

Omega-3 eyed for retina protection

25/06/2007 - **Omega-3 fatty acids may protect our eyes against the development and progression of retinopathy, a deterioration of the retina, is results from a mice study can be translated to humans.**

The study adds further support for increasing the ratio of [omega-3](#) to [omega-6](#) fatty acids with the finding that omega-6 fatty acid consumption is associated with an increased risk of [retinopathy](#).

Retinopathy, said to affect about four million diabetic patients and about 40,000 premature infants in the US alone, is a two-step disease that begins with a loss of blood vessels in the retina. As a result, the retina becomes oxygen-starved and reacts by spurring new vessel growth. The new vessels grow abnormally however and are malformed, leaky and over-abundant.

In the end stage of the disease, the abnormal vessels pull the retina away from its supporting layer, and this retinal detachment ultimately causes blindness.

Lead authors from Harvard Medical School and the National Eye Institute report that increased omega-3 and decreased omega-6 in the diet reduce the area of vessel loss that ultimately causes the growth of the abnormal vessels and blindness.

The researchers studied retinopathy in a mouse model, feeding mice diets rich in omega-3 fatty acids or omega-6 fatty acids. Moreover, the mice were genetically altered with a gene which mammals normally lack that converts omega-6 into omega-3 fatty acids.

Mice on the omega-3 diet, rich in DHA (docosahexaenoic acid) and its precursor EPA (eicosapentaenoic acid), were found to have 40 to 50 per cent less initial vessel loss in the retina than the omega-6-fed mice. As a result, the omega-3 group had a 40 to 50 per cent decrease in pathological vessel growth.

"Our studies suggest that after initial loss, vessels re-grew more quickly and efficiently in the omega-3-fed mice," said researchers. *"This increased the oxygen supply to retinal tissue, resulting in a dampening of the inflammatory 'alarm' signals that lead to pathologic vessel growth."*

The mechanism behind the apparent effects of omega-3 was proposed to be the suppression a type of inflammatory protein called tumour necrosis factor alpha (TNF-alpha). TNF-alpha is found in one type of cell, called microglia, which can be closely associated with retinal blood vessels.

Indeed, omega-3-fed mice had increased production of the anti-inflammatory

compounds neuroprotectinD1, resolvinD1 and resolvinE1 in their retinas. These compounds, derived from omega-3 fatty acids, also potentially protected against pathological vessel growth. No detection of these compounds was reported in the retinas of mice fed the omega-6 diet.

"Our findings represent new evidence suggesting the possibility that omega-3 fatty acids act as protective factors in diseases that affect retinal blood vessels," said researchers. "This is a major conceptual advance in the effort to identify modifiable factors that may influence inflammatory processes implicated in the development of common sight-threatening retinal diseases."

Researchers said: *"If clinical trials find that supplementing with omega-3 fatty acids is as effective in protecting humans against retinal disease as demonstrated by the findings of this study, this cost effective intervention could benefit millions of people."*

A clinical trial at Children's Hospital Boston is set to test the effects of omega-3 supplementation in premature babies, who are at risk for vision loss.

Commenting on the results, Paul Sieving, who is director of the NEI and was not involved in this study, said: *"This study explores the potential benefit of dietary omega-3 fatty acids in protecting against the development and progression of retinal disease. The study gives us a better understanding of the biological processes that lead to retinopathy and how to intervene to prevent or slow disease."*

The study was a collaborative effort by researchers at Harvard Medical School, Brigham and Women's Hospital, Massachusetts General Hospital, the University of Goteborg in Sweden, and the National Eye Institute (NEI) and National Institute on Alcohol Abuse and Alcoholism (NIAAA) of the National Institutes of Health (NIH).