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Special Interest Articles:

- CHRONIC FATIGUE SYNDROME AND THE ADRENAL GLAND
- COQ10 AND BLOOD VESSEL LINING
- L-CARNITINE AND LIVER
- COQ10 AND ASTHMA
- HEART SURGERY AND CoQ10
- LIFESTYLE CHANGES PREVENT DIABETES

Macular Degeneration and Antioxidants

AMD is an acronym for "Age Related Macular Degeneration". It is a disease where the retina degenerates, destroying central vision, leaving only peripheral vision. It is the leading cause of blindness in people over 55 years of age, affecting between 25 and 30 million people worldwide.

In the journal *Ophthalmology* (February 2008, Volume 115, Issue 2, Pages 324-333) found

that antioxidants may do more than merely prevent AMD. The 27 subjects were given either a placebo or antioxidant nutrients (vitamins A, E and zinc), and bioflavonoids (plant antioxidants, including lutein, zeaxanthin, and astaxanthin). Although it was a small study, the researchers noted improvements in the vision of the group given the supplements.

Topical Steroids and Adrenal Suppression

The use of topical steroids for skin problems may suppress the adrenal glands. According to an article in *Family Practice News* (January 1, 2004:69), the Food and Drug Administration had recommended that a black box warning be placed on topical steroids. A "black box" warning appears on prescription drugs that may cause serious adverse effects. The warning usually has a black border surrounding the text of the warning—hence the name. When medical studies indicate that the drug carries a significant risk of serious side-effects, the U.S. Food and Drug Administration (FDA) can require a pharmaceutical company to place a black box warning on the labeling of a prescription drug, or

in literature describing it. It is the strongest warning that the FDA requires.

Use of topical steroids may cause asymptomatic, secondary adrenal suppression when used to treat atopic dermatitis in children. The problem is asymptomatic until the child experiences trauma or infection which may trigger acute adrenal suppression. The symptoms of acute adrenal insufficiency include low blood pressure, weakness, fatigue, nausea, and vomiting are often mistaken for something else. Topical steroids are often used in very young children to treat atopic dermatitis—frequently under the age of six months.

Chronic Fatigue Syndrome and the Adrenal Gland

The authors of the study feel that CFS patients may have an adrenal insufficiency, which makes the adrenal glands more sensitive to ACTH.

Cortisol levels and 24-hour urinary free cortisol levels were tested in 72 normal controls and in 30 patients diagnosed with chronic fatigue syndrome (CFS). The research appeared in the *Journal of Clinical Endocrinology and Metabolism* (1991;73(6):1224-1234). The patients with CFS had lower evening cortisol levels and lower free cortisol excretion (found in 24-hour urine test).

ACTH stands for Adrenocorticotropic hormone. It stimulates the adrenal cortex to secrete cortisol (a glucocorticoid). The study found that the CFS patients had higher concentrations of ACTH. They had an overall increased sensitivity to ACTH, but a reduced maximal response to the hormone. In general, CFS patients have lower levels of glucocorticoids

(like cortisol) than healthy people. The authors of the study feel that CFS patients may have an adrenal insufficiency, which makes the adrenal glands more sensitive to ACTH. The fact that the adrenal glands do not respond as well to high doses of ACTH may indicate that there may be some atrophy of the glands (perhaps due to overstimulation).

CRH is corticotropin-releasing hormone (CRH), originally named corticotropin-releasing factor (CRF), and also called corticoliberin, is a polypeptide hormone and neurotransmitter involved in the stress response. It stimulates the pituitary to make ACTH and it is inhibited by cortisol. In CFS patients, the adrenal insufficiency may be due to a deficiency of CRH.

CoQ10 and the Lining of Your Blood Vessels

The endothelium is the thin layer of cells that lines the interior surface of blood vessels. It forms an interface between circulating blood in the lumen and the rest of the vessel wall. Endothelial cells line the entire circulatory system, from the heart to the smallest capillary. These cells reduce turbulence of the flow of blood, allowing the fluid to be pumped farther. Endothelial cells protect against atherosclerosis by helping to prevent blood clotting, because they contain heparan sulfate. Heparan sulfate acts as an anticoagulant.

The health of the endothelial cells is an important factor in preventing atherosclerosis. A meta-analysis that appeared in the journal *Atherosclerosis* (epublished ahead of print Oct 25, 2011) included MEDLINE, Cochrane Library, Scopus, and EMBASE to identify studies prior to and including July 1, 2011 that looked at randomized, controlled studies dealing with CoQ10 supplementation and endothelial function. The analysis found that CoQ10 supplementation significantly improved endothelial function.

Insulin Insensitivity

Now that the holidays are over, it is a good time to reflect on the damage done by sugar and insulin. Insulin has a lot to do with weight gain and so many other common health problems. It is involved with high blood pressure, high cholesterol, high triglycerides, Type 2 diabetes, menstrual problems, heart disease, pain, inflammation, depression and even polycystic ovaries. With simple lifestyle changes and some good nutritional products you can lose weight and help improve a lot of other health problems.

Symptoms of insulin resistance include fatigue, weight gain, brain fog, carbohydrate craving, and periods of hypoglycemia after a high carbohydrate meal (often needing a nap after eating). Approximately 50% of patients with high blood pressure are insulin insensitive. Approximately 30% of American adults are insulin insensitive and 25% have Syndrome X. The *Journal of the American Medical Association* states that if a patient has three or more of the following symptoms: waist measurement greater than 40" in men (35" in women), triglycerides greater than 150, HDL lower than 40, blood pressure greater than 135/85 or fasting glucose of 110, Syndrome X is present.

Problems with sugar and insulin cause weight gain, along with a variety of other health problems. In general, people with insulin insensitivity will have a BMI greater than 30. They carry weight around

their abdominal area and crave sugar and starch. Getting insulin production under control is the key to weight loss—and there are some products that will help you to do this.

Dietary changes are, of course necessary. You need to follow a low glycemic diet—avoiding high glycemic foods like refined carbohydrates. You should eat three meals per day.

It is important to exercise regularly. It is also a good idea to stop snacking. The snacking issue is a tough one; many patients with insulin insensitivity are labeled as hypoglycemic. Some feel weak or shaky if meals are delayed or feel the need to snack every two hours (or have been told to do so). It is a good idea to wean from this by increasing the time between snacks. When you first eat, you produce insulin which helps to store the calories of the meal. As time goes on, you produce glucagon, which helps to burn the stored calories. The first three hours after eating, insulin is dominant; after three hours glucagon becomes dominant. You cannot lose weight if you keep producing insulin and snacking makes you produce insulin. It is especially important not to eat between dinner and bedtime. The dietary changes are difficult, but necessary. Fortunately there are products that help to bring insulin under control and to help with cravings.

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L-Carnitine and the Liver

Carnitine exists in two stereoisomers. L-carnitine is the biologically active form. Its enantiomer, D-carnitine, is biologically inactive. It is biosynthesized from the amino acids lysine and methionine. In living cells, it is required for the transport of fatty acids from the cytosol into the mitochondria during the breakdown of fats for the generation of metabolic energy.

Fatty liver, also known as fatty liver disease (FLD), is a condition where fat accumulates in liver cells. The condition is reversible, but if the cause of the damage persists or it is left untreated, it can lead to permanent damage. Despite having multiple causes, fatty liver can be considered a single disease that occurs worldwide in those with excessive alcohol intake and those who are obese (with or without effects of insulin resistance). The condition is also associated with other diseases that influence fat metabolism. Accumulation of fat may also be accompanied by a progressive inflammation of the liver (hepatitis), called steatohepatitis.

In research that appeared in *Diabetology & Metabolic Syndrome* (2011 Nov 15; 3:31), the therapeutic effect of L-carnitine on nonalcoholic fatty liver disease was recognized in streptozotocin-induced Type 2 diabetic mice. The mice were divided into five groups. One group acted as the control. Another group had Type 2 diabetes induced, without treatment. One group was pre-treated with 125 mg/kg of L-carnitine prior to streptozotocin exposure. Two of the groups were treated with either 125 mg/kg of L-carnitine or 250 mg/kg of L-

carnitine. The researchers determined that supplementation with L-carnitine increased levels of Acetyl L-carnitine and L-carnitine in the liver. They also found that L-carnitine supplementation benefits fatty liver in Type 2 diabetes by increasing fatty acid oxidation and protecting mitochondrial function in the liver.

Research appearing in the *World Journal of Gastroenterology* (2011 Oct 21; 17(39): 4414-20) looked at L-carnitine supplementation for hepatitis C. The 69 subjects were hepatitis C patients who were being treated with interferon A plus ribavirin. They were divided into two groups. For 12 months both groups received their drug therapy, but one group was also supplemented with L-carnitine. All patients underwent laboratory investigations including: red cell count, hemoglobin, white cell count, platelets, bilirubin, alanine aminotransferase (ALT), aspartate aminotransferase (AST). After a 12-month period, the group treated with L-carnitine had better AST (76.8 vs 108.8) and ALT (112.3 vs 137.9) values. There were also improvement in platelet, RBC and WBC counts, and in hemoglobin levels. The researchers concluded, "L-carnitine supplementations modulate erythropoiesis, leukopoiesis and thrombocytopoiesis, and may be useful in patients treated for HCV. L-carnitine treatment offers the possibility of achieving a sustained virological response while preventing overtreatment."

CoQ10 and Asthma

The relationship between supplementation with a combination of CoQ10, vitamin C and alpha tocopherol and asthma symptoms was examined in an open, crossover, randomized study that was published in *Biofactors* (2005; 25(1-4): 235-40). The subjects of the study were 41 patients, between the ages of 25 and 50, with bronchial asthma. For the first four months of the study, one group received supplementation with antioxidants (vitamins E and C) and CoQ10, as well as their standard asthmatic therapy. The second group received standard asthmatic therapy alone. During the second four months

of the study, the therapies were reversed for the two groups. The control group received the supplements and the original supplement group received only standard asthma therapy.

Those patients who were dependent on corticosteroids had low levels of CoQ10 in their plasma; this confirms earlier research. Taking antioxidants and CoQ10 reduced the need for corticosteroids in the subjects. The researchers concluded that supplementation with CoQ10 and antioxidants may be beneficial to patients with asthma.

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Heart Surgery and CoQ10

Bypass surgery produces oxidative stress, so it stands to reason that supplementing with antioxidants may improve surgical outcomes. Taking CoQ10 may be beneficial to coronary bypass patients, according to research appearing in the *Journal of Cardiothoracic and Vascular Anesthesia* (2008 Dec;22(6):832-9). The subjects of the study were scheduled for CABG surgery. The 30 patients were randomly assigned to receive either a placebo or between 150 -180 mg of CoQ10 per day for seven to ten days prior to the surgery. The group receiving the supplement has shorter hospital stays, fewer reperfusion arrhythmias, less need for blood product (and less mediastinal

drainage) and less myocardial dysfunction than the control group. Other research appearing in the *Journal of Thoracic and Cardiovascular Surgery* (January 2005;129(1):25-32) 62 coronary bypass surgery patients received 300 mg/day of CoQ10 for two weeks before surgery. Another group of 59 subjects received a placebo. In the group receiving the supplement, mitochondrial respiration was more efficient and mitochondrial tissue from the supplement group recovered from hypoxia more quickly than it did for the control group. In short, CoQ10 protected from oxidative stress.

Lifestyle Changes Help Prevent Diabetes

"The most beautiful thing we can experience is the mysterious. It is the source of all true art and science."

Einstein

About 8% of the American population has Type 2 diabetes. Type 2 diabetes exists when the body becomes insensitive to insulin and thereby has an increasingly difficult time handling sugar. Research published in the *New England Journal of Medicine* (February 7, 2002;346:393-403) shows that lifestyle change outperforms both drugs and placebo for prevention of diabetes.

The researchers compared the drug Glucophage (which helps the body better respond to insulin) to weight-loss and exercise. The subjects of the study were 3200 non-diabetic men and women with an average age 51 and a tendency toward high blood sugar. The average body mass index (BMI) of the participants was 34 (a BMI over 30 is considered obese).

Two groups of subjects were given either Glucophage, or a placebo. A third group made changes in their lifestyle (including 2 ½ hours of physical activity each week) designed to get the subjects to lose 7% of their weight.

Over the next three years, the group that exercised and

changed their diet had a 58% lower risk of developing Type 2 diabetes than people in the placebo group. Those given Glucophage only cut their diabetes risk by 31%.

Getting stress under control is also a useful strategy for Type 2 diabetes. According to research appearing in the January, 2002 issue of *Diabetes Care*, stress management can help to lower blood sugar levels in Type 2 diabetics. The HbA1c test measures the average blood sugar levels over a prolonged period of time. In one study, there were 108 subjects aged 30 or above with Type 2 diabetes. All subjects participated in a diabetes education program. The education program provided to one group included stress management. The control group did not receive stress management.

Stress reduction techniques like breathing exercises, visualization, progressive muscle relaxation and instruction on how to cope with stress lowered HbA1c levels by an average of 0.5%. Nearly 1/3 of the subjects had a reduction of 1%.

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