International Journal of Home Science 2021; 7(3): 156-158

International Journal of Home Science

ISSN: 2395-7476
IJHS 2021; 7(3): 156-158

www.homesciencejournal.com
Received: 06-07-2021
Accepted: 10-08-2021

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Role of Omega-3 fatty acid in our body

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Abstract
The human body can make most of the types of fats it needs from other fats or raw materials. That isn't the case for omega-3 fatty acids. These are essential fats—the body can't make them but must get them from food. Foods high in Omega-3 include fish, vegetable oils, nuts (especially walnuts), flax seeds, flaxseed oil, and leafy vegetables.

Keywords: Omega-3, human body, raw materials

Introduction

Omega-3 Fatty Acids

Omega-3 are polyunsaturated fatty acids (PUFAs) with more than one carbon-carbon double bond in their backbone. They are polyunsaturated because their chain comprises several double bonds. One way in which a fatty acid is named is determined by the location of the first double bond, counted from the tail, that is, the omega (ω-) or the n- end. Thus, in omega-3 fatty acids, the first double bond is between the third and fourth carbon atoms from the tail end. These essential nutrients have to be introduced through diet. They can be found in fish such as sardines, salmon, tuna, halibut, and other seafood such as algae and krill (Ulven *et al*., 2011) [3] and in lake trout, in some plants, and nut oils. These PUFAs, which are stored in membrane phospholipids, are responsible for numerous cellular functions including the maintenance of the cell membrane structure, fluidity, signaling, and cell-to-cell interaction.

The 3 types of omega-3

There are three main types of omega-3 fatty acids - ALA, DHA, and EPA.

ALA

Alpha-linolenic acid (ALA) is the most common omega-3 fatty acid in your diet (Hyung *et al*., 2014) [13]. Your body mainly uses it for energy, but it can also be converted into the biologically active forms of omega-3, EPA and DHA.However, this conversion process is inefficient. Only a small percentage of ALA is converted into the active forms**.** ALA is found in foods like flax seeds, flaxseed oil, canola oil, chia seeds, walnuts, hemp seeds, and soybeans.

EPA

Eicosapentaenoic acid (EPA) is mostly found in animal products, such as fatty fish and fish oil. However, some microalgae also contain EPA. It has several functions in your body. Part of it can be converted into DHA.

DHA

Docosahexaenoic acid (DHA) is the most important omega-3 fatty acid in your body. It's a key structural component of your brain, the retina of your eyes, and numerous other body parts (Philippe *et al*., 2011) [2]. Like EPA, it occurs mainly in animal products like fatty fish and fish oil. Meat, eggs, and dairy from grass-fed animals also tend to contain significant amounts. Vegetarians and vegans often lack DHA and should take microalgae supplements to make sure they get enough of this omega-3.

Effect of omega -3 on health

1) Omega-3s Can Fight Depression and Anxiety

Depression is one of the most common mental disorders in the world. Symptoms include sadness, lethargy and a general loss of interest in life (Conklin *et al.*, 2015) [4]. Anxiety, also a common disorder, is characterized by constant worry and nervousness. Interestingly, studies indicate that people who consume omega-3s regularly are less likely to be depressed.

2) Omega-3s Can Improve Eye Health

DHA, a type of omega-3, is a major structural component of the retina of your eye**.** When you don't get enough DHA, vision problems may arise. Interestingly, getting enough omega-3 is linked to a reduced risk of macular degeneration, one of the world's leading causes of permanent eye damage and blindness.

3) Omega-3s Can Promote Brain Health During Pregnancy and Early Life

Omega-3s are crucial for brain growth and development in infants. DHA accounts for 40% of the polyunsaturated fatty acids in your brain and 60% in the retina of your eye**.** Therefore, it's no surprise that infants fed a DHA-fortified formula have better eyesight than infants fed a formula without it. Getting enough omega-3s during pregnancy is associated with numerous benefits for your child, including (Smith *et al*., 2003) [11].

- Higher intelligence
- Better communication and social skills
- Fewer behavioral problems
- Decreased risk of developmental delay
- Decreased risk of ADHD, autism and cerebral palsy

4) Omega-3s Can Improve Risk Factors for Heart Disease

Heart attacks and strokes are the world's leading causes of death. Decades ago, researchers observed that fish-eating communities had very low rates of these diseases. This was later linked to omega-3 consumption. Since then, omega-3 fatty acids have been tied to numerous benefits for heart health**.** These benefits address:

Triglycerides

Omega-3s can cause a major reduction in triglycerides, usually in the range of 15–30%.

Blood pressure

Omega-3s can reduce blood pressure levels in people with high blood pressure.

Plant Sources of Omega-3 Fatty Acids

Omega-3 fatty acids are important fats that provide many health benefits.

Chia Seeds

Chia seeds are known for their many health benefits, bringing a hefty dose of fiber and protein with each serving. They're also a great plant-based source of ALA omega-3 fatty acids. One study found that consuming a diet with chia seeds, nopal, soy protein and oats decreased blood triglycerides, glucose intolerance and inflammatory markers (Martha *et al*., 2012) [1]. The current daily recommended intake of ALA for adults over age 19 is 1,100 mg for women and 1,600 mg for men. Boost your chia seed intake by whipping up a nutritious chia pudding or sprinkle chia seeds on top of salads, yogurts or smoothies.

Brussels Sprouts

In addition to their high content of vitamin K, vitamin C and fiber, Brussels sprouts are an excellent source of omega-3 fatty acids. Because cruciferous vegetables like Brussels sprouts are so rich in nutrients and omega-3 fatty acids, they have been linked to many health benefits. In fact, one study found that an increased intake of cruciferous vegetables is associated with a 16% lower risk of heart disease. Whether they're roasted, steamed, blanched or stir-fried, Brussels sprouts make a healthy and delicious accompaniment to any meal.

Hemp Seed

In addition to protein, magnesium, iron and zinc, hemp seeds are comprised of about 30% oil and contain a good amount of omega-3s**.**Animal studies have found that the omega-3s found in hemp seeds could benefit heart health. They may do this by preventing the formation of blood clots and helping the heart recover after a heart attack.

Walnuts

Walnuts are loaded with healthy fats and ALA omega-3 fatty acids. In fact, walnuts are comprised of about 65% fat by weight. Several animal studies have found that walnuts could help improve brain health due to their omega-3 content. A 2011 animal study found that eating walnuts was associated with improvements in learning and memory.

Flaxseeds

Flaxseeds are nutritional powerhouses, providing a good amount of fiber, protein, magnesium and manganese in each serving. They're also an excellent source of omega-3s.Several studies have demonstrated the heart-healthy benefits of flaxseeds, largely thanks to their omega-3 fatty acid content. Both flaxseeds and flaxseed oil have been shown to reduce cholesterol in multiple studies.

Conclusion

Omega-3 fatty acids have many health benefits. The best way to reap them is by eating fatty fish at least twice per week, but if you don't eat fatty fish often, you should consider taking a supplement. However, it's important to make sure your supplement contains enough eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). These are the most useful types of omega-3 fats, and they are found in fatty fish and algae. You can also get omega-3 from seeds and nuts, like flax seeds and walnuts. These foods contain alpha-linolenic acid (ALA), a small part of which can be converted into EPA and DHA in your body.

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