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GLUCOSAMINE AND CHONDROITAN: BEYOND ARTHRITIS

There are a number of studies that support the use of glucosamine and chondroitin for arthritis pain. A recent double-blind study appearing in the *New England Journal of Medicine* (2006; 354(8): 795-808) looked at 1,583 patients with osteoarthritis in the knee. The study was looking at pain reduction over a 24 week period. It found that patients with moderate to severe knee pain experienced a reduction in pain when placed on a combination of glucosamine and chondroitin supplements.

Of course these supplements help to repair and strengthen cartilage and are not primarily used for pain relief. Still many of the studies focus on pain and compare the supplement to popular pain medications. Interestingly, the supplements usually compare favorably to the pain medications. The fact that glucosamine and chondroitin can improve the health of the cartilage to actually give an arthritis patient some pain relief is a testament to how effective they can be.

One study appearing in *Eksp Klin Farmakol* (2002 Nov -Dec; 65(6): 67-9) looked at glucosamine and its capacity to repair cartilage in traumatic arthritis and keratitis following trauma. It found that supplementation with glucosamine hydrochloride improved the healing of the connective tissue. Another study, appearing in *Osteoarthritis Cartilage* (2003;11:335-342) found that glucosamine and chondroitin greatly improved cartilage's response to both chemical and structural stress.

Glucosamine and chondroitin supplements can offer protection to the joint and can improve healing after injury. Supplementation can therefore be of value to performance athletes.

CRP AND ESSENTIAL FATTY ACIDS

CRP is C-reactive protein. It is a globular protein; its levels increase in the presence of inflammation. Elevated CRP is associated with an increased risk for heart disease. It is also associated with an increased risk for death from other causes, as verified by research appearing in *Clinical Chemistry* (2008 Feb;54 (2):335-42). CRP is also associated with depression, cognitive decline and stroke, according to a meta-analysis of 19 studies appearing in *Lancet Neurology* (2005; 4(6): 371-380).

Omega-3 fatty acid consumption may play a role in lowering CRP levels. In the journal, *Nutrition Research* (November 2008,201(1):184-191), a cross-sectional study involving over 440 Japanese women found that dietary intake of omega-3 fatty acids was inversely proportional to CRP levels.

A study appearing in the *European Journal of Clinical Nutrition* (epub ahead of print April 8, 2009) looked at omega-3 fatty acid levels and compared them to CRP levels in 124 adults. The study found that there was an inverse relationship between CRP levels and omega-3 fatty acid levels.

Another study, appearing in the journal *Atherosclerosis* (Volume 201, Issue 1, November 2008, Pages 184 -191) looked at dietary intake of omega-3 fatty aicds and CRP levels in 14,191 subjects between the ages of 40 and 69 years. This study found that omega-3 fatty acid consumption was inversely associated with CRP levels. The authors concluded, "Sufficient dietary intake of n-3PUFA may attenuate inflammatory reaction and this effect is more evident among high-risk populations such as male smokers although the small numbers of female ex-smokers and nonsmokers limited statistical power to draw strong conclusions about these groups." Similarly, research appearing in the *American Journal of Clinical Nutrition* (2006; 84(1): 223-9) and *Nutritional Research* (2008; 28(5): 309-14) also found an inverse relationship between omega-3 fatty acid consumption and CRP.

It makes sense. CRP is an indicator of low-grade, sustained inflammation. There is a large body of research establishing that omega-3 fatty acids are anti-inflammatory. So it stands to reason that omega-3 fatty acid consumption should help to bring CRP levels under control.

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LIVER FAILURE AND GLUTEN SENSITIVITY

In a study published in the journal *Gastroenterology* (April 2002;122:881-888), describes case histories of four patients with liver disease who also had celiac disease (gluten allergy). Gluten free diets reversed the liver dysfunction in these cases (one patient did not adhere to a gluten-free diet and the disease progressed until he needed a liver transplant). Two of the patients who managed to stay on the gluten-free diet, maintained good liver function. The researchers then looked at the prevalence of celiac disease in patients awaiting liver transplant and found that 4% of 185 patients had celiac disease.

Celiac disease is characterized by gluten insensitivity; it damages the small intestine and interferes with nutrient absorption. Symptoms often include abdominal pain, gas, fatigue, and diarrhea. It is associated with other immune system disorders—including autoimmune hepatitis. The authors of this study believe that celiac disease should be investigated for all cases of autoimmune hepatitis or any hepatitis of unknown origin.

BLOOD PRESSURE AND PAIN CONTROL

One way to reduce inflammation is to "change the patient's oil". There is a large body of research showing that omega-3 fatty acids are anti-inflammatory. There is a good reason to choose omega-3 fatty acids over pain medication—blood pressure.

According to research published in the *Archives of Internal Medicine* (October 28, 2002;162:2204-2208), frequent use of pain-relief medications may result in an increased risk of high blood pressure in women. These drugs are known as NSAIDs (non-steroidal anti-inflammatory drugs). Use of acetaminophen (eg Tylenol) was also monitored in this study. Acetaminophen is not an NSAID, it addresses pain, but not inflammation.

NSAIDs work by blocking hormone-like substances known as prostaglandins, some of which cause inflammation. Prostaglandins also dilate blood vessels. If they are chemically blocked by NSAIDs, blood vessels may narrow. This can lead to hypertension.

The health of 80,000 women (all of whom did not suffer from hypertension) was monitored. Frequency of the use of pain medication (including aspirin, NSAIDs and acetaminophen) was noted and compared with the number of diagnosed cases of hypertension after two years. Use of NSAIDs 22 days or more each month increased the risk of high blood pressure by about 86%. Women using acetaminophen 22 days or more each month were almost twice as likely to have high blood pressure than those who did not. Aspirin users did not experience the increased risk of high blood pressure. Researchers concluded that over use of pain medications could be responsible for a large portion of the hypertension cases in the United States.

According to a double-blind, placebo controlled study appearing in the *Journal of Nutrition* (2007 Apr;137(4):973-8), a small amount of DHA (docosahexaenoic acid) can moderately reduce blood pressure. The 38 male subjects were randomized to receive either 700 mcg of DHA or a placebo each day of the three month study. The study paused for four months and the role of the subjects were reversed, with the original placebo group receiving the supplement and the original supplement group receiving the placebo. Overall, subjects taking DHA had a diastolic blood pressure that was lower by 3.3 mm Hg. Heart rate was also lower in the DHA group, by 2.1 beats per minute.

A cross-sectional epidemiological study appearing in the journal, *Hypertension* (2007;50:313-319) looked at blood pressure in relationship to 4,680 subjects. Blood pressure was measured eight times over four doctor visits. The researchers found an inverse relationship between omega-3 fatty acid consumption from food and blood pressure.

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SJÖGREN'S SYNDROME

Sjögren's syndrome is an autoimmune disease where the immune system attacks moisture producing glands. Generally the patient has dry eyes and dry mouth, but the disease may also affect other organs, including the GI system, the kidneys, blood vessels, lungs, liver, central nervous system and pancreas. In the United States there are nearly 4,000,000 patients with this disease. They often experience extreme fatigue and joint pain, and have a high risk of developing lymphoma.

Low levels of sex hormones are associated with the disease and severity of symptoms. Research appearing in the *Journal of Clinical Endocrinology and Metabolism* (Mar. 24, 2009; Epub ahead of print) tested DHEA supplementation in patients with Sjögren's syndrome. At the start of the nine-month long, double-blind, placebo-controlled study, subjects with primary Sjögren's syndrome had low levels of DHEA and DHEA sulfate. Supplementation improved blood levels and decreased the symptom of dry mouth.

Fatty acid supplementation may also be of value. A study appearing in the journal *Prostaglandins, Leukotreines and Essential Fatty Acids* (1998;59 (4):239-245) found that low DHA levels in cell membranes were associated with more severe symptoms in patients with primary Sjögren's syndrome. Primary Sjögren's syndrome exists when the patient does not suffer from any additional autoimmune disease. About half of all patients have a second autoimmune disease along with the Sjögren's syndrome.