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Recent Studies Report Coenzyme Q₁₀ Eases Migraine Frequency, Pain in Fibromyalgia

Coenzyme Q₁₀, a vitamin-like substance found in food (particularly in organ and muscle meats) and also made by the body, plays a key role in the body's production of energy. The basis of the 1978 Nobel prize in chemistry, CoQ₁₀ shuttles energy-carrying electrons and protons around in mitochondria, microscopic structures found in every cell.

Since the 1980s, researchers and a small number of physicians have put theory into practice, using CoQ₁₀ to treat cardiomyopathy and heart failure. By strengthening and increasing the energy output of heart-muscle cells, CoQ₁₀ enables the heart to function more efficiently.

But recent studies show that CoQ₁₀ can provide diverse health benefits. In one clinical trial, Todd D. Rozen, MD, and his colleagues at the Cleveland Clinic Headache Center treated 31 patients who had been suffering from regular migraine headaches (with and without visual auras) for at least one year. After a month-long baseline evaluation, the subjects received 150 mg daily of CoQ₁₀ for three months.

Twenty-nine of the 31 patients improved. Overall, almost two-thirds – more than 61 percent of the patients – had more than a 50 percent decline in the number of days with migraine headaches. Headache frequency decreased by 13 percent after the first month and by 55 percent after three months.

In a separate study, British physician Robert E. Lister used a combination of CoQ₁₀ and *Ginkgo biloba* extract to treat 25 people with fibromyalgia, a condition characterized by musculoskeletal pain, fatigue, depression, and other symptoms.

Lister asked the subjects to take a combination of 200 mg of CoQ₁₀ and 200 mg of ginkgo extract daily for 84 days. Clinical changes were recorded by the subjects completing a widely used questionnaire for evaluating fibromyalgia symptoms.

As a whole, the patients' quality of life scores improved by about 16 percent. "The overall subjective views of the patients, independent of quality of life scores, was that the majority (64%) felt the treat-

ment was of some benefit," Lister wrote. Twenty-seven percent reported no change, and 9 percent said they felt worse after taking the supplements.

Finally, a combination of laboratory and clinical studies by Franklin L. Rosenfeldt, MD, of Alfred Hospital, Australia, and his colleagues documented the beneficial effects of CoQ₁₀ on heart function. In the two laboratory studies, using hearts from aged rats and tissue from human hearts, Rosenfeldt found that CoQ₁₀ increased heart-energy levels as well as the heart's ability to contract, which is essential for beating and pumping blood.

In the clinical trial, Rosenfeldt and his colleagues asked elderly patients to take 300 mg of CoQ₁₀ or placebos daily for one week before heart surgery. Tests indicated that heart-energy and contraction improved among patients taking CoQ₁₀. In addition, it reduced heart damage from the surgery and shortened hospital stays from about nine to seven days.

Rosenfeldt explained that the three studies "showed a consistent benefit of CoQ₁₀ therapy." By increasing energy levels in the heart, more energy was available for normal contraction with each beat in the stressful post-surgical recovery period.

"When given for one week prior to cardiac surgery, CoQ₁₀ can accelerate cardiac recovery and lead to earlier discharge of the patient from the hospital," he wrote.

References: Rozen TD, Oshinsky ML, Gebeline CA, et al. Open label trial of coenzyme Q₁₀ as a migraine preventive. *Cephalalgia*, 2002;22:137-141. Lister RE. An open, pilot study to evaluate the potential benefits of coenzyme Q₁₀ combined with *Ginkgo biloba* extract in fibromyalgia syndrome. *Journal of International Medical Research*, 2002;30:195-199. Rosenfeldt FL, Pepe S, Linnane A, et al. Coenzyme Q₁₀ protects the aging heart against stress. Studies in rats, human tissues, and patients. *Annals of the New York Academy of Sciences*, 2002;959: 355-359. □

Antioxidants Can Slow Development of Cataracts, Two Studies Find

A multi-antioxidant supplement can slow the progression of cataracts, according to a study of 158 patients by British and American eye doctors.

The study treated patients with a daily combination of 18 mg (30,000 IU) of beta-carotene, 750 mg of vitamin C, and 600 IU of vitamin E or placebos for up to three years.

The size of the patients' cataracts was determined with a digital imaging system, and changes in cataract size were measured by the percent of increase in opaque pixels.

After two years, researchers noted a slight reduction in cataract growth among American, but not British patients taking the antioxidant supplements. And after three years, improvements occurred in both groups taking the antioxidant supplements, though American patients still had greater benefits.

Overall, people taking the antioxidants had cataracts that grew 1.61 percent less than those in patients taking placebos.

The weaker improvement among British patients may have been related to their better overall diets, the researchers wrote.

A separate study by Spanish and British researchers found that normal blood levels of vitamin C (based on about 60 mg daily intake) are related to a significant reduction in the risk of cataracts. The researchers compared food and blood levels of different nutrients and found that moderately high blood levels of vitamin C were associated with a 64 percent reduced risk of cataract. High dietary intake of vitamins C and E and selenium was slightly related to lower risk of cataract.

References: The Roche European American cataract trial (REACT): A randomized clinical trial to investigate the efficacy of an oral antioxidant micro-nutrient mixture to slow progression of age-related cataract. *Ophthalmic Epidemiology*, 2002;9:49-80. Valero MP, Fletcher AE, De Stavola BL, et al. Vitamin C is associated with reduced risk of cataract in a Mediterranean population. *Journal of Nutrition*, 2002;132:1299-1306. □

DNA-Enhancing Supplements Boost Sperm Concentrations in Men

A combination of folic acid and zinc supplements can significantly improve sperm concentrations in subfertile men.

Although sperm concentrations are directly related to fertility, other factors (such as sperm motility) also influence male fertility.

Both folic acid and zinc are involved in the

synthesis of new DNA and protein, processes needed for the body's production of new sperm.

Wai Yee Wong, MD, PhD, led a team of Dutch and South African researchers who gave various combinations of the supplements to both subfertile and fertile men. The combinations included zinc sulfate, folic acid, both nutrients, and placebos. Dosages of folic acid were 5 mg (5,000 mcg) and zinc sulfate were 66 mg daily during the 26-week study.

Overall, subfertile men taking both folic acid and zinc had a 74 percent increase in their total normal sperm counts, along with a minor 4 percent increase in abnormal sperm. A similar pattern occurred in the fertile men.

Wong WY, Merkus HM, Thomas CM, et al. Effects of folic acid and zinc sulfate on male factor subfertility: a double-blind, randomized, placebo controlled trial. *Fertility and Sterility*, 2002;77:491-498. □

Carnitine Supplements Enhance Drug's Ability to Lower Blood Fats

Taking supplemental L-carnitine along with the statin drug simvastatin (Zocor) improves blood-lipid profiles far better than the drug does by itself.

L-carnitine, a component of protein, helps transport fats into the mitochondria of cells, where they are burned for energy. It is available over-the-counter in health food stores in the United States.

Francesco Brescia, MD, and his colleagues at the University of Bari, Italy, treated 32 diabetic patients with elevated cholesterol and triglyceride levels. Half of the subjects took 20 mg of simvastatin daily for two months, and the other half took a combination of simvastatin and 2 grams of L-carnitine daily.

Patients receiving both treatments benefited from reductions in total cholesterol and triglycerides. However, patients taking the L-carnitine (in combination with simvastatin) had far greater benefits.

Overall, people in the carnitine group had a 42 percent reduction in triglyceride levels, compared with 24 percent in the group taking only the drug. Total cholesterol levels also declined more in the L-carnitine group, 29 percent versus 21 percent in the drug group.

Another significant difference was that patients taking L-carnitine had an overall 2 mg/dL increase in the "good" high-density lipoprotein (HDL) form of cholesterol. HDL cholesterol decreased by 3.4 mg in the simvastatin group.

"Combined treatment with L-carnitine and simvastatin resulted in greater antihyperlipidaemic effects (i.e. a less atherogenic plasma lipid profile) than with simvastatin alone," Brescia wrote. "The results of this preliminary study strongly suggest that

L-carnitine may have a role among antihyperlipidaemic strategies.”

Reference: Brescia F, Balestra E, Iasella MG, et al. Effects of combined treatment with simvastatin and L-carnitine on triglyceride levels in diabetic patients with hyperlipidaemia. *Clinical Drug Investigation*, 2002;22 (Suppl 1):23-28. □

Use of Magnesium Leads to Major Reduction in Pregnancy Complication

Intravenous administration of magnesium sulfate to pregnant women with preeclampsia significantly reduces their risk of developing eclampsia, based on the results of the largest study so far conducted on hypertensive disorders in pregnancy.

Preeclampsia, which can occur during late pregnancy and complicates 2-8 percent of pregnancies, is characterized by hypertension, headaches, and water retention. It is often a prelude to much more serious eclampsia, which can cause convulsions and death. About one-fourth of pregnancy-related deaths are the result of preeclampsia and eclampsia.

The study, coordinated by Lelia Duley, MD, involved the treatment of more than 10,000 women in 33 countries in Africa, Europe, Asia-Pacific, and the Americas. Half of the women received magnesium sulfate and half received placebo.

Women receiving magnesium had significantly fewer convulsions compared with women who had received placebo. “Women allocated magnesium sulfate had a 58 percent lower risk of eclampsia than those allocated placebo,” Duley wrote in *Lancet*. Magnesium also lowered the risk of pregnancy-related deaths by 45 percent.

In an editorial, researchers wrote, “It is time for concerted international action to ensure that women all over the world benefit from the results of the important research on magnesium sulfate.” The magnesium would cost only about \$5 US per patient.

Reference: Magpie Trial Collaborative Group. Do women with pre-eclampsia, and their babies, benefit from magnesium sulphate? The Magpie Trial: a randomised placebo-controlled trial. *Lancet*, 2002;359:1877-1890. □

High-Protein Diets Do Benefit Some Types of Overweight Subjects

For years, the use of high-protein diets in losing weight has been controversial. But a new study suggests that such diets can benefit certain types of obese people.

Naji Torbay, MD, and other researchers at the American University of Beirut, Lebanon, treated 27 obese patients with either a reduced-calorie, moderately high-protein diet (consisting of meat, fish,

vegetables, and small amounts of carbohydrates) or a reduced-calorie, high-carbohydrate diet (containing a larger percentage of bread, pasta, and other grain foods).

The basic idea behind the study was that people with elevated insulin levels react differently to the composition of a diet, doing better with more protein and less carbohydrate.

Although all of the subjects had normal blood sugar levels, 14 had elevated levels of insulin, suggestive of insulin resistance – the underlying cause of diabetes and hypertension. Thirteen of the subjects had normal insulin levels.

People with high insulin levels responded much more favorably to the high-protein rather than to the high-carbohydrate diet. Almost three-fourths of the subjects with elevated insulin levels lost 15 or more pounds on the high-protein diet. In contrast, less than half of the subjects with normal insulin levels lost that amount of weight on the high-protein diet.

Furthermore, people who had elevated insulin levels had much more significant decreases in insulin on the high-protein diet, compared with the high-carbohydrate diet. This change reflected more efficient insulin function and a lower risk of diabetes.

Meanwhile, the subjects with normal insulin levels lost more weight on the high-carbohydrate diet, compared with those who had elevated insulin levels.

In conclusion, Torbay wrote, people with normal blood sugar but elevated insulin “may benefit from a high protein low-carbohydrate hypoenergetic [low-calorie] diet in normalizing their fasting insulin levels and achieving more efficient weight loss...The results of the study suggest that obese subjects should be screened for fasting hyperinsulinemia [elevated insulin] before dietary recommendations are made.”

Reference: Torbay N, Baba NH, Sawaya S, et al. High protein vs high carbohydrate hypoenergetic diet in treatment of obese normoinsulinemic and hyperinsulinemic subjects. *Nutrition Research*, 2002; 22:587-598. □

Low Vitamin C Levels Related to Risk of Stroke Among Men

Low blood levels of vitamin C may increase the risk of stroke, according to a study by Finnish researchers.

Jukka T. Salonen, MD, PhD, of the University of Kuopio, and his colleagues tracked the health of 2,419 middle-age men over 10 years. All of the men were overweight and had hypertension, and 120 of them suffered either an ischemic or hemorrhagic stroke during the study.

Low blood levels of vitamin C at the beginning

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Quick Reviews of Recent Research

• Vitamin E halts prostate cancer cells

In prostate cells, the “androgen receptor” accepts testosterone molecules, which can stimulate the growth in cancer cells. Cell-culture and rodent studies have found that vitamin E succinate (d-alpha tocopherol succinate) inhibits the growth of different types of cancer cells. In laboratory experiments, researchers found that vitamin E succinate inhibited the activity of prostate-specific antigen (PSA), which is typically elevated in men with prostate cancer. This form of vitamin E also reduced production of androgen receptors, thereby limiting the cell-stimulating effect of testosterone.

Zhang Y, et al. *Proceedings of the National Academy of Sciences*, 2002;99:7408-7413.

• Mixed tocopherols may have advantages

Although vitamin E succinate may have anti-cancer properties, some research suggests that a combination of different vitamin E molecules, known as mixed tocopherols, may provide broader antioxidant activity and protect against coronary heart disease. In a cell study, researchers found that a combination of alpha tocopherol, gamma tocopherol, and delta tocopherol was more effective than alpha tocopherol alone in reducing free-radical oxidation of fats.

Liu M, et al. *Journal of Cardiovascular Pharmacology*, 2002;39:714-721.

• Chromium picolinate reduces insulin resistance

Human studies have found that supplements of chromium picolinate (1,000 mcg daily) reduce insulin levels and improve glucose tolerance in people with adult-onset (type 2) diabetes. Insulin resistance precedes and is the underpinning of adult-onset

diabetes, and it affects an estimated 60-70 million Americans. To assess the effect of chromium picolinate on insulin resistance, researchers gave the supplement to obese insulin-resistance rats for 12 weeks. Glucose-tolerance and insulin-tolerance tests indicated that the chromium-fed rats had lower insulin levels and better glucose tolerance, compared with untreated rats. They also had lower levels of total cholesterol and increased levels of high-density lipoprotein cholesterol. These findings support the use of chromium picolinate in treating prediabetic insulin resistance.

Cefalu WT, et al. *Journal of Nutrition*, 2002; 132:1107-1114.

• Garlic may reduce some damage from smoking

Smoking cigarettes increases free-radical levels, compared with levels in nonsmokers. In a study of 10 smokers and 10 nonsmokers, researchers found that supplements of Kyolic® Aged Garlic Extracts, taken for 14 days, significantly reduced levels of a key marker of free radicals in both smokers and nonsmokers. The amount of garlic was equivalent to 1,250 mg of dry garlic extract daily.

Dillon SA, et al. *Journal of Nutrition*, 2002; 132:168-171.

• Grape-seed antioxidants good for the heart

The sudden reduction of blood flow (ischemia) and its resumption (reperfusion) during a heart attack generate large numbers of harmful free radicals. Grape-seed extract is rich in a family of antioxidants known as proanthocyanidins. Laboratory rats treated with grape-seed extract had a significant decline in ventricular fibrillation and ventricular tachycardia. According to the researchers, grape-seed extract “could have valuable applications during routine cardiac surgery and might also be useful in cardiac transplantation.”

Pataki T, et al. *American Journal of Clinical Nutrition*, 2002;75:894-899.

Vitamin C and Stroke

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of the study were the most accurate predictor of stroke risk. Overall, men with the lowest levels of vitamin C were almost two and one-half times more likely to have a stroke, compared with those who had high levels of the vitamin.

Although vitamin C helps prevent free radical damage to blood vessels, Salonen acknowledged that the vitamin might also be a marker for a diet high in vegetables and fruit. Still, the study “suggests that low vitamin C concentration is a risk factor for future stroke,” he wrote.

Reference: Kurl S, Tuomainen TP, Laukkanen JA, et al. Plasma vitamin C modifies the association between hypertension and risk of stroke. *Stroke*, 2002;33:1568-1573. □

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