Effect of Fish Oil on Circulating Adiponectin: A Systematic Review and Meta-Analysis of Randomized Controlled Trials.

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Abstract

Context: **Seafood long-chain polyunsaturated omega-3 fatty acids (n-3 PUFAs) improve insulin sensitivity in animal experiments, but findings remain inconsistent in humans. Adiponectin is a robust marker for insulin sensitivity and adipocyte function**. Whether n-3 PUFAs affect adiponectin in humans is unknown.Objective: Following Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines, **the objective of the study was to perform a systematic review and meta-analysis of randomized, placebo-controlled clinical trials (RCTs) to determine the effect of n-3 PUFA consumption on circulating adiponectin in humans.**Data Sources:MEDLINE, EMBASE, CABI (CAB abstracts), Cochrane Central Registry of Controlled Trials, ClinicalTrials.gov, SIGLE, and Faculty of 1000 were searched through to June 2012, supplemented with author contact and reference list searches.Study Selection:RCTs of either fish oil supplementation or isocaloric fish meal feeding that evaluated adiponectin as an outcome were selected for the study. Data Extraction: Two investigators independently extracted the data. Effect estimates were pooled using inverse-variance weighted, random-effects meta-analysis. Heterogeneity was assessed by the $I2$ and Q statistic. Prespecified sources of heterogeneity were investigated by meta-regression. Publication bias was assessed using funnel plots and Egger's test.Data Synthesis:Of 110 studies, 14 RCTs met inclusion criteria. Fourteen trial arms evaluated fish oil (fish oil, n = 682; placebo, n = 641). **Fish oil increased adiponectin by 0.37 μg/mL** [95% confidence interval (CI) 0.07; 0.67, P = .02]. Although effects in 11 of 14 trials were 0 or greater, statistical heterogeneity was evident ($I2$ = 72.9%), unexplained by n-3 PUFA dose or duration, study quality score, study location, or baseline body mass index (meta-regression P > .05 each). The funnel plot was asymmetric in favor of smaller trials with greater effects (Egger's P = .11); the fill-and-trim method suggested a theoretical pooled effect of 0.18 μg/mL (95% CI -0.15; +0.52, P = .28). Only 2 trial arms evaluated fish feeding (n = 136 intervention and 68 control subjects), for which the pooled effect on adiponectin was not statistically significant (-0.01μg/mL, 95% CI -0.65; 0.64, P = 0.99), although CIs were broad due to the small number of subjects.Conclusions: **In placebo-controlled RCTs, fish oil moderately increases circulating adiponectin, although with unexplained heterogeneity as well as potential publication bias. These findings provide no evidence for harm and support possible benefits of n-3 PUFA consumption on insulin sensitivity and adipocyte function.**

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