

# The Nutrition Reporter™

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The independent newsletter that reports vitamin, mineral, and food therapies

## Supplements of N-Acetylcysteine, a Potent Antioxidant, Beneficial to Women with PCOS

Supplements of N-acetylcysteine (NAC) can lead to improvements in women with polycystic ovary syndrome, also known as PCOS.

The condition, which affects an estimated 10 percent of women of reproductive age, is characterized by a cluster of several symptoms: elevated levels of testosterone and other "male" hormones, body hair growing in a male pattern, enlarged cystic ovaries, infrequent ovulation, infertility, obesity, elevated insulin levels, and insulin resistance. The last three symptoms also increase the risk of developing diabetes and heart disease.

NAC is an antioxidant with diverse functions. It is a precursor to glutathione, one of the key antioxidants made by the body, and it also enhances immune resistance to infection. In conventional medicine, NAC is commonly used to treat acetaminophen (Tylenol) poisoning and as a mucolytic agent to break down mucous in the lungs.

In a recent study, Tulay Kilic-Okman, MD, of the Trakya University School of Medicine, Turkey, treated 20 women with PCOS. The women ranged from 19 to 37 years of age, and all had developed the disorder during the onset of puberty. The treatment included 600 mg of NAC three times daily for four weeks.

At the end of the study, the women had a 7.5 percent increase in sex hormone-binding globulin and a significant 58 percent decrease in blood testosterone levels. Markers of heart disease and diabetes risk also dropped substantially. Homocysteine levels decreased from an average of 10 micromoles per liter of blood to 6.6 mmol/L. Fasting insulin dropped from 13.2 micro-international units per millimeter to 9.3 mmIU/ml, leading to about a one-third decrease in insulin resistance.

An earlier study, published by Italian researchers, found that 1,800 mg of NAC daily reduced insulin levels and improved insulin sensitivity, both positive changes.

Some evidence suggests that eating foods with a

low glycemic index, including fish, lean meats, and high-fiber vegetables, might also help reverse PCOS.

"N-acetylcysteine appears to be effective as an insulin and testosterone-lowering drug in women with polycystic ovary syndrome," wrote Kilic-Okman. "Furthermore, we show that NAC may also be used as a therapeutic agent to ameliorate the homocysteine and lipid profile in PCOS."

Reference: Kilic-Okman T, Kucuk M. N-acetylcysteine treatment for polycystic ovary syndrome. *International Journal of Gynecology & Obstetrics*, 2004;85:296-297. □

### Perspectives...

#### Deficiencies Common, But Overlooked

If you had trouble starting your car, a mechanic would first check the most likely causes of the problem: is your battery dead, are you out of gasoline, and are the main electrical wires connected? Only after all of the basics checked out would he look deeper for a more arcane cause and more expensive solution.

Unfortunately, medical clinics don't usually look at the obvious cause of what's bothering a person: nutritional deficiencies or imbalances. They might do a comprehensive physical exam and order an expensive battery of tests, trying to identify some obscure cause of what's ailing you. The most obvious cause isn't even considered, and most insurers and HMO's don't want to pay for nutritional testing.

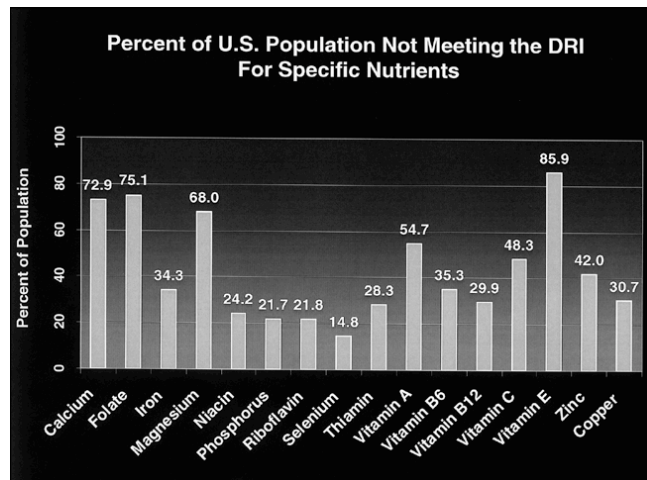
Why nutrition? It's very simple. Nutrients form the building blocks of the hundreds of thousands of biochemicals in your body. They form the basis of hormones, neurotransmitters, bones, skin, and even of DNA itself. We know that we die if we don't eat, but along the same line, we can't achieve optimal health if we don't eat healthy foods.

As I mulled over this thought, it occurred to me that I always used to hear doctors and dietitians say we live in the best-fed nation in the world. I don't

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hear people say this anymore. One reason is that Americans are obviously *overfed* – two out of every three people are overweight. Another reason is that nutritional deficiencies are so common that the situation should be embarrassing to every doctor, dietitian, and public health official.

The graph shows how common nutritional deficiencies are in the United States. For example,



72.9 percent of people do not consume the Daily Reference Intake for calcium. Data in the graph was obtained from the U.S. Department of Agriculture at [www.ba.ars.usda.gov/cnrg/services/state04.html](http://www.ba.ars.usda.gov/cnrg/services/state04.html).

Because the DRIs are conservative estimates for nutritional intake, the percentage of people with functional deficiencies is likely even higher. Furthermore, almost every medication, from antacids to oral contraceptives, interferes with nutrient absorption or utilization, which would exacerbate the deficiencies even more. It's so bad, it seems, that few people want to talk about it.

To find a nutritionally oriented doc, go to [www.acam.org](http://www.acam.org) or [www.orthomed.org](http://www.orthomed.org). —JC

### SAMe Helps Reverse Depression When SSRI Drugs Cannot

Supplements of SAMe – S-adenosyl-L-methionine – can help reverse depression, according to a study by researchers at the Massachusetts General Hospital, Boston.

Jonathan E. Alpert, MD, and his colleagues treated 30 patients who had not responded to serotonin-reuptake inhibitors (SSRIs), such as Prozac and Paxil. The study included both women and men with an average age of 48 years. Most had experienced several major episodes of depression, and the latest depression had lasted around two years.

For two weeks, the subjects were asked to take 400 mg of SAMe twice daily. For the next month, they took 800 mg twice daily.

Using several clinical tests to measure depression, Alpert found that SAMe led to significant improvements. Half of the subjects improved greatly, and 43 percent had a complete remission.

Two patients dropped out of the study. The most common side effects were constipation and gastrointestinal upset.

SAMe plays a key role in building molecules, some of which are used to make neurotransmitters, such as serotonin.

Reference: Alpert JE, Papakostas G, Mischoulon D, et al. S-adenosyl-l-methionine (SAMe) as an adjunct for resistant major depressive disorder. *Journal of Clinical Psychopharmacology*, 2004;24: 661-664. □

### Early Malnutrition Increases Likelihood of Behavioral Problems in Children

Children who are malnourished at age three are more likely to have behavioral problems as they get older, according to a study by researchers at the University of Southern California, Los Angeles.

Jianghong Liu, PhD, and her colleagues studied 1,559 boys and girls on the island of Mauritius, an island off the African coast in the Indian Ocean. The children were evaluated for frank nutritional deficiencies of B vitamins, protein, and iron. Almost one-fourth of the children had at least one sign of nutritional deficiency.

The children's cognitive abilities were assessed at ages three and 11, and their antisocial, aggressive, and hyperactive behavior was measured at ages eight, 11, and 17 years of age.

Children who were malnourished at age three were more aggressive or hyperactive at age eight. They also had increasing behavioral problems by the time they turned 11 and 17 years of age, including more acting out at school, breaking rules, and getting into fights.

At 17 years of age, they were 51 percent more likely to exhibit violent and antisocial behavior.

The behavioral problems were more serious among children who had more than one nutritional deficiency. The problems were also independent of "psychosocial adversity," but they were related to low IQ.

Liu wrote that "early malnutrition negatively affects brain growth and development and that brain impairments predispose to antisocial and violent behavior by affecting cognitive function.

Reference: Liu G, Raine A, Venables PH, et al. Malnutrition at age 3 years and externalizing behavior problems at ages 8, 11, and 17 years. *American Journal of Psychiatry*, 2004;161:2005-2013. □

## High Levels of Trans Fats May Be a Factor in Inflammation and Heart Failure

People suffering from end-stage heart failure have many signs of systemic inflammation – and that inflammation is strongly associated with high intake of trans fats.

Dariush Mozaffarian, MD, of the Harvard Medical School and his colleagues studied 86 patients under treatment for severe heart failure at the University of Washington Medical Center, Seattle. Tests found that the patients had blood levels of trans fats ranging from 0.7 to 2.9 percent of total cell-membrane fats.

Trans fat levels “were strongly associated with concentrations of several inflammatory markers,” according to Mozaffarian. Among them were interleukin-1, tumor necrosis factor, monocyte chemoattractant protein, and brain natriuretic peptide.

Trans fats promote inflammation through several different mechanisms, such as by altering how cells normally communicate with each other. Previous research has shown that trans fats promote inflammation in generally healthy people as well.

Reference: Mozaffarian D, Rimm EB, King IB, et al. Trans fatty acids and systemic inflammation in heart failure. *American Journal of Clinical Nutrition*, 2004;80:1521-1525. □

## Antioxidants Protect Against Chemotherapy-Induced Hearing Loss

Vitamin E and N-acetylcysteine (NAC) can reduce the hearing loss associated with the cancer chemotherapeutic drug cisplatin, according to two recent animal studies.

Cisplatin is used to treat several types of cancer, including those of the head and neck. It is considered a highly effective anti-cancer drug, but its use is limited because it leads to progressive and permanent hearing loss.

In one study, Leonard P. Rybak, MD, PhD, of the Southern Illinois School of Medicine, Springfield, exposed laboratory rats to cisplatin and either vitamin E or placebos. Animals receiving vitamin E had significantly less hearing loss compared with the others.

Using an electron microscope, Rybak found that vitamin E protected against the loss of tiny hairs in the ears of the rats. These hairs play a key role in normal hearing.

In a separate study, researchers at Oregon Health Sciences University, Portland, treated laboratory rats with cisplatin and either NAC or placebos. NAC protected the animals from any significant loss

of hearing, compared with those given a placebo.

References: Kalkanis JG, Whitworth C, Rybak LP. Vitamin E reduces cisplatin ototoxicity. *Laryngoscope*, 2004;114:538-542. Dickey DT, Muldoon LL, Kraemer DF, et al. Protection against cisplatin-induced ototoxicity by N-acetylcysteine in a rat model. *Hearing Research*, 2004;193:25-30. □

## High Selenium Levels Seem to Lower the Risk of Recurrent Colon Cancer

An analysis of three studies has found that high intake of selenium is associated with about a one-third lower risk of colorectal adenomas, a type of cancer.

Elizabeth T. Jacobs, PhD, of the University of Arizona Cancer Center, Tucson, and her colleagues analyzed blood levels of selenium and the risk of recurrent adenomas in 1,763 subjects. The people were participating in the Polyp Prevention Trial, the Wheat Bran Fiber Trial, and the Polyp Prevention Study.

She found that people with the highest blood levels of selenium had about a one-third lower risk of developing new adenomas. The findings were consistent with a 1996 study in which people taking 200 mcg of selenium daily had a 58 percent lower risk of developing colorectal cancer.

Selenium is a component of glutathione peroxidase, one of the most potent antioxidants made by the body.

Reference: Jacobs ET, Jiang R, Alberts DS, et al. Selenium and colorectal adenoma: results of a pooled analysis. *Journal of the National Cancer Institute*, 2004;96:1669-1675. □

## Magnesium May Improve Recovery After Traumatic Injury to the Brain

Traumatic brain injury can lead to impaired thinking and memory, apathy, mood disorders, and aggressiveness. But supplemental magnesium may reduce the odds of neurological impairment, according to an animal study.

Researchers have known that magnesium levels decline after brain injury, a result of the destruction of brain cells. Robert Vink, PhD, of the University of Adelaide, Australia, and his colleagues hypothesized that magnesium might reduce the risk of post-traumatic behavioral problem.

Vink and his colleagues measured depression and anxiety levels (based on physical activity) before and after inducing brain injury in 32 anesthetized rats. Half of the animals received an infusion of magnesium sulfate 30 minutes after the injury.

One week later, the incidence of behavioral

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## Quick Reviews of Recent Research

### • Low vitamin B6 linked to depression

In a Danish study, researchers reported that 18 out of 140 men were suffering from depression. The depression was not related to low levels of folic acid or vitamin B12. However, it correlated with low blood levels of pyridoxal phosphate, the active form of vitamin B6.

Hvas AM, et al. *Psychotherapy and Psychosomatics*, 2004;73(6):340-343.

### • Plant sterols may increase antioxidant needs

Plant sterols are used as supplements and in foods to lower blood cholesterol levels. In a study of 26 men with normal cholesterol levels, foods containing added plant sterols led to reduced blood levels of vitamin E and beta-carotene. The researchers recommended that people consuming plant sterols eat extra fruits and vegetables or take dietary supplements of vitamin E and carotenoids.

Richelle M, et al. *American Journal of Clinical Nutrition*, 2004;80:171-177.

### • Green tea may reduce prostate cancer risk

In an animal study, researchers found that antioxidant polyphenols in green tea reduced the risk of prostate cancer in mice. The polyphenols also reduced markers of angiogenesis and metastasis. The anticancer effect appeared related to an inhibition of insulin-like growth factor, a chemical known to promote tumor growth.

Adhami VM, et al. *Cancer Research*, 2004;64:8715-8722.

### • Vitamin C reduces kidney risk

Contrast nephropathy is a kidney disorder caused by a chemical used to increase the visibility of real-time x-rays during angiography or cardiac catheterization. Its use increases the risk of death or

## Magnesium and Brain Injury...

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changes was less than 30 percent among the animals given magnesium. The untreated animals had more than double the risk of depression and anxiety. After 28 days, the animals' behavior was virtually the same as pre-injury levels.

"It would therefore be of interest to examine whether altered magnesium status exists in post-traumatic stress disorder patients, and whether subsequent treatment with magnesium would in fact provide any benefit in this condition," Vink wrote.

Reference: Fromm L, Heath DL, Vink R, et al. Magnesium attenuates post-traumatic depression/anxiety following diffuse brain injury in rats. *Journal of the American College of Nutrition*, 2004;529S-533S. □

injury during these procedures. In a double-blind study of 231 patients, researchers found that vitamin C reduced the risk of contrast nephropathy by 62 percent. They administered 3 grams of vitamin C at least two hours before the procedure, followed by another 2 grams the following evening and morning.

Spargias K, et al. *Circulation*, 2004;110:2837-2842.

### • DHEA benefits elderly men and women

Researchers gave 50 mg of DHEA (dehydroepiandrosterone) or placebos to 28 men and 28 women ranging in age from 65-78 years. All of the subjects had age-related decreases in their DHEA levels. DHEA supplementation led to significant decreases in the subjects' visceral and subcutaneous fat, as well as to lower insulin levels and improved insulin sensitivity. DHEA is a hormone precursor to testosterone and estrogen.

Villareal DT, et al. *JAMA*, 2004;292:2243-2248.

### • Zinc may lower risk of oral cancers

Researchers have known that the Cox-2 enzyme is overly active in cancers of the tongue and esophagus. The enzyme is involved in promoting inflammation, and reducing Cox-2 lowers inflammation. In a study with laboratory rats, researchers found that Cox-2 activity increased sharply if the animals were deficient in zinc. Treating the rats with either zinc or Cox-2 inhibitors reduced Cox-2 levels and reversed the growth of these cancers.

Fong LY, et al. *Journal of the National Cancer Institute*, 2005;97:40-50.

### • Carotenoid protect against bladder cancer

Researchers compared carotenoid levels in 423 patients with bladder cancer and 467 healthy subjects. A combination of high levels of DNA damage and low carotenoid intake increased the risk of cancer by three times. People eating the most carotenoids had almost half the risk of developing bladder cancer.

Schabath MB, et al. *Journal of Nutrition*, 2004;134:3362-3369.

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