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Health Benefits of Omega-3 Fatty Acids

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Perspective

Omega-3 fatty acids (n-3 FAs) are a heterogeneous category of fatty acids with a double bond between the third and fourth carbon atoms from the methyl end (from the 1 carbon atom). Monounsaturated fatty acids (MUFAs; one double bond in the carbon chain) and polyunsaturated fatty acids (PUFAs) are the two types of fatty acids that we differentiate (PUFAs; more than one double bond in carbon chain). Conjugated fatty acids (CFAs) are PUFAs that have at least one pair of conjugated double bonds, which are not separated by methylene bridges but by a single bond. We also discuss hydroxy fatty acids (HFAs), oxo fatty acids (keto fatty acids), and hydroperoxy fatty acids as examples of modified omega-3 fatty acids. We identify saturated and unsaturated fatty acids among the hydroxy fatty acids, which have a long unbranched carbon chain with a carboxyl group at one end and one or more hydroxy groups. Oxo or keto fatty acids have a carboxy group as well as a ketonic or aldehydic group in the molecule. Hydroperoxy fatty acids, on the other hand, have at least one hydroperoxy group (-OOH). Some publications conflate the meanings of long-chain (LC) n-3 PUFAs with omega-3 fatty acids, which is deceptive because "omega-3 fatty acids" is a larger phrase.

According to the World Health Organization, worldwide obesity has nearly doubled to over 1.4 billion people in the previous three decades, implying that one-third of Western nations are overweight or obese. Obesity-related illnesses such as type 2 diabetes (T2D), sarcopenic obesity, and cardiovascular disease have increased in tandem with rising obesity rates, making obesity one of the world's biggest healthcare challenges. Being overweight or obese raises your chances of acquiring diabetes by up to 30%. The cost of primary diabetes care in the United Kingdom's National Health Service (NHS) is currently £9.8 billion per year and is predicted to rise (NHS). Skeletal muscle is a key location of glucose elimination, accounting for around 30% of postprandial glucose elimination.

Maintaining the metabolic health of skeletal muscle is consequently critical for glycemic management. Improved skeletal muscle metabolic performance and insulin sensitivity could thus have a significant impact on the obesity-induced development of insulin resistance and diabetes, while also lowering health-care costs and improving quality of life. Skeletal muscle mass maintenance is important not just for metabolic function, but also for physical function because it controls movement. Skeletal muscle accounts for around 40% of total body mass (depending on adiposity levels) and is highly adaptive to environmental changes such as food and physical activity levels.

The loss of muscle mass that comes with growing older is an unavoidable part of the ageing process. Reduced skeletal muscle mass and metabolic performance can be harmful to one's general health and is a crucial factor in the beginning of disease as one gets older. Loss of muscle mass and subsequent physical function puts a person at risk for chronic disease, as well as frailty and a lower quality of life. Skeletal muscle mass declines about 0.2%-0.5% each year after the age of 50 and this loss is increased in a sick state. Furthermore, even a 5% loss in skeletal muscle mass has been linked to an increase in morbidity. If the rate of sarcopenia (age-related loss of muscle mass) can be lowered by 10%, it will save the US $1.1 billion in health-care costs per year. Finding effective therapy for enhancing muscle mass and metabolic function is therefore crucial in clinical practise. Recent research reveals that adjusting the omega-3 polyunsaturated fatty acid (PUFA) content of skeletal muscle can help with muscle function and metabolism. In this review, we will look at the possible therapeutic role and molecular mechanism of action of omega-3 PUFAs in the regulation of skeletal muscle metabolic and physical function, with a focus on marine derived omega-3 PUFAs [1-5].

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