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To Slow Down Your Aging Process, Watch Out for AGEs in Your Food

One of the hidden dangers in foods is a class of substances known as advanced glycation end products (AGEs), sometimes referred to as glycotoxins. In large amounts, AGEs can literally age the body.

To be fair, we make some of our own AGEs as a normal byproduct of metabolism. And AGEs have some positive attributes – they give a roast turkey and many other baked or grilled foods a rich taste. The problem, as you might imagine, is when we make or consume too many AGEs.

AGEs result from a particular type of chemical reaction between sugars and proteins, as well as between sugars and fats. The reaction permanently changes the protein so it cannot be used to make tissue or hormones. High blood and tissue levels of AGEs promote the free-radical damage of tissues and inflammation, accelerate the aging process, and have been linked to a greater risk of type 2 diabetes and cardiovascular diseases.

Cooked food is the major source of dietary AGEs. But some methods of cooking lead to very high levels of AGEs, while others produce relatively few AGEs.

Just recently, Helen Vlassara, MD, of the Mount Sinai School of Medicine, New York City, and her colleagues reviewed the scientific evidence on AGEs and provided new research on the amounts of AGEs in different foods.

"Animal-derived foods that are high in fat and protein are generally AGE-rich and prone to new AGE formation during cooking," Vlassara wrote. However, vegetables, fruits, dairy products, and whole grains contain relatively small amounts of AGEs, even after cooking.

Cooking with dry heat – e.g., baking, grilling, broiling, and searing – generally increases the amount of AGEs. So does frying foods. And so does cooking with dry heat or frying for long periods.

Based on Vlassara's article in the *Journal of the American Dietetic Association*, the formation of AGEs can be significantly reduced by using moist heat (e.g., boiling), cooking for shorter times, and cooking at lower temperatures. Using acidic ingredients, such as sprinkling lemon juice on cooking foods or marinating foods with vinegar, can also reduce AGEs.

Some of the highest AGEs were found in broiled beef frankfurters, baked chicken, roasted or barbecued chicken skin, fried bacon, broiled beef steak, and microwaved beef steak. Some of the lowest AGEs were found in scrambled eggs (in olive oil, butter, or other cooking oils), soups, stews, salmon steamed in foil, and chicken poached in water.

Vlassara concluded by writing that "how we prepare and process food may be equally important as nutrient composition."

Reference: Uribarri J, Woodruff S, Goodman S, et al. Advanced glycation end products in foods and a practical guide to their reduction in the diet. *Journal of the American Dietetic Association*, 2010;110;911-916. ❑

Perspectives

Water – Drink It to Your Health

It's the middle of summer – and a good time to have a glass of water. Not a soft drink or coffee, but water. Right now, not later.

Most of your body is water, and suboptimal hydration over many years leads to smaller organ sizes and reduced biochemical activity. Brain shrinkage, which is usually a factor in dementia, appears strongly related to the inadequate consumption of fluids over many years.

An associate recently drew my attention to an study published several years ago in the *American Journal of Epidemiology*. Jacqueline Chan, PhD, and her colleagues investigated the relationship between water consumption and the risk of fatal heart attacks in 20,000 men and women. Men who consumed the

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least amount of water over a six-year period were almost 50 percent more likely to die from a heart attack. Women who drank the least amount of water were two and one-half times more likely to have a fatal heart attack. Chan pointed out that hydration influences the viscosity, or thickness, of blood – meaning that you could think of water as nature's original blood thinner.

Water is a key ingredient in the chemistry of life. Each molecule of water consists of two hydrogen atoms and one oxygen atom, and both elements play important roles in energy production. When we tamper too much with the water we consume, we alter the chemistry of the body. For example, thirst reminds us that we need water, but many people attempt to quench their thirst with a soft drink, juice, or beer – the body is asking for water, but we give it a calorie-packed liquid.

Enjoy that cold glass of water. *–JC*

Fish Oil Capsules May Protect Against Colorectal Cancers

A study of patients with a genetic risk for colorectal cancer has found that supplements of eicosapentaenoic acid (EPA) reduce both the number and size of precancerous polyps.

Mark A. Hull, PhD, of St. James's University Hospital, Leeds, England, and his colleagues studied 55 patients with familial adenomatous polyposis (FAP). The inherited condition is often treated with prophylactic removal of the colon to prevent colorectal cancer. The drug celecoxib (Celebrex) has been shown to reduce the size of polyps, but it increases the risk of heart disease, and Hull wrote that a safer form of chemoprevention was needed.

Twenty-eight of the patients received four proprietary EPA capsules daily, adding up to 2,000 mg of EPA daily for six months. Meanwhile, 27 patients received placebos.

By the end of the study, patients taking the EPA capsules had an average 22 percent decrease in the number of polyps and an average 30 percent decrease in polyp diameter. In contrast, the number and size of polyps in the placebo group increased during the study.

Hull and his colleagues wrote that "the observed antineoplastic activity is almost certainly a combination of regression of existing adenomas and prevention of de novo tumor growth."

Reference: West NJ, Clark SK, Phillips RK, et al. Eicosapentaenoic acid reduces rectal polyp number and size in familial adenomatous polyposis. *Gut*, 2010: doi 10.1136/gut.2009.200642. ❑

Ginger Supplements Ease Muscle Pain from Repetitive Exercise

Ginger is widely regarded as an anti-inflammatory herb and is commonly used to treat aches and pains. In a new study, researchers have found that both raw and heat-treated ginger can ease muscle pain from repetitive exercise.

Christopher D. Black, PhD, of Georgia College and State University, Milledgeville, Georgia, and his colleagues conducted two studies with a total of 74 participants. Some received 2 grams of raw ginger in capsules for 11 days, while others were given heat-treated ginger or placebos.

The subjects then used hand weights (5 to 15 pounds each) to do 18 flexes with their weaker arms – enough to induce pain and inflammation in their elbows. The raw ginger resulted in a 25 percent reduction in post-exercise muscle pain after 24 hours, and the heat-treated ginger was almost as effective in reducing pain.

Other research cited by Black has found that ginger blocks the activity of numerous pro-inflammatory molecules, including interleukins, tumor necrosis factor alpha, and COX-1 and COX-2 enzymes.

Reference: Black CD, Herring MP, Hurley DJ, et al. Ginger (*Zingiber officinale*) reduces muscle pain caused by eccentric exercise. *Journal of Pain*, 2010: doi 10.1016/j.pain.2009.12.013. ❑

Vitamin D May Protect Against Pelvic Disorders in Woman

One in every four American women experience pelvic floor disorders, including urinary or fecal incontinence and pelvic organ prolapse. A new study suggests that these disorders may be related to low vitamin D levels – and that higher levels of the vitamin might be protective.

Samuel S. Badalian, MD, PhD, and Paula F. Rosenbaum, PhD, of the SUNY Upstate Medical University, in Syracuse, New York, analyzed data from 1,881 women participating in the latest National Health and Nutrition Examination Survey (NHANES).

Blood tests showed that 82 percent of the women, age 20 and older, were either deficient in or had a borderline deficiency ("insufficiency") in vitamin D. Higher levels of vitamin D were associated with a lower risk of any type of pelvic floor disorders in all women and especially in those who were age 50 or older – significant because the risk of pelvic floor disorders increases with age.

According to Badalian and Rosenbaum, each 5 ng/ml increase in vitamin D levels was related to a 6 percent decrease in pelvic floor disorders. In other words, a woman with a vitamin D level of 50 ng/ml was 24 percent less likely to experience pelvic floor disorders, compared with a women who had a vitamin D level of 30 ng/ml.

The protective effect of vitamin D appeared greater among postmenopausal women. Among women age 50 and older, each 5 ng/ml increase in vitamin D was associated with a 8 percent lower risk of pelvic floor disorders.

The researchers noted that vitamin D is required for normal muscle synthesis, and that stronger pelvic muscles might reduce the risk of pelvic floor disorders.

They concluded by writing that the "treatment of vitamin D insufficiency and deficiency in both pre-menopausal and postmenopausal women could improve pelvic muscle strength, with a possible reduction in the pelvic floor disorders including urinary incontinence."

Reference: Badalian SS, Rosenbaum PF. Vitamin D and pelvic floor disorders in women. *Obstetrics and Gynecology*, 2010;115:795-803. ❑

Blood-Sugar Drug Can Cause Vitamin B12 Deficiency

Metformin is the most common drug prescribed to lower blood sugar and insulin levels in people with type 2 diabetes. Doctors have long known that it can reduce blood levels of vitamin B12, but a new study has found that the longer people take the drug, the lower their vitamin B12 levels.

Coen D.A. Stehouwer, MD, PhD, of Maastricht University Medical Centre, Netherlands, and his colleagues tracked 390 patients with type 2 diabetes. All of the patients were receiving insulin.

Stehouwer and his colleagues asked the patients to also take either 850 mg of metformin or placebos three times daily for a little over four years.

The researchers found that the long-term use of metformin led to significant and persistent decreases in vitamin B12 levels. By the end of the study, people taking metformin had an average 19 percent decrease in vitamin B12 levels. In contrast, people taking the placebos had no change in their vitamin B12 levels.

Patients who ended up with vitamin B12 deficiencies also had high levels of homocysteine, a risk factor for heart attack and stroke. Some people also had decreased levels of folic acid, a B vitamin.

Metformin is believed to cause malabsorption of vitamin B12 by interfering with the "intrinsic factor," a protein needed to absorb the vitamin in the digestive tract. Some research suggests the negative effect of metformin can be reversed by increasing calcium intake.

"Our data provide a strong case for routine assessment of vitamin B12 levels during long term treatment with metformin," wrote the authors.

Reference: de Jager J, Kooy A, Lehert P, et al. Long term treatment with metformin in patients with type 2 diabetes and risk of vitamin B12 deficiency: randomised placebo controlled trial. *BMJ*, 2010;340:c2181. ❑

Adopting a Low-Glycemic Diet Helpful for Women with PCOS

Polycystic ovary syndrome (PCOS) affects up to 10 percent of women of child-bearing age and is a major cause of infertility. Insulin resistance is part of the syndrome, which also includes ovarian cysts, excess male hormones, and a lack of ovulation.

Weight loss is known to help reduce PCOS symptoms, but the optimal type of diet for women with this condition has not been clear, according to researcher Jennie C. Brand-Miller, PhD, of the University of Sydney, Australia.

So Brand-Miller and her colleagues asked 96 overweight and obese women with PCOS to follow one of two diets without any particular type of calorie restriction. One diet consisted of low-glycemic foods, and the other was a conventional "healthy" diet with similar levels of vitamins and minerals. The women were asked to stay on these diets for either 12 months or until they lost 7 percent of their body weight.

About half of the women dropped out of the study, leaving 29 on the low-glycemic diet and 20 on the conventional healthy diet. Among women who remained in the study, those following the low-glycemic diet had greater improvements in their blood sugar levels (based on an oral glucose-tolerance test). Women who also took metformin had a greater benefit in blood sugar levels.

Seventy-six percent of the women had irregular menstrual cycles when they began the study. The regularity of menstrual cycles improved in 95 percent of women eating a low-glycemic diet, compared with 63 percent on the conventional diet.

In addition, fibrinogen levels decreased in women eating the low-glycemic diet, indicating an anti-coagulant effect of the diet. Fibrinogen levels increased in the other women.

Reference: Marsh KA, Steinbeck KS, Atkinson FS, et al. Effect of a low glycemic index compared with a conventional healthy diet on polycystic ovary syndrome. *American Journal of Clinical Nutrition*, 2010: doi 10.3945/ajcn.2010.29261. ❑

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Quick Reviews of Recent Research

• Vitamin D has heart-healthy benefits

Endothelial progenitor cells (EPCs) are needed to repair blood vessel walls. Several studies have found that low levels of EPCs are associated with an increased risk of type 2 diabetes and cardiovascular disease. EPCs may be dependent on vitamin D levels. Researchers at the Center for the Improvement of Human Functioning International, Wichita, Kansas, found that levels of EPCs correlated with vitamin D levels – the higher the vitamin D levels in a group of 41 healthy adults, the more EPCs they had. Blood levels of vitamin D above 40 ng/ml of blood showed a positive effect on blood pressure. Higher levels of vitamin D were also associated with a healthier lipid profile.

Mikirova NA. *Panminerva Medica*, 2010;52 (Suppl 1 & 2): 1-7.

• Lignans may protect against breast cancer

Plant estrogens may help protect against breast cancer by blocking some of the activity of hormonal estrogens. Research on soy isoflavones has yielded conflicting results, but another family of plant estrogens called lignans may have protective effects. Researchers from the German Cancer Research Center, Heidelberg, analyzed 21 studies focusing on lignans and breast cancer risk. Overall, lignans did not have a protective effect. However, high lignan intake was associated with a 14-16 percent lower risk of breast cancer among postmenopausal women. The highest lignan levels are found in flax seeds and sesame seeds, but appreciable amounts are also found in sprouts, fruits, berries, vegetables, green tea, and whole grains, according to the researchers.

Buck K. *American Journal of Clinical Nutrition*, 2010: doi 10.3945/ajcn.2009.28573.

• Fish oils protect against heart failure

Researchers analyzed the eating habits and tracked the health of 36,234 middle-age and elderly women in Sweden. Women who each week consumed one or two servings of fish rich in omega-3 fats had a significantly lower risk of hospitalization for or death from heart failure. Women consuming the most fish had a 25 percent lower risk of heart failure.

Levitan EB. *European Journal of Clinical Nutrition*, 2010: doi 10.1038/ejcn.2010.50

• Television commercials offer bad diets

Eating the foods advertised in television commercials would lead to a very unhealthy diet, according to a study by researchers at Atlantic State University, Savannah, Georgia. The researchers analyzed 800 foods promoted in 3,000 commercials aired over 28 days. Assuming the people ate only 2,000 calories of the advertised foods each day, they would end up consuming 20 times the amount of fat and 25 times the amount of sugar they need. At the same time, they would eat only 40 percent of the recommended amount of vegetables, 32 percent of recommended dairy products, and 27 percent of the recommended fruits.

Mink M. *Journal of the American Dietetic Association*, 2010;110:904-910.

• Fructose complicates liver disease

Researchers at Duke University Medical Center, Durham, North Carolina, investigated the relationship between fructose consumption and fatty liver disease. They focused on 427 adults who completed a dietary questionnaire within three months of having a liver biopsy. Higher fructose consumption was associated with men, younger ages, +6elevated triglyceride levels, and increased calorie intake. Daily consumption of fructose was associated with less severe fatty liver but with more serious fibrosis (excess fibrous tissue or scarring), as well as liver inflammation.

Abdelmalek MF. *Hepatology*, 2010:51:1961-1971.

• Supplements reduce eye pressure

A combination of the herb bilberry and Pycnogenol®, an antioxidant extract of French maritime pine trees, can reduce high blood pressure in the eyes, a condition known as ocular hypertension. Researchers at the University of Chieti-Pescara, San Valentino, Italy, treated 79 men and women with the bilberry-Pycnogenol combination, the drug Latanoprost, or a combination of the supplements and drug. The supplements and drug were comparable in benefits, but the most effective regimen combined the supplements with the drug.

Steigerwalt RD. *Clinical Ophthalmology*, 2010;4:471-476.

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