Omega-3 may reduce type-1 diabetes

26/09/2007 - **An increased intake of omega-3 fatty acids from marine sources may reduce of children at risk of type-1 diabetes from developing the disease, suggests new research.**

The study looked at the incidence of the disease among 1770 children at high risk of developing type-1 diabetes, with increased omega-3 intake associated with a 55 per cent reduction in risk.

"Our study suggests that higher consumption of total omega-3 fatty acids, which was reported on the FFQ, is associated with a lower risk of islet autoimmunity (IA) in children at increased genetic risk of type 1 diabetes," wrote researchers.

"This association is further substantiated by the observation that a higher proportion of omega-3 fatty acids in the erythrocyte membranes is associated with a decreased risk of IA in a subset of this same population," they added.

Type-1 diabetes occurs when people are not able to produce any insulin after the cells in the pancreas have been damaged, thought to be an autoimmune response.

"Type 1 diabetes mellitus is an autoimmune disease that is characterized by the destruction of insulin-producing beta cells in the pancreatic islets. Although it is not yet known what initiates the autoimmune process, it is likely that both genetic background and environmental factors contribute to the disease process," explained the authors.

In order to investigate the potential role of dietary factors in the development of type-1 diabetes, researchers examined whether consumption of omega-3 and omega-6 fatty acids was associated with the development of pancreatic islet autoimmunity (IA).

Dietary intakes were evaluated using a 111-item food frequency questionnaire (FFQ) completed annually by the children's mothers. The children were recruited at age two and followed for an average of 6.2 years. Children were identified as having a high risk of type-1 diabetes by either possessing a high diabetes risk HLA (human leukocyte antigen) genotype or having a sibling or parent with type 1 diabetes.

The researchers also conducted a case-cohort study with a subset of 244 children in order to investigate the risk of IA related to the levels of polyunsaturated fatty acids in red blood cell (erythrocyte) membranes.

For the whole study population, the researchers document 58 positive cases of IA during the follow-up period, and after adjusting for confounding factors including HLA genotype, family history of type-1 diabetes, caloric intake, and total omega-6 fatty acid intake, found that total omega-3 fatty acid intake was inversely associated with 55 per cent reduction in IA risk

In the case-cohort study, omega-3 fatty acid content of erythrocyte membranes was associated with a 37 per cent decreased risk of IA.

Levels of the three marine omega-3 fatty acids eicosapentaenoic acid (EPA, 20:5n-3), docosahexaenoic acid (DHA, 22:6n-3), and docosapentaenoic acid (DPA, 22:5n-3) were combined with the plant omega-3 alpha-linolenic acid (ALA) to estimate the total omega-3 fatty acid intake.

While no direct mechanistic study was performed by Norris and coworkers, they do suggest that the benefits of the omega-3 fatty acids may be due to their anti-inflammatory properties, and their ability to reduce oxidative stress.

"Overall, our data suggest that ingestion of omega-3 fatty acids throughout childhood may decrease the risk of IA," wrote the researchers.

They noted that a newly established clinical trial, called "The Nutritional Intervention for the Prevention of Type 1 Diabetes," is testing if dietary supplementation with anti-inflammatory doses of DHA during pregnancy and infancy could inhibit early islet inflammatory events key to the development of type-1 diabetes.

"If this trial confirms this hypothesis, dietary supplementation with omega-3 fatty acids could become a mainstay for early intervention to safely prevent the development of type 1 diabetes," concluded researchers.

Commenting independently on the research, Cathy Moulton care advisor at leading charity Diabetes UK, said: *"This is an interesting new study. Diabetes UK recommends that people follow a healthy, balanced diet that includes portions of oily fish, which are naturally rich in a variety of fatty acids and vitamin D, rather than taking additional supplements.*

"More research needs to be done to find out how beneficial fish oil can be in reducing the risk of developing type-1 diabetes."