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Life Extension Update Exclusive

EPA increases adiponectin in animals and humans

The September, 2007 issue of the American Heart Association journal *Arteriosclerosis, Thrombosis and Vascular Biology* published the finding of researchers in Japan that administration of the omega-3 polyunsaturated fatty acid known as eicosapentaenoic acid (EPA) results in an increase in adiponectin, an adipocytokine found in adipose tissue that reduces inflammation and atherosclerosis in animals and in humans.

Levels of adiponectin have been found to be reduced in obese individuals. By increasing fatty acid oxidation, adiponectin lowers fatty acids and triglycerides, and enhances liver and skeletal muscle insulin sensitivity.

In an experiment with genetically obese mice and mice in which obesity was induced by a high fat diet, four weeks of a diet consisting of 5 percent EPA resulted in an increase in serum adiponectin compared with similar groups of mice that received a control diet. In the genetically obese mice that received EPA, white adipose tissue weight was decreased in several locations compared with the control mice, although body weight gain did not differ.

In adipocytes (fat cells) cultured with macrophages, EPA was shown to reverse the decrease in adiponectin secretion, in part by down regulating tumor necrosis factor-alpha (TNF-alpha) in the macrophages. The authors suggest that "EPA reversed the coculture-induced decrease in adiponectin secretion at least in part through the reduction of the inflammatory changes induced by the interaction between adipocytes and macrophages."

In obese humans who received 1.8 grams EPA for three months, plasma triglycerides decreased and adiponectin increased while remaining relatively unchanged in the group that did not receive the fatty acid. Multivariate analysis of the data confirmed that EPA was the only independent determinant of adiponectin levels.

"This study demonstrates that EPA increases adiponectin secretion in rodent models of obesity and human obese subjects, possibly through the improvement of the inflammatory changes in obese adipose tissue. Because EPA has reduced the risk of major coronary events in a large-scale, prospective, randomized clinical trial, this study provides important insight into its therapeutic implication in obesity-related metabolic sequelae," the authors conclude.

Health Concern

Inflammation

Aging results in an increase of inflammatory cytokines (destructive cell-signaling chemicals) that contribute to the progression of many degenerative diseases (Van der Meide et al. 1996; Licinio et al. 1999). Rheumatoid arthritis is a classic autoimmune

disorder in which excess levels of cytokines such as tumor necrosis factor-alpha (TNF-a), interleukin-6 (IL-6), interleukin 1b [IL-1 (b)], and/or interleukin-8 (IL-8) are known to cause or contribute to the inflammatory syndrome (Deon et al. 2001).

Chronic inflammation is also involved in diseases as diverse as atherosclerosis, cancer, heart valve dysfunction, obesity, diabetes, congestive heart failure, digestive system diseases, and Alzheimer's disease (Brouqui et al. 1994; Devaux et al. 1997; De Keyser et al. 1998). In aged people with multiple degenerative diseases, the inflammatory marker, C-reactive protein, is often sharply elevated, indicating the presence of an underlying inflammatory disorder (Invitti 2002; Lee et al. 2002; Santoro et al. 2002; Sitzer et al. 2002). When a cytokine blood profile is conducted on people in a weakened condition, an excess level of one or more of the inflammatory cytokines, e.g., TNF-a, IL-6, IL-1(b), or IL-8, is usually found (Santoro et al. 2002).

Scientists have identified dietary supplements and prescription drugs that can reduce levels of the pro-inflammatory cytokines. The docosahexaenoic acid (DHA) fraction of fish oil is the best documented supplement to suppress TNF-a, IL-6, IL-1(b), and IL-8 (Jeyarajah et al. 1999; James et al. 2000; Watanabe et al. 2000; Yano et al. 2000). A study on healthy humans and those with rheumatoid disease shows that fish oil suppresses these dangerous cytokines by up to 90% (James et al. 2000).

<http://www.lef.org/protocols/prtcl-146.shtml>

Featured Products

Super Omega-3 EPA/DHA with Sesame Lignans & Olive Fruit Extract

Studies associate the Mediterranean diet, rich in omega-3 fatty acids, olive oil, and antioxidant-rich fruits, vegetables, and herbs, with lowered cardiovascular risk and increased life span. Other studies support omega-3's importance cardiovascular health. In fact, the FDA states that supportive but not conclusive research shows that consumption of EPA and DHA omega-3 fatty acids may reduce the risk of coronary heart disease.

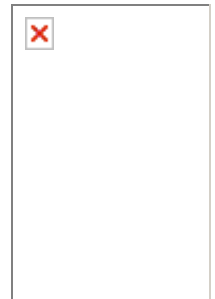
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Dayna Dye
Editor, Life Extension Update
ddy@lifeextension.com
954 766 8433 extension 7716
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