

# Abstract

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## Why do omega-3 fatty acids lower serum triglycerides?

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**PURPOSE OF REVIEW:** Fish oils rich in n-3 fatty acids reduce serum triglyceride levels. This well known effect has been shown to be caused by decreased very low-density lipoprotein triglyceride secretion rates in kinetic studies in humans. Animal studies have explored the biochemical mechanisms underlying this effect. Triglyceride synthesis could be reduced by n-3 fatty acids in three general ways: reduced substrate (i.e. fatty acids) availability, which could be secondary to increase in beta-oxidation, decreased free fatty acids delivery to the liver, decreased hepatic fatty acids synthesis; increased phospholipid synthesis; or decreased activity of triglyceride-synthesizing enzymes (diacylglycerol acyltransferase or phosphatidic acid phosphohydrolase).

**RECENT FINDINGS:** Rarely were experimental conditions used in rat studies physiologically relevant to the human situation in which 1.2% energy as n-3 fatty acids lowers serum triglyceride levels. Nevertheless, the most consistent effect of n-3 fatty acids feeding in rats is to decrease lipogenesis. Increased beta-oxidation was frequently, but not consistently, reported with similar numbers of studies reporting increased mitochondrial compared with peroxisomal oxidation. Inhibition of triglyceride-synthesizing enzymes was only occasionally noted.

**SUMMARY:** As the vast majority of studies fed unphysiologically high doses of n-3 fatty acids, these findings in rats must be considered tentative, and the mechanism by which n-3 fatty acids reduce triglyceride levels in humans remains speculative.

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