was able to taper off anti-seizure drugs while following the diet for five months. "After losing six pounds, her carbohydrates were increased to 20 grams per day without worsening of seizures," Kossoff reported.

Kossoff also described a 10-year-old boy who had seizures, behavioral problems, and developmental disorders. Medications led to only minor improvements. His symptoms improved, without side effects, while following the ketogenic diet for 2.5 years. His family discontinued the diet because it was seen as overly restrictive and the boy had been free of seizures. One year later, the boy began developing "staring spells" and aggressive behavior. This time he began following the Atkins diet, with 10-20 grams of carbohydrates daily, and within a month his staring spells stopped and his behavior improved.

Reference: Kossoff EH, Krauss GL, McGrogan JR, et al. Efficacy of the Atkins diet as therapy for intractable epilepsy. *Neurology*, 2003;61:1789-1791. ▯

Researchers Identify Mechanism Behind Green Tea's Anticancer Benefits

Animal and epidemiological studies have found that green tea can reduce the risk of lung, prostate, and breast cancers. Many researchers have attributed the benefits of green tea to its high concentration of antioxidants, which prevent cancer-promoting cell mutations. But in a recent study, researchers identified a new way that green tea protects against cancer.

Hirofumi Tachibana, PhD, of Kyushu University, Japan, and his colleagues conducted experiments using human lung cancer cells and epigallocatechin-3-gallate (EGCG), the principal antioxidant found in green tea.

Tachibana discovered that EGCG attached to "laminin receptors," a type of protein located on the surface of the cancer cells. Laminin receptors are involved in cancer metastases. When EGCG attached to this receptor, growth of the cancer cells decreased.

The amounts of EGCG used in the experiments were comparable to those found in human after drinking two or three cups of green tea. Other constituents of green tea, including caffeine, did not have an anticancer effect.

Reference: Tachibana H, Koga K, Fujimura Y, et al. A receptor for green tea polyphenol EGCG. *Nature Structural and Molecular Biology*, published online March 14, 2004. ▯

High-Sugar, High-Carb Foods Boost Women's Risk of Colorectal Cancer

Eating diets rich in high-glycemic foods, carbohydrates, and fructose significantly boosts the risk of developing colorectal cancer, according to researchers at the Harvard Medical School.

High-glycemic foods are rapidly digested and quickly raise blood sugar and insulin levels. These foods include pastries, soft drinks, breakfast bars, white breads, and pastas.

According to Harvard's Simin Liu, MD, ScD, "a diet inducing high blood glucose and an elevated insulin response may contribute to a metabolic environment conducive to tumor growth."

Liu and his colleagues analyzed the eating habits of almost 40,000 women in relation to their risk of colorectal cancer. Over an eight-year period, 174 of the women were diagnosed with colorectal cancer.

The researchers found that women eating the most high-glycemic foods were almost three times more likely to develop colorectal cancer.

Women whose diets contained a lot of nonfiber carbohydrate – refined flour products, such as white bread – were two and one-half times more likely to develop colorectal cancer. And women who consumed large amounts of fructose, found in sucrose and high-fructose corn syrup, had twice the risk of developing cancer.

Reference: Higginbotham S, Zhang ZF, Lee IM, et al. Dietary glycemic load and risk of colorectal cancer in the women's health study. *Journal of the National Cancer Institute*, 2004;96:229-233.

Low Folic Acid and Vitamin B12 Linked to Risk of Ischemic Stroke

Low intake of folic acid and vitamin B12 increase the risk of the most common type of stroke, according to a new study. The finding is consistent with scores of studies showing that elevated homocysteine levels, a sign of low folic acid, are a risk factor for cardiovascular diseases.

In the latest study, Ka He, MD, of the Northwestern University School of Medicine, Chicago, and his colleagues analyzed the diets and vitamin intake of 43,732 men ages 40 to 70 years old. During 14 years of follow up, 455 men suffered an ischemic stroke, 125 had a hemorrhagic stroke, and 145 had unknown types of stroke. Ischemic strokes are caused by a blockage in a blood vessel in the brain, whereas hemorrhagic strokes result from a blood-vessel rupture.

He reported that men consuming the most folic acid, from foods or supplements, were almost 30 percent less likely to experience an ischemic stroke. Similarly, men consuming the most vitamin B12 had a 23 percent lower risk of ischemic stroke. Neither vitamin was related to the risk of hemorrhagic stroke.

Both folic acid and vitamin B12 are involved in breaking down homocysteine, which is known to damage blood vessel walls.

In a separate study, Robert Clarke, MD, of the University of Oxford, England, investigated the prevalence of vitamin B12 and folic acid among 3,511 elderly subjects. His determination of "metabolically significant" deficiency was based on a combination of low vitamin levels and elevated homocysteine levels.

Clarke reported that the number of vitamin deficiencies increased with age. Vitamin B12 deficiency affected about 5 percent of people 65 to 74 years old and 10 percent of people 75 years of age or older. Rates of folic acid deficiency were comparable. However, only about 10 percent of people with low vitamin B12 levels also had low folic acid levels.

References: He K, Merchant A, Rimm EB, et al. Folate, vitamin B6, and B12 intakes in relation to risk of stroke among men. *Stroke*, 2004;35:169-174. Clarke R, Evans JG, Scneede J, et al. Vitamin B12 and folate deficiency in later life. *Age and Ageing*, 2004;33:34-41.

Vitamin E Helps Heal Damage to Artery Walls, Protect Against Heart Disease

Vitamin E appears to play a unique role in helping the body heal microscopic injuries to artery walls and thus prevent heart disease. Such injuries occur during the development of coronary artery disease and during surgical procedures, such as balloon angioplasty.

Endothelial cells line the inside of arteries. After an artery is damaged, some of these cells migrate to the injury site as part of the healing process. However, oxidized low-density lipoprotein (LDL) cholesterol, which plays other roles in promoting heart disease, also inhibits endothelial cell migration.

In a recent series of cell experiments, Linda M. Graham, MD, of the Cleveland Clinic Foundation, confirmed previous research showing that oxidized LDL inhibited normal endothelial cell migration. Next, she and her colleagues added vitamin E or synthetic antioxidants (probucol and BHT) to determine their effect on endothelial cell migration.

Graham found that vitamin E preserved endothelial migration, even in the presence of oxidized LDL. Neither of the synthetic antioxidants provided this benefit.

As a result, Graham concluded that vitamin E worked by stabilizing the membranes [walls] of endothelial cells, not as an antioxidant. "'Non-antioxidant' properties of vitamin E…could be important in the primary prevention of atherosclerosis and its complications," Graham wrote. "Our in vitro studies show that a-tocopherol [vitamin E] can preserve endothelial migration in the presence of cell-oxidized LDL."

Reference: van Aalst JA, Burmeister W, Fox PL, et al. A-tocopherol preserves endothelial cell migration in the presence of cell-oxidized low-density lipoprotein by inhibiting changes in cell membrane fluidity. *Journal of Vascular Surgery*, 2004;39:229-237.

Quick Reviews of Recent Research

• Cod liver oil reduces risk of type 1 diabetes

Cod liver oil is a rich source of anti-inflammatory omega-3 fish oils and vitamin D. Norwegian researchers studied the consumption of cod liver oil in 545 children diagnosed with type 1 diabetes and 1,668 nondiabetic children. Consumption of cod liver oil during the first year of life was associated with a significant 26 percent lower risk of developing type 1 diabetes. Other vitamin D supplements were not associated with a lower risk of diabetes, so the researchers concluded that the omega-3 fats in cod liver oil may influence gene activity and help regulate the immune system.

Stene LC, et al. *American Journal of Clinical Nutrition*, 2003;78:1128-1134.

• Vitamin E reduces symptoms of tardive dyskinesia

Tardive dyskinesia, characterized by involuntary movements of the arms and legs, often results from alcoholism or medical treatment for schizophrenia and Parkinson disease. Researchers used either 1,200 IU of vitamin E or placebos to treat 41 schizophrenic patients who also had tardive dyskinesia for at least one year. By the end of the 12-week study, patients taking vitamin E had a 46 percent reduction in tardive dyskinesia symptoms, based on clinical evaluations using the Abnormal Involuntary Movement Scale. In addition, the vitamin E supplements led to increased blood levels of superoxide dismutase (SOD), an antioxidant enzyme, which may have also helped to lessen symptoms. Placebos provided no significant improvements.

Zhang XY, et al. *Journal of Clinical Psychopharmacology*, 2004;24:83-86.

• Vitamin C may protect against SARS epidemic

In a letter to the editor, a leading researcher cited research showing high-dose vitamin C supplements reduce the length and severity of the common cold. Three additional studies have found that vitamin C can reduce the incidence of pneumonia. In light of the vitamin's benefits in respiratory tract infections, the researcher proposed that the potential value of vitamin C be tested against severe acute respiratory syndrome (SARS), which has emerged over the past couple of years.

Hemila H. *Journal of Antimicrobial Chemotherapy*, 2003;52:1049-1050.

• Modified citrus pectin may help in prostate cancer

Pectin, a type of fiber found in fruit, is known for its ability to reduce cholesterol and triglyceride levels. Several studies have found that a particular type of pectin, known as modified citrus pectin, has some anticancer properties. Researchers asked 10 men with prostate cancer to take supplements containing 14.4 grams of modified citrus pectin daily for one year. Seven of the patients had smaller increases in prostate-specific antigen, a sign of less aggressive tumor activity.

Guess BW, et al. *Prostate Cancer and Prostatic Diseases*, 2003;6:301-304.

• St. John's wort helps children with depression

Several studies have found that the herb St. John's wort is as effective as prescription antidepressant medications in the treatment of mild to moderate depression in adults. Researchers used St. John's wort to treat 33 children, ages 6 to 16, with moderate or more severe depression. The patients were initially given 150 mg of the herb three times daily for four weeks. If the patients did not improve, the dosage was doubled for another four weeks. Almost one-fourth of the children improved after four weeks, and more than three-fourths of them had improved after eight weeks. Side effects, such as dizziness, increased appetite, or loose stools, were minor.

Findling RL, et al. *Journal of the American Academy of Child and Adolescent Psychiatry*, 2003;42:908-914.

• Carotenoids may be needed for healthy bones

Although calcium gets the most attention for its role in maintaining strong bones, many other nutrients are involved in forming the protein/mineral matrix in bones. Researchers analyzed the dietary intake of several antioxidant carotenoids in 68 men and 137 women. Lycopene was associated with increased bone density in men. Lutein, zeaxanthin, and lycopene was associated with bone density in premenopausal women, and beta-carotene was related to bone density in postmenopausal women. The researchers concluded that carotenoids and possibly other antioxidants in fruit and vegetables may play a role in bone health.

Wattanapenpaiboon N, et al. *Asia Pacific Journal of Clinical Nutrition*, 2003;12:467-473.

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