Cardiovascular Benefits of Astaxanthin

Natural Astaxanthin is a very good tonic for the heart. It has a variety of properties that can help people prevent heart disease and also help people with heart disease to minimize their risk of a heart attack or stroke. Astaxanthin's antioxidant power and its ability to reduce silent inflammation are two obvious cardiovascular benefits; additionally, there are other potential benefits that have been demonstrated in human clinical trials and/or pre-clinical animal studies.

There is evidence that Natural Astaxanthin can help improve blood lipid profiles by decreasing low density lipoprotein (LDL, bad cholesterol) and triglycerides, and by increasing high density lipoprotein (HDL, good cholesterol). This has been demonstrated in both human and animal trials.

An early study in rats demonstrated that Astaxanthin raised HDL, the good cholesterol (Murillo, E, 1992). A later study tested both Astaxanthin and Vitamin E in rabbits that had high cholesterol. This research found that both supplements, particularly Astaxanthin, improved plaque stability in the arteries. All the rabbits that ingested Astaxanthin were classified as "early plaques," as compared to the rabbits ingesting Vitamin E and also the control group (Li, et al, 2004). A third animal study was done last year in rats. This study showed that Astaxanthin increased HDL while decreasing both triglycerides and non-esterified fatty acids in the blood (Hussein, et al, 2006).

A human clinical trial in Japan found a very promising effect on LDL (bad cholesterol) both in test tubes and in human volunteers. The in-vitro test showed that Astaxanthin dose-dependently prolonged the oxidation lag time of LDL. The test was then repeated in humans at doses as low as 1.8 mg per day and as high as 21.6 mg per day for fourteen days. This study found that all four doses positively affected LDL oxidation lag time—at 1.8 mg per day it was 5% longer; at 3.6 mg it was 26% longer; at 14.4 mg it was 42% longer; and at the highest dose of 21.6 mg, the upward trend stopped and the lag time was only 31% longer. This suggests that the optimum dose for blood lipid profiles is significantly less than 21.6 mg per day. The researchers concluded that consumption of Astaxanthin "inhibits LDL oxidation and possibly therefore contributes to the prevention of atherosclerosis" (Iwamoto, et al, 2000).

An unpublished human clinical trial was done in Eastern Europe on men with high cholesterol. Subjects supplemented with 4 mg of Astaxanthin (as BioAstin®) for thirty days. At the end of the study, subjects taking Astaxanthin showed an average decrease in total cholesterol and of LDL of 17%, and an average decrease of triglycerides of 24%! (Trimeks, 2003).

Another potential benefit for cardiovascular health may be Astaxanthin's ability to decrease blood pressure. To date, research has been only pre-clinical animal trials in rodents, but the results look promising. A group of Japanese researchers have done three separate experiments on rats with high blood pressure. In the first study, the researchers discovered that supplementation with Astaxanthin for fourteen days resulted in a significant decrease in blood pressure for the hypertensive rats, while rats with normal blood pressure levels showed no decrease. They also showed that stroke-prone rats that were fed Astaxanthin for five weeks had a delayed incidence of stroke while also

decreasing their blood pressure. In another area researched in this study, mice with poor blood flow to the brain improved their memory when fed Astaxanthin; basically, the treatment mice proved to be smarter after being fed Astaxanthin. The study concluded, "These results indicate that Astaxanthin can exert beneficial effects in protection against hypertension and stroke and in improving memory in vascular dementia." This study was very broad in its scope and quite ground-breaking (Hussein, et al, 2005a), so the same researcher led another study later the same year.

The second study again examined the effect of Astaxanthin on hypertensive rats, but with an aim of also finding Astaxanthin's mechanism of action for high blood pressure. They found that Astaxanthin's mechanism for decreasing high blood pressure may be its modulating effect on nitric oxide. Nitric oxide is a causative factor for inflammation. So at the same time Astaxanthin is controlling inflammation through its modulation of nitric oxide, it is also controlling blood pressure. This study went on to examine the hearts of the rats after contractions were induced with a variety of substances. The constrictive effects of these introduced substances were improved by Astaxanthin, demonstrating that it may help reduce the consequences of a heart attack. The conclusion was that Astaxanthin may help with blood fluidity in hypertension, and that it may restore the vascular tone (Hussein, et al, 2005b).

There is one human study that is related to this anti-hypertensive animal research as well as the blood lipid research. This study centered on human volunteers supplementing with 6 mg of Astaxanthin per day for only ten days. At the end of the ten day period, a significant improvement in blood flow was found in the treatment group (Miyawaki, H, 2005).

A very different type of animal study related to cardiac health was done by a different group of Japanese scientists at the Kyoto University of Medicine. The study found that mice that were fed Astaxanthin and then run on a treadmill until exhaustion suffered less heart damage than mice that were similarly exercised without Astaxanthin supplementation. On examination, they found Astaxanthin concentrated in the mice's hearts. They concluded that Astaxanthin can decrease exercise induced damage in the heart as well as in the skeletal muscle (Aoi, et al, 2003).

At the Medical College of Wisconsin, another animal study with rats showed cardio-protective attributes for Astaxanthin. In this study, Astaxanthin was given to rats prior to heart attacks. It was found that Astaxanthin significantly reduced the area of infarction and the damage caused to the heart by the heart attack (Gross and Lockwood, 2004).

Lastly, let's briefly talk about a group of researchers from Honolulu, Hawaii that are looking at making a unique, injectable delivery system for Astaxanthin into a patented prescription drug for cardiovascular patients. The group has trademarked the name Cardax® for their product and has done extensive research on it. Three of these studies are of particular interest: In the first, they used rats as the model for their experiment and in the second they used dogs. Both results were very promising: "These results suggest that Cardax has marked cardioprotective properties in both rodents and canines. Thus, Cardax may be a novel and powerful new means to prevent myocardial [inner heart muscle tissue] injury" (Gross and Lockwood, 2003 and 2005).

The third study that was done on Cardax was extremely exciting. It was led by a scientist at the prestigious Harvard Medical School. This study tested Cardax's effect on

the negative side effects of Vioxx®. Vioxx is a prescription anti-inflammatory that can have a horrible side effect of causing deaths from cardiovascular disease and heart attacks. This study states that the dangerous cardiovascular effects that may be caused by Vioxx are related to its action of increasing the susceptibility of LDL and cellular membrane lipids to oxidation, which contributes to plaque instability and thrombus formation (formation of blood clots in the arteries). This study demonstrates that Vioxx is a pro-oxidant. Now for the amazing part: Astaxanthin, as an antioxidant, completely negated the pro-oxidant effect of Vioxx! The study states, "Remarkably, Astaxanthin was able to completely inhibit the adverse effects of Vioxx on lipid peroxidation…We have now demonstrated a pharmacologic approach to block the pro-oxidant effects of Vioxx using a high lipophilic chain-breaking antioxidant, Astaxanthin" (Mason, et al, 2006).

The work that is being done on Cardax, the unique injectable delivery system for Astaxanthin, shows tremendous potential, but people who would like to experience Astaxanthin's cardioprotective properties don't have to wait for this to become an approved prescription drug. The medical research to date clearly demonstrates that Natural Astaxanthin, already available as a low cost dietary supplement in most countries, should have cardiovascular benefits as well.

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