



THE HEALTH SUPPLEMENTS INFORMATION SERVICE REAFFIRMS THE HEALTH BENEFITS BEHIND OMEGA-3 ESSENTIAL FATTY ACIDS

The following e-feature bulletin from The Health Supplements Information Service takes a look at fish oils and omega-3 fatty acids; investigating what they are, how we obtain them from the diet, and what exactly they do in our bodies from infancy through to our golden years.

What are omega-3 fatty acids?

Omega-3 polyunsaturated fatty acids (PUFA) are a group of fatty acids vital for normal development and long-term health. Omega-3s are required across the whole lifecycle, beginning in the womb and continuing through to old age. They are essential for all the cells in the body, particularly those in the brain, retina, nervous system, immune system, and circulation. There are different types omega-3 fatty acids, each with a specific chemical structure, but the key health benefits are thought to come from the very long chain omega-3s, called docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA).

How do we obtain omega-3 fatty acids?

DHA and EPA can be synthesised in our bodies from the essential fatty acid, alpha-linolenic acid (ALA), but the process is very slow and can be inefficient (particularly as we age), and can be inhibited by too many omega-6 fats in the diet (e.g. from vegetable oils). The richest dietary sources of DHA and EPA are oily fish and most experts advise that omega-3 fatty acids are consumed directly from sources such as salmon, trout, mackerel, sardines, fresh tuna and pilchards.

Research shows that two out of three people in the UK - the majority of adults - do not eat the two portions of oily fish a week recommended by the Food Standards Agency, either because it doesn't fit in with their lifestyle or simply because they don't like fish, especially oily fish.^{1,2} The statistics for young people are even worse. Amongst those aged 19 to 24 years old, only 13 per cent of women and 3 per cent of men eat oily fish.³

Only 3 per cent of children and 15 per cent of adults from a low income background report eating oily fish.⁴

As a result, a large proportion of the population is missing out on vital omega-3s for health. Fish oil supplements can provide a valuable way of bridging the nutritional gap for those people whose diets may be lacking in the essential nutrients provided by oily fish, including those whose intakes are erratic.

The two key omega-3 fatty acids – DHA and EPA explained

The two key omega-3 fatty acids – DHA and EPA – play somewhat different but complementary roles within the body. In the brain, for example, DHA has a structural role, while EPA has a functional role. As a structural fatty acid, DHA is important for healthy development from the point of conception through early childhood. DHA is thought to be crucial in development of neural pathways in the brain, and normal development of the retina and immune system. This is why certain products aimed at pregnant women and babies are generally formulated with a high DHA content.

EPA, on the other hand, as part of its functional role, is thought to support normal communication between cells in the brain, making it crucial from birth right through to old age. This means that the balance of omega-3s should include a mix of both EPA and DHA and, if a supplement is to be taken, this should be formulated with a relatively high EPA content. It is important to note that most omega-3 formulations are designed to maximise the incorporation and function of both fatty acids.

Docosahexaenoic Acid (DHA): Structural fatty acid

During the development of the brain, throughout pregnancy and (at least) the first two years of life, structural fatty acids like DHA are particularly important. DHA is an essential part of the building blocks of the brain, nervous system and eyes. In fact, DHA makes up approximately 97% of all omega-3 fatty acids found in the brain, and 93% of omega-3s found in the eyes.^{5,6}

The typical growth-spurt seen in the brains of foetuses in late pregnancy and the first year of life can often lead to fatty acid depletion in mothers and their babies. Supplementing pregnant and breast-feeding women, or their babies, with DHA has been found to benefit infant eye development, sleeping patterns, allergies and

subsequent mental abilities⁷ with improvements in child IQ seen after four years, according to one study.⁸

Functional fatty acids (Eicosapentaenoic Acid - EPA):

Emerging research suggests that the functional omega-3, EPA, is extremely important from birth as it helps in the transmission of messages between cells. After two years of age, the brain and eyes have largely developed and there is then a need to ensure that all of the cells are functioning and communicating effectively.

The high EPA omega-3 formulation used in certain robust clinical studies has been found to benefit cognitive function, e.g. reading, writing and spelling, in children in mainstream education who had learning difficulties (such as DCD and ADHD).⁹

Certain omega-3 supplements aimed at pregnant women and babies are generally formulated with a high DHA content, while those formulated for childhood and adulthood have a relatively higher level of EPA. It is, however, important to note that most omega-3 formulations are designed to maximise the incorporation and function of both fatty acids.

Overall benefits of omega-3 fatty acids

Omega-3 fatty acids are essential to health and are associated with many health benefits.¹⁰ In summary these benefits include:

Heart health

Omega-3 fatty acids are well known for their heart health benefits with a significant body of evidence pointing towards improved vascular and heart health. Large-scale studies have suggested that a higher intake of omega-3s and fish are linked with a lower risk of heart disease and death from heart attacks. Some studies also link high intakes of omega-3s with a reduced risk of stroke. One study found that hospital admissions for cardiovascular (CV) disease were lowest in those people regularly taking omega-3 supplements.¹¹

Evidence suggests that omega-3 can:

- Reduce blood viscosity and inflammation in CV disease patients
- Improve arterial elasticity, with benefits for blood pressure control
- Reduce the risk of dangerous irregular heart rhythms (arrhythmias)
- Reduce levels of triglycerides - blood fats linked with heart disease

- Help to balance cholesterol levels, increasing high density lipoprotein (HDL – the “good” cholesterol”) whilst reducing levels of low density lipoprotein (LDL – the “bad” cholesterol)
- Reduce the risk of potentially harmful blood clots
- Slow the growth rate of arterial plaques (formed from LDL cholesterol)

Sorting fact from fiction: A paper published on the 11th July 2013¹² looking at a possible link between high blood levels of omega-3 fatty acids and prostate cancer in men, Sarah West an independent nutritionist and an expert for the Health Supplements Information Service notes:

“The research was an epidemiological case-cohort study which measured blood levels of omega-3s and merely provides a snapshot of information, rather than the full picture. Furthermore, the research did not analyse the participants’ diet or whether they took omega-3 supplements.

“For instance, we don't know how controlled the trial was. The study would have to account for other risk factors for prostate cancer (including family history, age and race) before it could be considered definitive.

“Whilst the results indicate a possible correlation between prostate cancer and higher omega-3 ratios in the blood, an association found in an epidemiological study **does not** prove causation.

“It is currently not clear whether elevated omega-3s are causing increased prostate cancer, are a consequence of prostate cancer or are simply correlative. **These findings cannot therefore be used to suggest that a high intake of omega-3 fatty acids can cause prostate cancer.** The existing batch of literature is not nearly sufficient to make that statement.

“Other epidemiological studies have come to different conclusions from this trial. One meta-analysis of 12 studies found a significant negative association between high blood levels of the omega-3 PUFA docosapentaenoic acid (DPA) and total prostate cancer risk¹³. A further recent meta-analysis found no association between omega-3 fatty acids and prostate cancer risk¹⁴. Another recent study suggested that high intakes of omega-3 fatty acids actually slowed down the development of prostate cancer tumours¹⁵.

“It is also important to note that **this is not a new study.** The blood level data comes from men participating in

the Selenium and Vitamin E Cancer Prevention Trial (SELECT) which investigated potential ways to reduce the risk of prostate cancer. Initial data from this trial was reported as long ago as 2008, so these are not new findings.

“Moreover, omega-3 supplements are intended for the maintenance of good health, not for disease management.”

“Current Department of Health recommendations are to eat two portions of fish each week, one of which should be oily. Relatively few people in the UK achieve this intake which makes an omega-3 supplement an ideal way of achieving government recommendations.”

Pregnant women

A good omega-3 PUFA intake has been shown to be hugely important for pregnant women, both for their health and that of their unborn child. Omega-3s are known to be essential for normal foetal development. Despite this, dietary data indicate that women of childbearing age in the UK have omega-3 intakes of only 98 to 203 mg per day,¹⁶ less than half the recommended 450mg a day.

Are we getting enough?

The Department of Health (DH) recommends eating two portions of fish a week, one of which should be oily fish (e.g. sardines, mackerel or salmon). Having examined/assessed the scientific evidence for the role of EPA and DHA in health, the UK government increased the earlier recommendation of 200 mg daily to 450 mg of omega-3 PUFA, principally as EPA and DHA. This is equivalent to the fish recommendation mentioned previously.¹⁷

Only 27 per cent of adults eat oily fish at all, with an average intake of omega-3 fatty acids of 270mg, half of which comes from oily fish.¹

Omega-3 supplementation

Supplementation is considered a safe and effective way of boosting omega-3 fatty acid intakes, with research suggesting that supplements can be as useful as eating oily fish itself. Given that fish is not consumed universally, particularly in children and young people who need it the most, supplements have a major role to play in boosting omega-3 intakes. Studies have shown that fish oil and omega-3 supplementation can be just as effective as eating oily fish in raising omega-3 levels.¹⁸

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