

The effects of dietary eicosapentaenoic acid on insulin sensitivity, glucose tolerance and osmotic fragility of erythrocyte membrane of young rat.

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To investigate the effects of dietary eicosapentaenoic acids on insulin sensitivity and glucose tolerance, Sprague Dawley male rats(4wks old) were divided into 6 groups and fed a 10 weight % fat diet containing EPA-concentrated oil(EPA, $\omega 3$), perilla oil(P O, $\omega 3$), fish oil(FO), corn oil(CO, $\omega 6$) or beef tallow(BT, SFA) as fat source for 4 weeks. Cornstarch diet(CS) was used as control group. EPA, PO and CO diets provided similar percentage(about 60%) of the major class of fatty acids. After 4 weeks feeding, Insulin-stimulated lipogenesis in epididymal fat tissue, oral glucose tolerance, and hemolysis extent in various concentrations of hypotonic solution were measured for the estimation of insulin sensitivity, control of blood glucose and osmotic fragility of erythrocyte membrane respectively.

EPA feeding remarkably increased insulin-stimulated lipogenesis in epididymal fat tissue, compared to any other $\omega 3$ or $\omega 6$ group. The effect of FO feeding did not show any difference from that of BT.

Dietary $\omega 3$ fatty acid(EPA and PO) improved erythrocyte fragility compared to CO ($\omega 6$) or BT(SFA). A close negative correlation was noticed between insulin-stimulated lipogenesis in adipose tissue and osmotic fragility of erythrocyte membrane. Blood glucose response on oral glucose tolerance test, was not affected by different dietary fats, and was not correlated with insulin sensitivity, either.

Our trial suggests that marine omega 3 fatty acid(EPA) feeding seems to improve both of insulin sensitivity and osmotic fragility of erythrocyte membrane through the change of membrane fatty acid composition.