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The Redemption of Protein: Good for Weight, Glucose, and Blood Fats

As popular as they are, high-protein diets have remained controversial since they were popularized by Robert Atkins, MD, in the early 1970s. Do they really help people lose weight? Improve their blood sugar? Or lower blood fats?

The answer to all those questions is yes, according to a well-controlled study of 322 moderately obese middle-age men and women. The study was conducted at a research center with an on-site medical clinic and cafeteria in Dimona, Israel – enabling exceptional dietary and medical follow-up of the participants.

Iris Shai, PhD, RD, of Ben-Gurion University led a team of international researchers that included physicians from the Harvard Medical School and University of Leipzig, Germany.

The men and women in the study ate (1) a high-protein, low-carb diet, (2) a Mediterranean-style diet, or (3) a traditional low-fat, low-carlorie diet for two years. Not surprisingly, people in the high-protein, low-carb group consumed the fewest carbohydrates, but participants of all three groups consumed approximately the same number of calories.

People in all three groups lost weight, but those eating the high-protein, low-carb diet lost the most – an average of 12 pounds. People on the Mediterranean diet lost 10 pounds, and those on the low-fat diet lost a little over 7 pounds. Abdominal fat decreased the most among people on the high-protein, low-carb diet.

For people on the high-protein diet, levels of HbA_{1c} – which provides an average blood sugar level over about four weeks – decreased by a significant 0.9%, a decline that was approximately twice that of people following either the Mediterranean or low-fat diet. For people with type 2 diabetes, the high-protein diet led to an 18 mg/dl decline in fasting blood sugar. However, on the Mediterranean diet, people with diabetes had an even greater 33 mg/dl decrease in fasting blood sugar.

Meanwhile, people on the high-protein, low-carb diet averaged a 23.7 mg/dl decrease in triglycideride levels – almost 10 times greater than those on the low-fat diet. Levels of the "bad" low-density lipoprotein (LDL) form of cholesterol decreased in both the high-protein and Mediterranean diet groups, but not in the low-fat group. At the same time, levels of the good high-density lipoprotein (HDL) cholesterol increased about 30 percent in the high-protein group, compared with the other two groups.

In addition, levels of high-sensitivity C-reactive protein (CRP), a marker of inflammation, decreased substantially in the high-protein and Mediterranean diet groups. People on the high-protein diet averaged a 29 percent decrease in CRP levels, and those on the Mediterranean diet had a 21 percent decrease in CRP.

In a separate study, researchers at Bleking Hospital, Karlshamn, Sweden, tracked the progress of 31 people on either a high-protein, low-carb diet or a high-carb diet over almost four years. Two-thirds of the high-carb group switched to a high-protein, low-carb diet after the first six months of the study.

By the end of the study, people following a high-protein, low-carb diet had an average decrease from 8% to 6.8% in their HbA_{1c} levels. They also lost an average of 17.6 pounds of body weight.

References: Shai I, Schwartzfuchs D, Henkin Y, et al. Weight loss with a low-carbohydrates, Mediterranean, or low-fat diet. *New England Journal of Medicine*, 2008;359: 229-241. Nielsen JV, Joensson EA. Low-carbohydrate diet in type 2 diabetes: stable improvement of bodyweight and glycemic control during 44 months follow-up. *Nutrition & Metabolism*, 2008;5:14. ❑

Perspectives

Hospitals as Dangerous Places

Ads touting the benefits of particular hospitals are common in big city newspapers, but on a recent day, I was struck by the sheer number of full-page ads for hospitals. In particular, one ad read: "For a healthy

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heart...eat properly, exercise daily and visit St. Francis, the hospital with more of the best cardiac specialists than any other hospital..."

What do hospitals have to do with disease prevention? Virtually nothing.

Years ago, while researching an article on the Navajo reservation, I learned that Native Americans had a specific word for hospitals – it translated to "the place where people go to die."

The truth is that hospitals are among of the most dangerous places in our modern world, and you would do your best to stay out of hospitals. They're a great place to contract "nosocomial infections," a euphemism for infections contracted in hospitals. This doesn't mean that hospitals and surgery don't help a lot of people. They do, but there are serious downsides – e.g., death – while being hospitalized.

It turns out that whenever physicians go on either a strike or a work slowdown, the area's death rate decreases. I'm serious. When physicians began a major work slowdown in Israel in 2000, the death rate decreased by 68 percent. When Israeli doctors went on strike for a month in 1973, the death rate during that month dropped by 50 percent. No one had seen such a dramatic decrease in death rates since the previous doctors' strike 20 years before.

In 1976, doctors in Los Angeles went on strike to protest increases in malpractice insurance. You guessed it – the death rate decreased by 18 percent. That same year, doctors in Bogota, Columbia, also went on strike, and the death rate went down by 35 percent.

The risk of death in hospitals also seems to relate to the magnitude of intervention, with more aggressive interventions increasing the odds of dying. In a recent study, patients were more likely to die when treated entirely by critical-care physicians in intensive care units (ICUs), compared with patients treated entirely by noncritical-care physicians. You might argue that patients in ICUs are more seriously ill, but the researchers accounted for these differences in severity of illness.

The problem lies with the pharmaceutical and surgical interventions that lie at the heart of modern medicine. Aggressive interventions are dangerous – and deadly – compared with more conservative therapies, such as nutritional medicine, especially for chronic diseases. Going to a hospital invites such interventions, and doctors often forget their Hippocratic Oath: first do no harm. *–JC*

References: Siegel-Itzkovich J. *BMJ*, 2000;320:1561. Mendelsohn RS. *Confessions of a Medical Heretic*. Chicago: Contemporary Books, 1979:114. Levy MM. *Annals of Internal Medicine*, 2008;148:801-809. ❑

Injections of Vitamin C Slow Growth of Cancers in Mice

Many alternative and nutritionally oriented physicians administer large intravenous (IV) doses of vitamin C as an adjunct therapy in the treatment of cancer patients. The large amounts of vitamin C – 50 grams or more – increase hydrogen peroxide and amount to a nontoxic form of chemotherapy.

In the latest study documenting the benefits and biological mechanism of IV vitamin C, Mark Levine, MD, PhD, of the National Institutes of Health, reported the effects of vitamin C injections in laboratory mice with aggressive forms of ovarian, pancreatic, and brain (gliobastoma) cancers.

Overall, vitamin C led to a 41 to 53 percent decrease in the growth and weight of the tumors. Thirty percent of untreated mice with brain cancers experienced metastasis, but none of the mice receiving vitamin C had metastases. In addition, the vitamin C did not produce any discernible side effects in any of the mice.

The vitamin C concentrations in the mice were comparable to those achieved in two clinical trials of people with cancer at the University of Kansas, according to Levine. Such high concentrations cannot be achieved with oral vitamin C supplements.

In related experiments on 43 types of cancer cells, Levine found that large amounts of vitamin C inhibited the growth of three-fourths of the cancers. Vitamin C had no negative effect on the five types of normal cells tested.

In the cell studies, Levine confirmed that high-dose vitamin C increased production of hydrogen peroxide in cancer cells, leading to their destruction. Normal cells make the antioxidant enzyme catalase, which protects against hydrogen peroxide.

Reference: Chen Q, Espey MG, Sun AY, et al. Pharmacologic doses of ascorbate act as a prooxidant and decrease growth of aggressive tumor xenographs in mice. *Proceedings of the National Academy of Sciences*, 2008; doi:10.1073/pnas.0804226105. ❑

Combination of Supplements Lowers Blood Pressure

A combination of L-arginine and N-acetylcysteine (NAC) led to impressive reductions in blood pressure and other indicators of heart disease risk in a group of men with type 2 diabetes.

L-arginine, an amino acid (protein building block), is the precursor to nitric oxide, a compound that regulates blood vessel tone and blood pressure. Free radicals can reduce the activity of nitric oxide, so Valentino Martina, MD, of the University of Torino,

Italy, and his colleagues decided to also give subjects NAC supplements. They choose NAC because it is a sulfur-containing antioxidant, and sulfur-containing compounds are needed to make nitric oxide.

Martina asked 24 men to take a combination of 1,200 mg L-arginine and 600 mg NAC or placebos daily for six months. All of the men had hypertension, and they stopped taking medications for high-blood pressure 15 days before starting the supplements or placebos.

By the end of the study, men taking L-arginine and NAC had 5-point (mmHg) decreases in both systolic and diastolic blood pressure and significant improvements in endothelial function – that is, blood vessel tone. The men also had numerous other improvements that would likely reduce their risk of coronary heart disease – including decreases in total cholesterol, LDL cholesterol, high-sensitivity C-reactive protein (a marker of inflammation), adhesion molecules (involved in inflammation), and fibrinogen.

"In conclusion," wrote Martina, " combined NAC and L-arginine administration seems to be a sucessful and well-tolerated antiathergenic therapy..."

Reference: Martina V, Masha A, Gigliardi VR, et al. Long-term N-acetylcysteine and L-arginine administration reduces endothelial activation and systolic blood pressure in hypertensive patients with type 2 diabetes. *Diabetes Care*, 2008;31:940-944. ❑

Curcumin Supplements May Have Benefits in Pancreatic Cancer

Pancreatic cancer has a poor prognosis, with most patients dying within one year of diagnosis. Conventional treatment options are also limited, with only two chemotherapeutic drugs having benefits in less than 10 percent of patients.

However, a new study, conducted by physicians and researchers at the M.D. Anderson Cancer Center, Houston, has found that a small number of patients with pancreatic cancer do respond positively to high-dose curcumin supplements.

Curcumin, an extract of the spice turmeric, has potent anti-inflammatory properties. It inhibits the activity of "nuclear factor kappa beta," a gene transcription protein that promotes inflammation, tumor growth, and metastasis.

Razelle Kurzrock, MD, and her colleagues treated 25 pancreatic cancer patients with 8 grams of curcumin daily. She was able to evaluate 21 of the patients for their response to curcumin.

Although bioavailability of curcumin was poor, and most patients did not show improvements, three patients did respond to the supplements. One patient has remained stable for more than 18 months and had a decrease in his CA125 level, a marker of cancer activity. Another patient had a dramatic 73 percent decrease in tumor size for one month, but other cancerous lesions started to grow in size. A third patient remained in the study for eight months, and had a feeling of well-being, but experienced an increase in "nontarget" lesions.

"Oral curcumin is well tolerated and, despite its limited absorption, has biological activity in some patients with pancreatic cancer," wrote Kurzrock.

Reference: Dhillon N, Aggarwal BB, Newman RA, et al. Phase II trial of curcumin in patients with advanced pancreatic cancer. *Clinical Cancer Research*, 2008;14:4491-4499. ❑

Antioxidants Increase Survival Rate Among Trauma Patients

Giving antioxidants to severely injured trauma patients significantly increases their chances of survival, according to a study at the Vanderbilt University Medical Center, Nashville, Tennessee.

Bryan A. Cotton, MD, and his colleagues treated 2,272 trauma patients with surgery and medications, plus antioxidants for either seven days or until being discharged from the hospital (whichever came first). He and his colleagues compared their responses to 2,022 trauma patients treated with surgery and medications during the previous year.

The antioxidant protocol consisted of 1,000 mg of vitamin C given intravenously every eight hours, 200 mcg of selenium given intravenously every day, and 1,000 IU of vitamin given E through either a naso- or orogastric tube every eight hours.

Overall, patients receiving antioxidants had a 28 percent lower risk of dying while hospitalized. However, patients with only a 50 percent chance of survival benefited the most. The antioxidants improved their odds of surviving by 76 percent, compared with similar patients who had not received antioxidants.

The antioxidants also led to shorter stays in the intensive care unit and shorter hospitalizations.

Cotton wrote that critically injured trauma patients have high levels of free radicals and low levels of antioxidants, a combination that increases the odds of multiorgan failure and death.

He also noted the tremendous costs savings from antioxidants. "The hospital cost per patient (7-day course) for this regimen is $11.00. Any outcome improvement...would demonstrate a significant cost savings..." Cotton wrote.

Reference: Collier BR, Giladi A, Dossett LA, et al. Impact of high-dose antioxidants on outcomes in acutely injured patients. *Journal of Parenteral and Enteral Nutrition*, 2008;32:383-388. ❑

More research summaries on next page

Quick Reviews of Recent Research

• Tomato extracts may help in prostate cancer

Several small studies on men have found that natural-source lycopene (which contains related compounds) can reduce the size of prostate tumors. In this study, researchers from the University of Missouri supplemented the diets of laboratory rats with tomato paste, tomato powder, or tomato paste containing extra D-fructose-L-histadine (DFLH), a fructose-amino acid compound found in fruits and vegetables. Animals consuming the tomato paste plus DFLH lived the longest, and only 18 percent of these animals developed prostate cancer. In contrast, 39 percent of rats in the plain tomato paste group, 43 percent of those in the tomato powder group, and 63 percent of those in the control group developed prostate cancer.

Mossine VV. *Cancer Research*, 2008;68:4384-4391.

• Low vitamin D levels linked to depression

Researchers from Vrije University in the Netherlands analyzed the relationship between blood levels of vitamin D and parathyroid hormone and the risk of depression among 1,282 older adults. Vitamin D levels were low in 14 percent of people with minor depression and 14 percent of people with major depression, compared with nondepressed subjects. In addition, levels of parathyroid hormone were 5 percent higher in people with minor depression and 33 percent higher in those with major depression. The researchers noted that vitamin D and calcium levels are inversely related to parathyroid hormone in healthy people. They added that elevated parathyroid hormone levels can be decreased with higher intake of vitamin D or calcium, as well as with greater exposure to sunlight.

Hoogendijk WJG. *Archives of General Psychiatry*, 2008; 65:508-512.

• Vitamin K may improve glucose tolerance

Researchers from Tufts University, Boston, investigated the relationship between vitamin K_1 intake and glucose tolerance in 2,719 men and women. The subjects underwent two-hour oral glucose-tolerance tests to measure glucose and insulin levels and to assess glucose tolerance. Higher intake of vitamin K_1 was associated with lower glucose and insulin responses – that is, better glucose tolerance and insulin sensitivity.

Yoshida M. *American Journal of Clinical Nutrition*, 2008; 88:210-215.

• Pycnogenol® eases severe PMS pain

Japanese researchers used either Pycnogenol supplements or placebos to treat 116 women with premenstrual pain. The subjects were untreated during the first two of five menstrual cycles, received the supplements or placebos during the third and fourth cycles, and were tracked for one cycle after stopping all supplements. Women with low levels of menstrual pain did not benefit from Pycnogenol. However, women with more severe pain had significant benefits. During the third and fourth menstrual cycles, the number of painful days decreased from 2.1 to 1.3 days. In addition, the women used significantly less analgesic medication. The benefits continued through the fifth menstrual cycle. Placebos did not confer any significant benefits.

Suzuki N. *Journal of Reproductive Medicine*, 2008;53: 338-346.

• Flavonoids related to low inflammation

Flavonoids, found in vegetables, fruits, and herbs, are potent antioxidant and anti-inflammatory compounds. Researchers from Korea and the United States analyzed the relationship between dietary intake of flavonoids and C-reactive protein (a marker of inflammation) in 8,335 adults. CRP levels tended to be high in women, older adults, Blacks, smokers, overweight subjects, and users of analgesic drugs. Higher consumption of vegetables and apples was related to lower CRP levels. Quercetin, kaempferol, daidzein, and genistein were among the specific flavonoids related to lower CRP levels.

Chun OK. *Journal of Nutrition*, 2008;138:753-760.

• Fish oils lower triglyceride levels

Researchers at the University of Texas, Dallas, gave 17 subjects 9 grams of omega-3 fish oils or placebos daily for eight weeks. The fish oil supplements led to a 46 percent reduce in blood triglycerides. Other blood lipids improved as well.

Vega GL. *Journal of Investigative Medicine*, 2008;56: 780-785.

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