

The Nutrition Reporter™

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If Nutrients Affect Mood, Can They Also Influence Violent Criminal Behavior?

Some researchers have long believed that the earliest signs of nutritional deficiencies appear as behavioral and mood abnormalities, including irritability and depression. But if nutrition can affect mood, could it also influence a person's tendency toward criminal behavior?

Some 25 years ago, Barbara Reed-Stitt, an Ohio probation officer, found that repeat offenses declined significantly when she encouraged probationers to eat wholesome foods and take vitamin supplements. More controlled research, such as that by Stephen J. Schoenthaler, PhD, a sociology professor at California State University, Turlock, has found that vitamin supplements improve the behavior of prison inmates.

In the most recent study along these lines, C. Bernard Gesch, CQSW, of Oxford University, England, and his colleagues tested the effects of vitamin/mineral and essential fatty acid supplements or placebos on 231 young adult prisoners 18 years of age and older.

The supplements were comparable to a conventional once-a-day supplement, containing very modest amounts of vitamins and minerals. A separate fatty acid supplement provided a fish-oil source of omega-3 and omega-6 fatty acids. Both supplements were taken for about five months.

The study was designed to test whether "supplementary vitamins, minerals, and essential fatty acids would significantly reduce the rate of disciplinary incidents," according to Gesch's report in the *British Journal of Psychiatry*.

The prisoners underwent a variety of psychological tests, and their behavior was carefully tracked. Of particular interest were changes in disciplinary actions from antisocial and violent behavior while incarcerated.

Of the 172 prisoners who completed the study, 82 took supplements and 90 took placebos. Prisoners receiving the supplements committed an average of 26.3 percent fewer offenses, compared with those taking placebos. Furthermore, prisoners taking

supplements committed an average of 35.1 percent fewer offenses, compared with before they began taking the supplements.

Gesch wrote that the most significant reduction occurred with the most serious and violent incidents. He also noted that behavioral problems may be greatest among prisoners consuming the poorest diets.

Before the study began, almost all of the prisoners were found deficient in selenium, a mineral associated with mood. More than two-thirds of the prisoners were also deficient in magnesium, potassium, iodine, and zinc.

"Antisocial behavior in prisons, including violence, are reduced by vitamins, minerals, and essential fatty acids with similar implications for those eating poor diets in the community," Gesch wrote. He noted that social factors, as well as diet, influence antisocial behavior.

Reference: Gesch CB, Hammond SM, Hampson SE, et al. Influence of supplementary vitamins, minerals and essential fatty acids on the antisocial behavior of young adult prisoners. *British Journal of Psychiatry*, 2002;181:22-28. □

Acetylcysteine Supplements Prevent Post-Surgical Kidney Disorder

Supplemental acetylcysteine, a potent antioxidant, can prevent a particular type of kidney complication in patients undergoing angiography and cardiac catheterization. The supplement is also known as N-acetylcysteine.

The condition, known as "contrast nephropathy," is caused by a chemical called a contrast agent. The complication affects about 5 percent of patients with mild kidney problems and up to 50 percent of those with severe kidney disease or diabetes.

When patients undergo diagnostic angiography or cardiac catheterization, the chemical is injected around the heart to improve the quality of real-time

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x-ray images. Physicians monitor those x-rays while performing the procedures.

But the chemical stresses the kidneys, and patients with kidney disease, such as those with reduced kidney function or diabetes, have the greatest risk of developing contrast nephropathy. The kidney stress appears related to the production of free radicals.

Jay Kay, MRCP, and his colleagues at Grantham Hospital, Hong Kong, used acetylcysteine because other studies have found it to protect the kidneys. He gave 600 mg of the supplement or placebos to 200 patients the day before and after undergoing angiography. All of the patients had been diagnosed with moderately reduced kidney function.

Kidney function was assessed based on blood clearance of creatinine levels. Acetylcysteine supplements significantly increased creatinine clearance and reduced blood levels of creatinine, compared with placebos. The benefits lasted for at least seven days after angiography.

Other studies have found that acetylcysteine significantly reduced symptoms of influenza and can extend the life expectancy of patients with AIDS.

Reference: Kay J, Chow WH, Chan TM, et al. Acetylcysteine for prevention of acute deterioration of renal function following elective coronary angiography and intervention. *JAMA*, 2003;289:553-558. □

Omega-3 Fish Oils, Olive Oil Ease Migraine Headaches in Young Adults

Supplements containing omega-3 fish oils can help reduce the frequency, length, and severity of migraine headaches in adolescents, researchers have reported.

Zeev Harel, MD, of the Hasbro Children's Hospital, Providence, Rhode Island, asked 27 boys and girls, ages 12 to 21, to take daily fish oil capsules containing 378 mg of eicosapentaenoic acid (EPA) and 249 mg of docosahexaenoic acid (DHA) daily for two months. In a second phase of the study, Harel gave the subjects "placebos" containing 1 gram of olive oil – which turned out to be almost as good as the fish oils.

Both omega-3 fish oils and olive oil (rich in omega-9 fatty acids) are well established for their anti-inflammatory properties. Inflammation is believed to play a role in migraine headaches, and it may be aggravated by diets high in pro-inflammatory omega-6 fats in corn, safflower, and soy cooking oils.

The subjects evaluated the benefits of each treatment using several accepted questionnaires.

After two months, 87 percent of those taking fish oil capsules had fewer headaches, 74 percent had

shorter headaches, and 83 percent reported less severe headaches. When the subjects took olive oil capsules, 78 percent had fewer headaches, 70 percent had shorter headaches, and 65 percent had less severe headaches.

Harel noted that 91 percent of the subjects would recommend either fish oils or olive oil to friends and relatives with migraine headaches.

Reference: Harel Z, Gascon G, Riggs S, et al. Supplementation with omega-3 polyunsaturated fatty acids in the management of recurrent migraines in adolescents. *Journal of Adolescent Health*, 2002;31: 154-161. □

Vitamin E Lowers Blood Pressure in Patients with Mild Hypertension

About a half-century ago, when Drs. Evan and Wilfrid Shute began using vitamin E supplements to treat coronary heart disease, they noticed that about one-third of patients experienced increases and one-third had decreases in blood pressure. Another third seemed to have no change in blood pressure when taking vitamin E.

For reasons that remain unexplained, recent large clinical trials of vitamin E have not reported any significant changes in blood pressure in patients with heart disease. But a recent study by Iranian researchers found that vitamin E supplements significantly lowered blood pressure in patients with mild hypertension.

Maryam Boshtam, MD, and colleagues at the Isfahan Cardiovascular Research Center, Iran, asked 70 patients recently diagnosed with mild hypertension to take either 200 IU of vitamin E or placebos daily for 27 weeks. The patients' initial blood pressure levels before treatments ranged from 140 mmHg systolic and 90 mmHg diastolic (140/90) up to 160 mmHg systolic to 100 mmHg diastolic (160/100).

By the end of the study, patients taking vitamin E supplements had, on average, a significant 24 percent decrease in systolic blood pressure (the first of the two numbers in a blood-pressure reading). Diastolic blood pressure (the second of the two numbers in a blood-pressure reading) decreased by an average of 12.5 percent. In contrast, systolic blood pressures in the placebo decreased by 1.6 percent and diastolic pressures decreased by 6.2 percent.

In addition, the patients' heart rates – beats per minute – decreased by 4.3 percent in the vitamin E group and, inexplicably, by 10 percent in the placebo group.

The researchers wrote that "a vitamin E supplement of 200 IU/day can be effective in mild hypertensive patients in the long term...and improve their

blood pressure status. Therefore, vitamin E supplement(s) could be recommended to such patients.”

Reference: Boshtam M, Rafiei M, Sadeghi K, et al. Vitamin E can reduce blood pressure in mild hypertensives. *International Journal for Vitamin and Nutrition Research*, 2002;72:309-314. □

Lutein Supplements Improve Visual Acuity in Patients with Cataracts

A growing body of research indicates that supplements of lutein, essential for the health of the retina, can improve visual acuity. The antioxidant carotenoid appears to reduce the scattering of light within the eye, functioning somewhat like natural polarizers.

In the latest study, Begona Olmedilla, PharmD, and her colleagues at the Clinica Puerta de Hierro, Madrid, Spain, gave 15 mg of lutein esters (a natural form of the nutrient) to five patients with age-related cataracts. Six other patients with cataracts took 100 mg of vitamin E, and six took placebos three times weekly for periods up to two years. Visual acuity and sensitivity to glare were measured with sophisticated eye tests at the beginning of the study and then periodically through the end of the study.

Overall, patients taking the lutein ester supplements had significant improvements in visual acuity and reduction in glare sensitivity. Meanwhile, patients taking vitamin E showed a trend toward maintaining their visual acuity, while those taking placebos had a decrease.

“Visual function in patients with age-related cataracts who received the lutein supplements improved, suggesting that a higher intake of lutein, through lutein-rich fruit and vegetables or supplements, may have beneficial effect on the visual performance of people with age-related cataracts,” Olmedilla wrote.

Reference: Olmedilla B, Granado F, Blanco I, et al. Lutein, but not a-tocopherol, supplementation improves visual function in patients with age-related cataracts: a 2-y double-blind, placebo-controlled pilot study. *Nutrition*, 2003;19:21-24. □

Vitamins E and C Lead to Eye-Surface Improvements in Diabetic Patients

Lutein may reduce the risk of serious eye diseases, such as macular degeneration and cataracts, and improve visual acuity. But relatively little research has been conducted on the relationship between nutrition and the surface of the eye, or whether subtle damage to the ocular surface may be a harbinger of more serious eye diseases.

In a recent study, Nikolaos M. Sitaras, MD, PhD, and his colleagues at the University of Athens, Greece, investigated how supplemental vitamins E and C might benefit the surface of the eye in 50 patients with type 2 diabetes.

“The ocular surface is relatively unprotected and constantly exposed to radiation, atmospheric oxygen, environmental chemicals, and physical insults, resulting in the general of reactive oxygen species [free radicals] which are thought to contribute to ocular damage,” he wrote in the *British Journal of Ophthalmology*.

Sitaras asked the diabetic subjects, who were at an increased risk of eye disease, to take 400 IU daily of vitamin E and 1,000 mg of vitamin C. Before supplementation and after the study, the subjects underwent a battery tests to assess the surface of eyes and ability to tear, which is essential for wetting and protecting the eye.

After taking the supplements, most of the diabetic subjects had significant improvements to the surface of their eyes. Seventy-eight percent of them had improved wetting of the eyes, which led to increases in the time between blinks. Still other tests indicated improvement of the ocular surface and that levels of a marker of free radicals had decreased.

“Our results also demonstrate that the orally administered antioxidant supplements improve the tear film stability, tear secretion, and health of the ocular surface,” Sitaras wrote.

Reference: Peponis V, Papathanasiou M, Kapranou, et al. Protective role of oral antioxidant supplementation in ocular surface of diabetic patients. *British Journal of Ophthalmology*, 2002;86:1369-1373. □

Researchers Report that Poor Glucose Tolerance Can Limit Memory

People with diabetes, a disease characterized by elevated blood sugar levels, have an increased risk of memory impairments. The reason, researchers have generally believed, is that sluggish metabolism of blood sugar reduces the amount of this fuel available to the brain.

Now, researchers have clearly shown that people with early signs of diabetes – impaired glucose tolerance and insulin resistance – also suffer from impaired memory, as well as a smaller region of the brain involved in storing recent memories.

Antonio Convit, MD, and his colleagues from the New York University School of Medicine, New York, studied 30 nondiabetic men and women ranging from 53 to 89 years of age.

Convit measured the subjects’ handling of

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Quick Reviews of Recent Research

• Dairy consumption linked to Parkinson disease

In a long-term study of 47,000 men and 88,000 women, researchers found that a high consumption of dairy products (except for dairy fat, such as butter) were associated with an increased risk of developing Parkinson disease. The increased risk was limited to men and not women.

Chen H, et al. *Annals of Neurology*, 2002;52:793-801.

• Stress reduces benefits of immunizations

Many people receive immunizations to reduce their risk of contracting the flu and other infections. However, people who feel stressed produce relatively low levels of infection-fighting antibodies after being immunized. Researchers studied 60 college students who had received a meningitis C conjugate vaccine. The researchers wrote that their "study provides the first evidence that antibody status after a conjugate vaccination may be susceptible to psychological influences." Earlier research has shown that low

Glucose Tolerance and Memory

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glucose by giving them an intravenous glucose-tolerance test, containing roughly the amount of sugar found in a small soft drink or a couple of doughnuts. The subjects were then given tests to assess their overall cognition and memory, including their ability to recall short paragraphs.

People who had the poorest glucose tolerance (and were the most insulin resistant) had the poorest recall. They also had a relatively small hippocampus, an important region of the brain for learning and memory.

Convit noted that the transport of glucose in the brain is reduced in diabetes. It is possible, he wrote, that among people with impaired glucose tolerance, an increased demand for glucose (such as when a person must remember something) causes low-grade hypoglycemic in part of the brain. The hippocampus is more sensitive to hypoglycemia than are other regions of the brain.

"These findings also suggest that better life-time management of blood sugar may improve memory in old age and perhaps even reduce the risk of Alzheimer's disease," Convit wrote.

Reference: Convit A, Wolf OT, Tarshish C, et al. Reduce glucose tolerance is associated with poor memory performance and hippocampal atrophy among normal elderly. *Proceedings of the National Academy of Sciences* (epublication): www.pnas.org/cgi/doi/10.1073/pnas.05072100. □

vitamin B12 levels also reduce antibody formation after immunization.

Burns VE, et al. *Psychosomatic Medicine*, 2002;64:963-970.

• Low antioxidant levels set stage for DNA damage

Researchers compared blood levels of antioxidant carotenoids and urine markers of DNA damage in 109 Lithuanian men and 99 Swedish men. The Lithuanian men had lower antioxidant levels and higher urine levels of 8-OHdG, a sign of DNA damage. In contrast, the Swedish men had higher blood levels of antioxidants and lower urine levels of 8-OHdG. The researchers believed that the higher risk of coronary heart disease among the Lithuanian men may be the result of greater DNA damage.

Kristenson M, et al. *Nutrition*, 2003;19:11-15.

• Pycnogenol® reduces histamine release

Pycnogenol, an antioxidant complex derived from the bark of French maritime pine trees, has been shown to have anti-inflammatory properties. In a recent cell-culture study, researchers found that Pycnogenol inhibited the release of histamine from mast cells, suggesting that it might reduce allergic reactions.

Sharma SC, et al. *Phytotherapy Research*, 2003;17:66-69.

• Phytosterols beneficial in benign enlarged prostates

In a review of seven studies, researchers reported that supplements of either the herb saw palmetto or beta-sitosterol were generally helpful in reducing urinary symptoms and improving quality of life in men with benign prostatic hyperplasia. Beta-sitosterol, a phytosterol, is the chief component of saw palmetto. In general, the dosages were 160 mg of saw palmetto extract twice daily or 20 mg daily of beta-sitosterol. Improvements were usually noted after three to six months of supplementation.

Coleman CI, et al. *Pharmacotherapy*, 2002;22:1426-1432.

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Post Office Box 30246 • Tucson AZ 85751-0246 USA

Editor and Publisher: **Jack Challem**

Copy Editor: **Mary E. Larsen**

Medical and Scientific Advisors:

Richard P. Huemer, MD Lancaster, California

Ralph K. Campbell, MD Polson, Montana • **Peter Langsjoen, MD** Tyler, Texas

Marcus Laux, ND San Francisco, California • **James A. Duke, PhD** Fulton, Maryland