

Targeting n-3 Polyunsaturated Fatty Acids in Non-Alcoholic Fatty Liver Disease

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Abstract

Background: Non-Alcoholic Fatty Liver Disease (NAFLD) is characterized by abnormal hepatic accumulation of triacylglycerides in the absence of alcohol consumption, in association with Oxidative Stress (OS), a pro-inflammatory state and Insulin Resistance (IR), which are attenuated by n-3 long-chain polyunsaturated Fatty Acids (FAs) C20-C22 (LCPUFAs) supplementation. Main causes of NAFLD comprise high caloric intake and a sedentary lifestyle, with high intakes of saturated FAs.

Methods: The review includes several searches considering the effects of n-3 LCPUFAs in NAFLD in vivo and in vitro models, using the PubMed database from the National Library of Medicine-National Institutes of Health.

Result: The LCPUFAs eicosapentaenoic acid (C20:5 n-3, EPA) and docosahexaenoic acid (C22:6 n-3, DHA) have a positive effect in diminishing liver steatosis, OS, and the levels of aspartate aminotransferase, alanine aminotransferase and pro-inflammatory cytokines, with improvement of insulin sensitivity and adiponectin levels. The molecular pathways described for n-3 LCPUFAs in cellular and animal models and humans include peroxisome proliferator-activated receptor-alpha activation favouring FA oxidation, diminution of lipogenesis due to sterol responsive element binding protein-1c downregulation and inflammation resolution. Besides, nuclear factor erythroid-2-related factor-2 activation is elicited by n-3 LCPUFA-derived oxidation products producing direct and indirect antioxidant responses, with concomitant anti-fibrogenic action.

Conclusion: The discussed effects of n-3 LCPUFA supplementation support its use in NAFLD, although having a limited value in NASH, a contention that may involve n-3 LCPUFA

oxygenated derivatives. Clinical trials establishing optimal dosages, intervention times, type of patients and possible synergies with other natural products are needed in future studies.

Palabras clave

Palabras clave de autor: [Liver steatosis](#); [n-3 polyunsaturated fatty acids](#); [alpha-linolenic acid](#); [eicosapentaenoic acid](#); [docosahexaenoic acid](#); [anti-lipogenic mechanism](#)

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