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Editorial

A Quick Overview of Omega-3 Fatty Acid

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EDITORIAL

Omega-3 fatty acids are polyunsaturated fatty acids (PUFAs) with a double bond three atoms away from the terminal methyl group in their chemical structure. They are also known as Omega-3 oils, 3 fatty acids, or n3 fatty acids. They are extensively distributed in nature and have a major function in human food and physiology as essential elements of animal lipid metabolism. alpha-linolenic acid (ALA), found in plant oils, and eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA), both found in the oils of marine fish, are the three forms of omega-3 fatty acids important in human physiology. Omega-3 fatty acids are mostly found in marine algae and phytoplankton (which also accumulate in fish). Walnuts, edible seeds, and flaxseeds are common sources of ALA-rich plant oils, whereas fish and fish oils are good sources of EPA and DHA.

Mammals can't make the important omega-3 fatty acid ALA, thus they have to get it from their diet. When ALA is accessible, they can use it to make EPA and DHA by adding more double bonds to its carbon chain (desaturation) and lengthening it (elongation). Specifically, ALA (18 carbons and 3 double bonds) is converted to EPA (20 carbons and 5 double bonds) and subsequently to DHA (22 carbons and 6 double bonds). The ability to convert ALA into longer-chain omega-3 fatty acids may be decreased as people age. Unsaturated fatty acids in foods exposed to air are susceptible to oxidation and rancidity. Dietary supplementation with omega-3 fatty acids did not appear to affect the risk of cancer or heart disease, according to a 2007 study.

Furthermore, studies on fish oil supplements have failed to back up claims that they can reduce heart attacks, strokes, or other vascular disease outcomes. However, a study published in 2021 found that just a 1% rise in Omega-3 acids in the blood resulted in a five-year improvement in lifespan. Organic nomenclature gave rise to the phrases –3 ("omega–3") fatty acid and n–3 fatty acid. The placement of the double bond closest to the methyl end of the molecule in the carbon chain is one method in which an unsaturated fatty acid is identified.

In general, the number n (or) refers to the locant of the molecule's methyl end, while the number n–x (or –x) refers to the locant of the molecule's closest double bond. Thus, starting at the methyl end of the fatty acid chain, there is a double bond at the carbon numbered 3 in omega–3 fatty acids. Because most chemical changes occur at the carboxyl end of the molecule, whereas the methyl group and its closest double bond remain unchanged in most chemical or enzymatic reactions, this classification method is beneficial. The dash in the formulas n–x or –x is essentially a minus symbol, albeit it is seldom read that such. In addition, the sign n (or) denotes the methyl end locant, which is counted from the carboxyl end of the fatty acid carbon chain. For example, in an omega-3 fatty acid with 18 carbon atoms (see picture), n (or) denotes the number 18, and n–3 (or –3) represents the subtraction 18–3=15, where 15 is the locant of the double bond closest to the methyl end, counting from the carboxyl end of the chain.

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