

# The role of omega-3 for improvement of mood, behavior and communication skills in children

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## Introduction

The long chain, polyunsaturated fatty acids (LCPUFAs) are well known for more than 100 years. Nowadays, there is a big emphasis on the use of omega-3 and its role for numerous functions in the body. There are two types of PUFAs, omega-6s, which are found primarily in vegetable oils such as sunflower, corn, flaxseed and canola oils, and omega-3s, specifically DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid), two long-chain PUFAs found primarily in fatty fish, and short-chain ALA (alpha-linolenic acid) that comes primarily from plant-based sources like flax. They are crucial for growing infants and critical for development of the brain and central nervous system. DHA is proven essential to pre- and postnatal brain development, whereas EPA seems more influential on behavior and mood. Both, DHA and EPA generate neuroprotective metabolites (Kidd, 2007).

Adequate dietary availability of DHA and EPA is fundamental to brain function. DHA/EPA are important throughout adulthood, as well as during the brain growth spurts that characterize pre-natal and post natal development (Kidd, 2007).

## Omega-3 acids in childhood brain development

With over 30 000 scientific papers published,

omega-3 fatty acids are the most studied nutrients in the world. Many people around the world does not consume enough EPA and DHA for brain and heart health support (Murrphy et al., 2015). In 2012, the European Commission authorized an Article 13.1 health claim that min 250 mg per day of EPA and DHA contributes to the maintenance of normal function of the heart, and 250 mg DHA per day contributes for the maintenance of normal brain and eye development. Two-thirds of the human brain is made of fat and DHA as primary structural membrane component makes up to 97% in the brain and 93% in the eyes. The fundamental importance of DHA for brain development is beyond dispute (McCann and Ames, 2005).

## *Omega-3 vs. omega-6 fatty acids - understanding the difference*

Our body does not produce omega 3 and/or omega 6; therefore, we should get them throughout food.

Omega 6 is very much present in today's modern diet contrary to omega 3. The ideal ratio of  $\omega$ -3 vs.  $\omega$ -6 is 1:2. Maximum accepted is 1:4. Nowadays, this ratio goes up to 1:20. Omega 6 fatty acids possess proinflammatory activity, while contrary to this, both DHA and EPA, inhibit the formation of leukotrienes and prostaglandins from arachidonic

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acid, and  $\omega$ -6 fatty acid and reduces the generation of cytokines from inflammatory cells (Lee et al., 1985).

*DHA/EPA proper daily intake may give positive results for improvement of mood, behavior and communication skills in children*

Despite the higher concentration of DHA and EPA needed for more effective therapy for this particular impairment, also the ratio between these two structural similar fatty acids is important as they compete in the gut for absorption. Therefore, the recommended ratio for maximum bioavailability is 1.5:1 for EPA/DHA.

## Materials and methods

### Materials

80 children of age from 17 months till 10 years were supplemented with NBL Fish oil (product of NOBEL ILAC -Turkey) for 6 weeks. NBL fish oil is a high-quality purified omega-3 product abundant in EPA and DHA.

### Methods

Participants were divided in two groups regarding the age. Children of age from 1-4 were given 5 mL per day, while children above 4 years 10 mL. The quantity of 10 mL provides 820 mg of omega 3, out of it 390 mg EPA and 260 mg DHA. The younger group received half concentrations of the daily recommended dosage, respectively for DHA and EPA. A team of specialists were enrolled to conduct a careful assessment of the effects of the product on children's mood, behavior and performances of the communication skills (attention, eye contact, focus, social response).

## Results and discussion

What triggered our attention was the positive reaction from both parents and health providers in the association during consuming this omega 3 product. The health professionals practice usage of omega 3 as part of children's treatment for more than 3 years. The omega 3 product had positive influence mainly on the communication skills (short-term possibility for eye contact, managing of the hyperactivity, keeping focus and longer

contraction). We are aware that the 6 week supplementation period is very short for a conclusion, but the noted results deserve a chance for longer and further investigation, especially that this is very sensitive, and more often present condition nowadays.

## Conclusion

There are so many clinical papers that claim the beneficial effects of omega 3, but only few explain the role of concentration of DHA/EPA and their ratio as key factors for positive effects.

Research into omega-3 fatty acids as a possible treatment for mood, behavior and improvement of the communication and social skills is new and interesting area of research that should be seriously taken into consideration.

The conclusions are that higher concentrations of EPA and DHA are necessary. Moreover, consumers should pay attention to the origin of the fish oil, the fish source and the ratio of DHA/EPA for higher efficacy of the treatment. The daily intake of omega 6 vs. omega 3 should be as lower as possible and tending to reach ratio of 2:1.

## References

- Kidd, M.P., 2007. Omega-3 DHA and EPA for cognition, behavior, and mood: Clinical findings and structural functional synergies with cell membrane phospholipids. *Alternative Medicine Review* 12(3), 207-227.
- Lee, T.H., Hoover, R.I., Williams, J.D., Sperling, R.I., Ravalese 3rd, R., Spur, B.V., Robinson, D.R., Corey, E.J., Lewis, R.A., Austen, K.F., 1985. Effect of dietary enrichment with eicosanoic and docosahexanoic acid on *in-vitro* neutrophil and monocyte leucotiene generation and neutrophil function. *N. Engl. J. Med* 312(19), 1217-1224.
- McCann, J.C., Ames, B.N., 2005. Is docosahexanoic acid, an n-3 long-chain polyunsaturated fatty acid, required for development of normal brain function? An overview of evidence from cognitive and behavioral tests in human and animals. *Am. J. Clin. Nutr.* 82(2), 281-295.
- Murphy, R.A., Yu, E.A., Ciappio, E.D., Mehta, S., McBurney, M.I., 2015. Suboptimal plasma long chain n-3 concentrations are common among adults in the United States, NHANES 2003–2004. *Nutrients* 7(12), 10282-10289.