

# The Nutrition Reporter™

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## High-Protein, Low-Carb Eating Reduces Cholesterol and Does Not Weaken Bones

Adopting a diet low in both carbohydrates and saturated fat can reduce levels of some blood fats, while improving the ratios between healthy and unhealthy blood fats. Meanwhile, a second study found that a high-protein, low-carb diet does not increase the loss of calcium from bones.

Ronald M. Krauss, MD, of the Children's Hospital Oakland Research Institute, California, studied 178 overweight men who were assigned to one of four diets, with additional calorie restrictions later in the 10-week study. The four diets included (1) high carb, low saturated fat, (2) moderate carb, low saturated fat, (3) low carb, high saturated fat, and (4) low carb and low saturated fat.

Krauss found that all of the subjects lost weight, an average of 5 pounds, regardless of their diet. Men on the low-carb, low-saturated-fat diet had significant reductions in triglyceride levels, a risk factor for heart disease. Their levels of "bad" small-particle low-density lipoprotein (LDL) cholesterol decreased, and their ratio of "good" high-density lipoprotein to cholesterol improved. Meanwhile, the high-carb diet resulted in greater reductions in LDL levels.

In a separate study, John D. Carter, MD, of the University of South Florida, Tampa, placed 15 overweight men and women on a very low carbohydrate diet (20 grams of carbs daily) for one month, followed by a moderate carbohydrate diet (40 grams of carb daily) for two months. Fifteen comparative subjects were monitored and allowed to eat what they wanted.

During the three-month study, the dieters lost an average of 14 pounds, compared with about two pounds among the non-dieters.

Carter looked at two markers of bone health, including the rate of bone turnover. There were no significant differences between the low-carb dieters and non-dieters in terms of calcium loss from bones. This finding is significant because other research, mostly in animals, suggested that low-carb diets can weaken bones and increase the risk of osteoporosis.

A high-protein, low-saturated-fat diet would include fish, chicken, and high-fiber vegetables.

Reference: Krauss RM, Blanche PJ, Rawlings RS, et al. Separate effects of reduced carbohydrate intake and weight loss on atherogenic dyslipidemia. *American Journal of Clinical Nutrition*, 2006,83:1025-1031. Carter JD, Vasey FB, Valeriano J. The effect of a low-carbohydrate diet on bone turnover. *Osteoporosis International*, 2006; epub ahead of print. □

### Perspectives...

#### Why Organic Foods Are More Nutritious

For years, dietitians, pesticide makers, junk food companies, and Big Agriculture have argued that organic foods are a waste of money. They often point to the enormous crop yields – i.e., supposed superiority – of conventional corporate farming.

Organic farming is based on sustainable agricultural methods, in which soil nutrients are replenished with natural fertilizers and chemical pesticides are avoided.

A few small studies have strongly suggested that organic foods have higher levels of many nutrients. Several years ago, researchers found that plants increased their production of antioxidants to protect against weather and insect stresses. Pesticides obviate the need for these natural defenses, resulting in lower antioxidant levels.

New research points to a fundamental flaw in high-volume farming. Biochemist Donald R. Davis, PhD, of the University of Texas, Austin, and his colleagues analyzed levels of 13 nutrients in 43 food crops between 1950 and 1999. They used U.S. Department of Agriculture data for their comparison.

Although overall crop yields increased many times during this time, levels of six nutrients decreased. For example, protein declined by 6 percent, and vitamin B2 went down by 38 percent. Calcium, phosphorus, iron, and vitamin C also had substantial declines.

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After further investigation, Davis and his colleagues attributed the decrease in nutrient levels to a “dilution effect.” Although plant yields per acre increased, the root systems of plants were not able to improve their assimilation of nitrogen and minerals, which are needed to make protein and vitamins.

In other words, growing more plants per acre is equivalent to having more mouths for the soil to feed. That means smaller portions of nutrients per plant.

The lesson? You can’t fool Mother Nature. – JC

## Researchers Identify Why Eating a Meal Can Leave You Feeling Fuzzy and Tired

Many people assume that feeling tired after a meal is normal. Others chalk it up to low blood sugar. The truth is that it’s a sign of high blood sugar, and it might point to impaired glucose tolerance, a form of prediabetes.

In a recent study, Denis Burdakov, PhD, of the University of Manchester, England, identified the specific changes that occur in brain cells after eating, resulting in mental fuzziness.

Researchers have known that orexin, a protein-like peptide secreted by brain cells, is responsible for feeling awake and alert. When orexin activity is blocked, it can lead to narcolepsy and obesity.

In a study using laboratory mice, Burdakov and his colleagues found that high levels of glucose, or blood sugar, inhibited the activity of orexin-producing neurons in the brain. As glucose levels went up, orexin levels went down – and so did alertness.

Higher glucose levels apparently changed the flow of potassium in cells, which in turn choked off orexin production. The result was that neurons stopped sending signals to other brain cells.

According to Burdakov’s study, the glucose-sensing mechanism is so sensitive that it can respond to small changes in glucose levels, such as between lunch and dinner.

In contrast, mental sharpness increases when orexin levels are elevated. That’s the case when a person’s blood sugar levels are low and he feels hungry. Because the mind is alert, it’s difficult to fall asleep when hungry.

Reference: Burdakov D, Lensen LT, Alexopoulos H, et al. Tandem-pore K<sup>+</sup> channels mediate inhibition of orexin neurons by glucose. *Neuron*, 2006;50:711-722. □

## Lycopene May Reduce Risk of Heart Disease in Post-Menopausal Women

Lycopene, the red antioxidant found in tomatoes, can lower cholesterol levels in post-menopausal women – and may reduce their risk of developing heart disease.

Renu Misra, MD, of the All India Institute of Medical Sciences, New Delhi, studied 41 post-menopausal women. Twenty of the women received 2 mg of natural tomato-derived lycopene, and 41 of the women received hormone-replacement therapy daily for six months.

By the end of the study, the hormone-replacement therapy reduced total cholesterol by almost 24 percent and the “bad” low-density lipoprotein (LDL) cholesterol by almost 20 percent. It increased the “good” high-density lipoprotein (HDL) cholesterol by almost 39 percent.

Natural lycopene had very similar benefits. It reduced total cholesterol by 24 percent and LDL cholesterol by almost 15 percent, while boosting HDL by 26 percent.

A marker of free radical levels decreased in both groups, and lycopene doubled blood levels of glutathione compared with hormone-replacement therapy.

Reference: Misra R, Mangi S, Joshi S, et al. LycoRed as an alternative to hormone replacement therapy in lowering serum lipids and oxidative stress markers: a randomized controlled clinical trial. *Journal of Obstetrics and Gynecology Research*, 2006; 32:299-304. □

## Antioxidant Combination May Provide Some Relief to Migraine Sufferers

A supplement containing three popular antioxidants may help people who suffer from migraine headaches.

Sirichai Chayasirisobhon, MD, a neurologist at the Kaiser Permanente Medical Center, Anaheim, California, used the antioxidant formula to treat 11 patients with a long history of migraine headaches. The patients had not responded to drug treatments for migraine.

The formula consisted of 1,200 mg of pine bark extract, 600 mg of vitamin C and 300 mg of vitamin E daily, which was taken for three months. Each of the ingredients is known to positively influence blood vessels.

By the end of the study, the patients had a 50 percent improvement in scores on the migraine disability assessment test. When two non-responding patients were excluded from the data analysis, the patients had almost a 68 percent reduction in migraine symptoms. Both the number of headaches and their frequency declined significantly.

Reference: Chayasirisobhon S. Use of a pine bark extract and antioxidant vitamin combination product as therapy for migraine in patients refractory to pharmacologic medication. *Headache*, 2006;46:788-793. □

## Lutein May Prevent Inflammatory Damage to the Eye's Retina

Researchers have identified some new ways that lutein, an antioxidant found in kale and broccoli, may prevent damage to the eye's retina.

Over the past 10 years, lutein has emerged as a key nutrient involved in the prevention of macular degeneration, a serious eye disease, and other types of retinal damage. Because of its yellowish pigment, researchers believe that the nutrient absorbs harmful wavelengths of blue light.

In the latest study, Jun-Sub Choi, PhD, a researcher at the Catholic University of Korea, injected laboratory rats with a chemical that causes retinal ischemia – that is, a reduction of blood flow to the retina. Ischemia is typically associated with increased levels of harmful free radicals and inflammation.

Choi found that ischemia in the retina led to increases in two enzymes, nitric oxide synthase (NOS) and cyclooxygenase-2 (COX-2) that are involved in inflammation. These changes led to the destruction of cells in the retina.

However, lutein inhibited the increase in NOS and COX-2, and it had a stronger effect at higher doses. Choi wrote that “a lutein supplement may protect against ischemia-mediated cell death in the retina.”

Nitric oxide, which is produced from NOS, is a major cell-regulatory molecule in the body. But in some contexts, high levels can function as a free radical. COX-2 is regarded as a pro-inflammatory enzyme, but its role in inflammation is strongly influenced by dietary fats.

Reference: Choi JS, Kim D, Hong YM, et al. Inhibition of nNOS and COX-2 expression by lutein in acute retinal ischemia. *Nutrition*, 2006;22:668-671. □

## L-Carnitine Supplements Help with Fatigue in MS Patients

People with multiple sclerosis (MS) are often treated with immune-suppressing drugs to reduce their symptoms. One of the common consequences of these drugs is extreme fatigue. Supplements of L-carnitine, a “trimethylated” amino acid sold over-the-counter can help.

Christine Lebrun, MD, a neurologist at the Pasteur Hospital in Nice, France, and her colleagues investigated 170 patients with MS-related fatigue and 70 others who did not have either MS or fatigue. Most of the MS patients reported feeling fatigued after engaging in slight physical activity.

In addition, most of the MS patients had been treated with one of three immune-suppressing drugs: interferon beta, mitoxantrone, and cyclophosphamide.

Patients taking these drugs had lower blood levels of L-carnitine, compared with patients who had not been given immune-suppressing drugs.

Lebrun treated the patients with 3 to 6 grams of L-carnitine daily for six months. After three months, fatigue scores on a standard clinical test improved significantly for 63 percent of the patients who had been taking immune-suppressing drugs. L-carnitine was most beneficial for patients taking interferon beta and cyclophosphamide.

The patients continued taking L-carnitine supplements for another three months. During this time they maintained their improvement.

L-carnitine plays an essential role in transporting fats deep into cells where they are burned for energy. Many immune-suppressing and anti-seizure drugs interfere with L-carnitine activity.

Reference: Lebrun C, Alchaar H, Candito M, et al. Levocarnitine administration in multiple sclerosis patients with immunosuppressive therapy-induced fatigue. *Multiple Sclerosis*, 2006;12:321-324. □

## Grapefruit Can Help People Lose Weight and Improve Their Glucose Tolerance

Since the “Hollywood Diet” of the 1930s, grapefruit has from time to time been included in various weight-loss regimens. It may not be just a fad. A recent controlled study found that different forms of grapefruit helped people lose weight and improve their insulin sensitivity.

Ken Fujioka, MD, of the Scripps Clinic, San Diego, California, tracked 91 overweight subjects who were asked to slightly modify their regular eating habits for 12 weeks. The subjects were asked to eat one-half fresh grapefruit, drink 8 ounces of grapefruit juice, take grapefruit capsules (containing 500 mg of whole grapefruit), or take placebos three times daily before each meal. Some of the subjects were given apple juice to match the calories of the grapefruit and grapefruit juice. In every other respect, the subjects were encouraged to follow their regular eating habits.

By the end of the study, people eating the fresh grapefruit lost an average of 3.6 pounds. Those drinking grapefruit juice lost 3.3 pounds, and those taking grapefruit capsules lost 2.4 pounds. Subjects taking placebos lost only one-half pound.

One-third of the subjects had metabolic syndrome, a cluster of risk factors for diabetes and heart disease. Those who consumed the fresh juice or grapefruit had significant improvements in insulin sensitivity, evidenced by reductions in fasting and post-meal insulin levels.

Grapefruit contains compounds known to

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## Quick Reviews of Recent Research

### • Quercetin protects against pesticide damage

In a laboratory study, Italian researchers found that quercetin could protect against genetic damage. In their experiments, they found that the common pesticide atrazine caused breaks in chromosomes, which could conceivably lead to cancer and accelerated aging. Adding quercetin, an antioxidant flavonoid found in apples and onions, prevented chromosome breaks.

Mastrangelo S, et al. *Environmental and Molecular Mutagenesis*, 2006;47:254-259.

### • Fruits and veggies protect against herpes infection

British researchers studied the relationship between fruit and vegetable intake, as well as vitamins, and the risk of herpes zoster (the virus that causes shingles). After analyzing 243 people prone to herpes infections and 483 healthy subjects, the researchers found that people who ate less than one piece of fruit per week were three times more likely to have herpes infections, compared with people who ate more than three pieces of fruit weekly. High intake of vitamins also reduced the risk of herpes infections among people age 60 and older.

Thomas SL, et al. *International Journal of Epidemiology*, 2006;35:307-314.

### • Ginseng supplements improve cancer survival

Chinese researchers studied the use of ginseng among 1,455 women with breast cancer. Twenty-seven percent of the women used ginseng before being diagnosed with breast cancer. Women who had used ginseng were 30 percent more likely to survive during six years of follow up.

Cui Y, et al. *American Journal of Epidemiology*, 2006;163:645-653.

### • Selenium has an affinity for the prostate

Considerable evidence indicates that selenium supplements can lower the risk of prostate cancer. In a study of 66 men with organ-confined (non-metasta-

sizing) prostate cancer, supplemental selenium resulted in 22 percent higher prostate levels of the mineral. The American researchers noted that selenium "accumulates preferentially in the human prostate gland," suggesting that it has a functional role.

Sabichi AL, et al. *Clinical Cancer Research*, 2006; 12:2178-2184.

### • B vitamins have analgesic effect

Several clinical trials have found that B-complex vitamins reduce pain and the need for pain-reducing medications. In a study with laboratory rats, Mexican researchers found that supplemental vitamins B1 and B12, along with an analgesic drug, significantly reduced pain. Vitamin B6 had a small benefit.

Caram-Salas NL, et al. *Pharmacology*, 2006; 77:53-62.

### • Curcumin and quercetin may help in arthritis

In a cell-culture study, Canadian researchers tested the anti-inflammatory activity of curcumin and quercetin. They found that curcumin was especially effective at reducing the inflammatory activity of white blood cells. Quercetin also had anti-inflammatory activity, but not to the same extent as curcumin. The researchers suggested that both antioxidants might be beneficial in rheumatoid arthritis.

Jackson JK, et al. *Inflammation Research*, 2006;55:168-175.

### • Lignans may reduce breast cancer risk

Lignans are a type of naturally occurring phytoestrogen found in flax seed, fruits, and vegetables. German researchers compared blood levels of enterolactone, a marker of lignan intake, in 220 premenopausal cases of breast cancer and 237 healthy subjects. Women with the highest levels of lignans had a 58 percent lower risk of developing breast cancer.

Piller R, et al. *European Journal of Cancer Prevention*, 2006;15:225-232.

## Grapefruit, Weight Reduction...

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reduce the activity of liver enzymes involved in breaking down drugs, leading to higher blood levels of these medications. Among the drugs affected are cholesterol-lowering statins and Zoloft. Because the liver plays a key role in glucose tolerance, grapefruit may very well affect other enzymes involved in regulating blood sugar and weight.

Reference: Fujioka K, Greenway F, Sheard J, et al. The effects of grapefruit on weight and insulin resistance: relationship to the metabolic syndrome. *Journal of Medicinal Food*, 2006;9:49-54. □

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