

Fish Oil's Benefits: Reduction of Inflammation

By Jenifer Goodwin

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FRIDAY, Sept. 3 (HealthDay News) -- Feeding obese mice omega-3 fatty acids reduced inflammation that can lead to diabetes, a new study finds.

Fish oil supplements that contain high levels of omega-3 fatty acids are one of the most popular dietary supplements in the United States. While omega-3 fatty acids are widely believed to be beneficial, exactly how they work hasn't been well understood, said study co-author Saswata Talukdar, a post-doctoral fellow at University of California, San Diego.

By studying fat tissue in the mice consuming fish oil, researchers found omega-3 fatty acids seem to act on a particular receptor on cells, GPR120, which, when activated, blocks inflammatory processes.

Chronic inflammation can lead to insulin resistance, a precursor to diabetes. Therefore, "if we can fix the inflammation part, it's possible that we could prevent insulin resistance or even ameliorate diabetes," Talukdar explained. The study was published in the Sept. 3 issue of the journal *Cell*.

Fat tissue contains macrophages, immune system cells that gobble up bacteria, clear out cellular debris and help rid the body of infection. But macrophages found in fat can also have a downside. When macrophages "go rogue," Talukdar said, they produce cytokines and other pro-inflammatory proteins.

A build up of cytokines can result in a "signaling cascade," that eventually leads to low-grade, chronic inflammation and insulin resistance, Talukdar said. In people with insulin resistance, cells are unable to properly utilize insulin, which regulates blood sugar levels. That can lead to type 2 diabetes, which is often linked to obesity.

While studying fat tissue, researchers found that omega-3 fatty acids, especially docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), acted on the specific receptor, GPR120 (for G protein-coupled receptor), found on the surface of macrophages.

The GPR120 receptor is found only on pro-inflammatory macrophages in mature fat cells, according to the study. Exposure to omega-3 fatty acids activates the receptor, which reduces the runaway pro-inflammatory cascade.

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When researchers fed obese mice omega-3 fatty acids, inflammation subsided and insulin sensitivity improved. Blood glucose levels also dropped significantly, Talukdar said.

But in obese mice that had their GPR120 receptor "knocked out" through genetic modification, omega-3 fatty acids had no effect -- thus underscoring the researchers' findings. "Prior to this point, people have always suspected omega-3s are beneficial. That's why people have been taking them," Talukdar said. "What we decided to ask was why omega-3 fatty acids can be anti-inflammatory. This shows when you give omega-3 fatty acids to an inflamed model, it might help battle insulin resistance."

This study focused on diabetes, but omega-3 fatty acids may also help with other diseases in which inflammation plays a role, including cancer and cardiovascular disease, researchers said.

The question that may first come to consumers' minds is: Should I be taking fish oil supplements? **YES!**

Experts note that a positive (or negative) finding in animal research doesn't guarantee the same result in people. Mice are often used in animal experiments because of their remarkable genetic similarity to humans, they say, but the majority of mice and other animal research fails to produce rewards for humans.

Dr. Jacob Warman, chief of endocrinology at The Brooklyn Hospital Center, called the results "impressive," but he said subsequent studies in people are needed.

Still, there's really no downside to taking fish oil -- and lots of people already do, Warman said.

Fish oil supplements are available over the counter, as well as by prescription. Doctors can also prescribe the drug Lovaza, made from fish oil, to help lower triglycerides in those with very high levels, Warman said.

However, to prevent diabetes and many other chronic diseases, your best bet is still to lose weight if you're obese, exercise and eat a healthy diet, Warman said.

"But patients with a history of diabetes in the family or patients who have metabolic syndrome, including obesity, high triglycerides, elevated blood pressure, elevated uric acid and low HDL levels," might want to try fish oil supplements, Warman said. "There is no downside."