

Omega-3 fatty acids for an optimal brain function

It is a well-known fact that the Japanese and other people living in East Asian countries are much healthier than most Central Europeans. This is mostly due to their high consumption of fish and other sea foods, which are rich sources of omega-3 fatty acids. As is the case with vitamins and minerals, omega-3 fatty acids from fish oil are very important for the human body. An omega-3-rich diet can prevent many of the diseases that are common today. Omega-3 fatty acids have been most researched with regard to their beneficial properties on heart diseases. In addition, research into the positive effects of fish oil as an important 'brain food' has been particularly notable in the fields of attention deficit disorders, schizophrenia and dementia. Below, we will examine all of this in more detail.



Many of the benefits of fish oil have been found to be due to the DHA (docosahexaenoic acid) and EPA (eicosapentaenoic acid) omega-3 fatty acids. These are among the most biologically active – and therefore the most important – omega-3 fatty acids. DHA and EPA are found in most fish oil supplements. DHA is, above all, considered to be the best 'brain fatty acid', needed for the healthy functioning of the mind. It is found in the membranes of the brain cells, where it is vital for the normal development and function of nerve cells. A growing number of studies support this finding and show that, for an optimally functioning brain, omega-3 fatty acids are vitally important throughout life – from the unborn child right through into the senior years. The following is a short overview of various brain disorders and the beneficial effects that dietary omega-3 fatty acids have on them:

Alzheimer's disease

Alzheimer's is a disease of the brain characterized by a decrease in mental agility, affecting personality and orientation. The exact cause of this disease has not yet been properly researched. However, there is a general consensus that harmful proteins (amyloids) – which disrupt the exchange of information between nerve cells – are deposited in the brain, thereby apparently causing some of the typical symptoms of Alzheimer's disease.

The results of various studies indicate that omega-3 fatty acids offer the most promising approach to resolving this issue. Research has shown that most Alzheimer's patients have an omega-3 deficiency. Due to an undersupply of fatty acids, there is a poor blood circulation, causing a lack of oxygen in the brain. As a result of this oxygen deficiency, certain brain cells produce large amounts of a particular protein, resulting in the blocking of another compound that reduces levels of glutamate. High glutamate levels can lead to the death of certain brain cells and increase the risk of Alzheimer's disease.

Other studies suggest that omega-3 fatty acids protect the brain from oxidative stress, a process whereby free radicals can attack and destroy nerve cells – a typical occurrence in the brains of Alzheimer's patients.

Researchers have come to the conclusion that healthy fatty acids, especially DHA, are highly valuable nutrients with neuro-protective properties that play an important role in the prevention of Alzheimer's disease and other age-related disorders (see <http://www.ncbi.nlm.nih.gov/pubmed/20211757>).

Parkinson's disease

Omega-3 fatty acids have also shown very promising effects in the prevention of Parkinson's disease, a neurological disorder characterized by symptoms such as muscle tremors and stiffness, rigidity, as well as slow movements. These problems are caused by the death of particular nerve cells which are important for movement control and dopamine production. Omega-3 fatty acids appear to protect against the loss of nerve cells and dopamine.

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By injecting the neuro-toxin MPTP, Canadian researchers were able to reduce the release of dopamine in mice. In this way, it was possible to artificially cause Parkinson's disease in the mice. The animals who had previously received omega-3-rich foods had no symptoms of Parkinson's disease, with their nerve cells and dopamine production remaining unaffected. However, 31 per cent of dopamine-producing nerve cells were destroyed in the control group. The scientists attribute this effect mostly to the fact that the DHA appeared to have replaced omega-6 fatty acids in the brains of the mice. The increased uptake of DHA in the brain seems therefore to play a particularly important role in the prevention of Parkinson's disease (<http://www.ncbi.nlm.nih.gov/pubmed/18032633>).

Depression

The fact that depression is rare in countries where there is a high consumption of fish demonstrates the positive effects that omega-3 fatty acids have on mental disorders. Research confirms that there is a low level of omega-3 in the blood plasma of patients with depression.

Such a connection was found not only in an international comparative study, but also in one conducted in Finland. In a study involving over 3,000 Finns, researchers found that their chances of suffering depression were greatly reduced if they regularly consumed fish, as compared to those who never or rarely consumed fish (<http://www.ncbi.nlm.nih.gov/pubmed/11274502>).

Not only is the concentration of omega-3 fatty acids in the blood plasma important, but so also is the ratio of omega-3 to omega-6 fatty acids. A further study could prove that there is a link between the ratio of arachidonic acid (AA, omega-6) to EPA (omega-3) and the severity in symptoms of depression. If there is more AA than EPA in the blood, then the symptoms are more severe (<http://www.ncbi.nlm.nih.gov/pubmed/17991818>).

Degeneration of the brain

The age-related loss of mental abilities is a natural process, and even healthy people are affected by this. It is possible, however, to maintain mental fitness for longer by taking omega-3 fatty acids regularly. Observations of healthy older people have shown that omega-3 fatty acids help stimulate signal conduction in the brain. The cerebral vessels thereby remain flexible and the brain is well-supplied with blood – the basic prerequisite for improving the brain's performance in thinking and attention abilities.

Norwegian researchers examined the eating habits and mental capacity of 2,000 people aged 70 to 74 and discovered that the higher the daily consumption of fish, the better they were able to solve mental tasks. It had already been established in studies that there is a correlation between the frequency of fish consumption and the speed of brain degeneration. According to a study undertaken by the University of Chicago, there was a slower decline in cognitive ability of around 10 per cent in elderly people who ate fish once a week at the age of 65 or more, and a 13 per cent slower decline when they ate two or more meals of fish per week (<http://www.ncbi.nlm.nih.gov/pubmed/16216930>).

Apparently this is related to the fatty acid composition of erythrocyte membranes: a higher proportion of omega-3 fatty acids is associated with a lower risk of cognitive impairment in later life, according to a French study on dietary factors and their influence on age-related brain decline.

The results show that omega-3 fatty acids play not only a valuable and important role in maintaining good health generally, but are also vital for our mental well-being. Just as with vitamins, minerals and other micronutrients, they should therefore be taken regularly – be it in a healthy meal with fish, or in a supplement such as fish oil capsules. In this way, you will remain just as mentally agile in later years as you are now.

(If you call us, please tell us the name of the person who has provided you with this Health letter (see box).