

Omega-3 Fatty Acids: Health Benefits and Dietary Recommendations

Omega-3 fatty acids have received a great amount of research attention in the past decade as a nutritional food supplement because of their many demonstrated and putative benefits for human health.

- The content of omega-3 fatty acids in meats, milk, and plant-derived foods can be increased by selective breeding and manufacturing procedures.
- A plethora of clinical and epidemiological evidence relates to the beneficial effects of omega-3 fatty acids, as in fatty fish, and is especially strong in neurocognitive disease.
- Growing evidence is emerging that omega-3 fatty acids have immunomodulatory effects and thus may be useful in treating inflammatory conditions such as rheumatoid arthritis, Crohn's disease, ulcerative colitis, psoriasis, asthma, lupus, and cystic fibrosis.
- Because of the great interest in health benefits of omega-3 fatty acids, agricultural and manufacturing practices are becoming available to increase concentrations of these nutrients in common animal- and plant-derived foods.

Omega-3 fatty acids are among the most studied compounds in biomedicine, from molecular biology and human genetics to food production.

- Omega-3 fatty acids are relevant to humans throughout the life cycle.
- Humans are sensitive to omega-3 fatty acid deficiency starting in fetal life.
- Scores of studies show that animals deprived of omega-3 fatty acids through gestation and lactation exhibit abnormalities in neurotransmitter levels, catecholamines, and signaling compounds compared to animals with a supply of omega-3 fatty acids.



Evidence for a role of long-chain omega-3 fatty acids in human health originates in preclinical and clinical studies showing composition of tissue or specific functions such as clotting or inflammatory function.

- The protective effect of omega-3 fatty acids toward cardiovascular disease development most likely relates to beneficial modification of a broad range of risk factors.
- Anti-inflammatory actions of omega-3 fatty acids may be important in preventing or slowing some steps in tumor initiation, particularly in some cancers such as colorectal cancer.
- Of the fatty acids studied, omega-3 fatty acids seem to possess the most potent effects on the immune system and its inflammatory component.
- Omega-3 fatty acids have important roles in the brain beyond infancy and indeed may be important for brain function throughout the life course.

The most important change in foods that will enhance omega-3 status is reduction in linoleic acid in foods and replacement with oleic acid, as is done with most high-oleic oils.

- Enhancing the omega-3 fatty acid content of several common commodity oils has become a research focus that could be applicable for human and livestock applications.
- Increasing the omega-3 fatty acid content of some animal products can be achieved by the addition of high-alpha-linolenic acid oil seeds to the diet.
- Currently, the most success of enhancing omega-3 fatty acid via dietary means has been achieved in poultry meat and eggs.
- The success of enhancing omega-3 fatty acid content via dietary means in livestock has been less successful than in poultry.
- With an increased demand for omega-3 fatty acids, wild-caught marine-based sources are considered unsustainable; therefore, efficient alternatives that could provide omega-3 fatty acids have become an industry priority.

The area of labeling and claims related to omega-3 fatty acids is arguably even more complex than the potential health benefits and the science underlying those benefits.

- Nutrient content claims are label claims that, directly or by implication, characterize the level of a nutrient in a food.
- A dietary supplement using a structure/function claim (one that describes the role of a nutrient or dietary ingredient in affecting normal structure or function in humans) must also carry the disclaimer that the Food and Drug Administration has not evaluated the claim, and that the product is not intended to diagnose, treat, cure, or prevent any disease.
- All labels for meat and poultry products that include a statement about the level of omega-3 fatty acids must be provided to the Food Safety and Inspection Service for approval before use.

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