

Education News



ISSUE 11 | FROM THE NUTRIGOLD NUTRITIONAL UPDATE SERVICE

FISH OIL

ESSENTIAL FOR HEARTS, BRAINS AND LIFE ITSELF

Our understanding of the role of fats and oils in our diet is continually evolving. For decades we were told that all fat is bad for us, and fat free diets were all the rage. Eventually the information filtered through that not all fats are the same, and that many fats and oils are essential to our health.

We are now continually refining which fats are good for us and which may not be so helpful: where once it was saturated fats (such as butter) vs. unsaturated fats (such as olive oil and fish oil), now it has become clearer that both of these have their place, and that it is the quality of the oils we need to be looking at.

What has ceased to be in doubt for a long time now is that fish oil is one of the “good” guys. The omega 3 oils in fish oil, now known to be essential to our diet, have been shown to benefit everything from arthritis to ADHD, from schizophrenia to stress.



OMEGA 3 OILS

The omega 3 oils in fish oil are part of a group of oils known as essential fatty acids (EFAs), unsaturated fats or polyunsaturated fats (PUFAs). A closer look at the PUFAs in fish oil shows them to be crucial for the health and proper function of every cell in our body.

The unsaturated fat content of our cell membranes determines how flexible each cell is and the ease of movement in and out of the cell. This determines how well nutrients and messages can enter the cell, and how efficiently toxins can be removed from the cell. The level of unsaturated fats in our cell membranes also affects how much energy each cell can produce to power almost everything it needs to do, as well as each cell's ability to communicate. All of this will ultimately influence the health and behaviour of each of the hundred trillion cells that our bodies contain.

In addition, omega 3 oils are used to make a series of prostaglandins, or tissue hormones, that combat inflammation, and help to keep everything running smoothly. We also need to be able to make a range of appropriate prostaglandins in order to regulate menstrual cycles and pregnancy, and to stimulate uterine contraction in childbirth. This is one of the reasons why essential fatty acids are so crucial during puberty and pregnancy, in addition to their role in making healthy new tissue cells in the developing foetus and in the lining of the womb. The omega 3s in fish oils are a fundamental factor in how well our brain and nervous

system work, the health of our reproductive system, the make-up of our skin, blood vessels, lungs, heart, digestive tract and, well, pretty much everything really. We are often told that proteins are our building blocks that make up all the different structures in our bodies, but oils have an equally vital role, and the omega 3 oils deserve special attention



OF OMEGA 3?

Omega 3 oils are found in marine sources such as fish and krill, and also in nuts and seeds, particularly flax seeds. Meat, dairy and eggs will also contain some levels of omega 3 for the same reason that humans do – it is present in the cell membrane – but the quantity will depend on the health and diet of the animals concerned.

Not all omega 3 is the same, however. Flax oil is often described as the vegetarian option for a good omega 3 source, but the structure of the omega 3 in flax oil is different to the structure of the omega 3 oils in fish.

Flax oil is rich in alpha-linolenic acid, which we call the parent form. In order to fully utilise it, we need to convert it to EPA and DHA (eicopentanoic acid and docosahexanoic acid), which are the longer chain forms of omega 3 found ready made in fish oil. The conversion process requires a lot of criteria to be in place, including the correct pH and an enzyme called D6D. Flax oil will only be a good vegetarian substitute for fish oil if the person taking it is sufficiently converting the alpha-linolenic acid to EPA and DHA.

Our efficiency in doing so has been in question for some time, and one review suggests that our conversion rate is less than 5-10% for EPA and 2-5% for DHA¹. Others have suggested that it depends on location, so that people living in areas where there has traditionally been a reliance on fish for omega 3 intake, for example, would naturally produce less D6D and so have a lower conversion rate.

In northern Europe most of us originally lived in coastal regions, so we would have been eating a mixture of fish, providing EPA and DHA, and nuts and seeds that we needed to convert. So our ability to convert the oils in flax oil, for example, would perhaps be better than people living in Antarctic regions, but not as good as if we had traditionally been living inland with less access to fish and more reliance on nuts and seeds.

Our ability to convert oils will undoubtedly differ from person to person, too, depending on the energy, resources and internal conditions available to each individual.

Our ability to produce the D6D enzyme, for example, can be blocked by a long list of factors, including alcohol, caffeine, environmental chemicals and carcinogens, hormonal imbalances including elevated stress hormones, radiation and trans fats².

We also need good levels of iron, magnesium, zinc, melatonin and vitamins C, B3 and B6 in order to make D6D³.

As modern, stressful lifestyles and diets as well as polluted environments can affect our ability to convert our omega oils, many of us would perhaps find benefit in increasing our levels of EPA and DHA, the converted long chain omega 3 oils. Both fish oil and krill oil contain EPA and DHA: fish oil tends to have a higher concentration of these, although krill oil contains them in phospholipid form, which means that their bioavailability is much higher⁴. Essentially, they are much more easily absorbed in the small intestine, and they slot into the cell membrane and the membrane surrounding the cell's nucleus much more easily.

OMEGA 3 VS. OMEGA 6

We also need to be aware that omega 3 oils compete for absorption with omega 6 oils, the other essential fatty acid we need in our diet. If we have too much omega 6, then we don't absorb omega 3 very efficiently, and vice versa (except that it's rarely the other way round).

We get omega 6 oils predominantly from nuts and seeds, as well as animal sources such as meat, dairy and eggs, and like omega 3 oils, they help allow substances to be transported across the cell membrane. Omega 6 oils have various roles in the body, and are particularly beneficial for the skin.

While omega 3 oils are used to produce anti-inflammatory prostaglandins, however, omega 6 oils are often used to make prostaglandins that stimulate inflammation in the body. So if we have too much omega 6 and not enough omega 3, it can be hard for our bodies to regulate

inflammation and keep levels down. This may be relevant for conditions ranging from eczema, asthma and arthritis to mental illness and cancer.

"If we have too much omega 6 and not enough omega 3, it can be hard for our bodies to regulate inflammation and keep levels down"

DIGESTING OMEGA 3

In order to be able to absorb fish oil (or any oil) effectively from the small intestine into the lymph and bloodstream, we need good levels of bile, which is produced by the liver and released by the gallbladder. The bile helps to emulsify fats so they can travel more easily through our bodily fluids. If our liver and gallbladder aren't up to the job, then we are more reliant on dietary emulsifiers such as lecithin. We also need the wall of our small intestine to be healthy and fully functioning, which requires, among other things, good levels of zinc and essential fatty acids, such as the very omega 3 oils we are seeking to absorb.



Once in the lymph and bloodstream, lipoproteins are formed, a mixture of lipids (fats) and proteins that transport the fats to where they need to go. Dr. Johanna Budwig, in her groundbreaking work on flax oil, noted a relationship between flax oil and sulphur-rich proteins (found in bee pollen, yoghurt, cottage cheese, oats, beans, meat, fish and eggs), and so recommended the two be taken together.^{5,6} Oils and proteins are always found together in nature, so it would seem sensible to emulate that by taking oil supplements with a meal or snack that contains protein.

OMEGA 6 / OMEGA 3 RATIOS

So how much is too much omega 6? There are differing opinions on what the original ratio would have been with traditional diets, but again it would probably have varied from region to region. Estimates range from 4:1 in favour of omega 6, to 1:1, i.e. equal amounts. Current intake, however, is usually between 10:1 and 25:1, which means that our average omega 6 intake is way too high⁷.

There are various reasons for this, including the fact that many of us now use oils high in omega 6 for cooking, omega 6 rich margarines have become hugely popular, our fish intake is much lower than it would have been in the past, and the balance of essential fatty acids in our meat, eggs and dairy has also changed. The ratio of omega 6 to 3 in animal products should be similar to our own ideal ratio, but the diet of farmed animals has changed substantially over the years, and so the levels of omega 6 are often around 25 times higher. Animals fed predominantly on wild pastures are much more likely to have a more balanced ratio, as are chickens fed a variety of seeds rather than just grains. So those who choose to eat meat have an additional reason for preferring free range organic options and game.

Fatty acids expert Artemis Simopoulos describes how these very high levels of omega 6 in our diets, especially compared to omega 3, promote the development of many diseases, including cardiovascular disease, cancer, and inflammatory and autoimmune diseases, while increased levels of omega 3 and a change in the ratio exert suppressive effects. He explains, "In the secondary prevention of cardiovascular disease, a ratio of 4:1 was associated with a 70% decrease in total mortality. A ratio of 2.5:1 reduced rectal cell proliferation in patients with colorectal cancer, whereas a ratio



of 4:1 with the same amount of omega-3 PUFA had no effect. The lower omega-6/omega-3 ratio in women with breast cancer was associated with decreased risk. A ratio of 2-3:1 suppressed inflammation in patients with rheumatoid arthritis, and a ratio of 5:1 had a beneficial effect on patients with asthma, whereas a ratio of 10:1 had adverse consequences."⁸ These findings suggest that we would do well to keep our ration of omega 6 to 3 at 5:1 or lower.

FISH OIL AND DISEASES FEATURING CHRONIC INFLAMMATION

Continual low grade inflammation is an underlying feature of many chronic diseases, including asthma, psoriasis and colitis, as well as rheumatoid arthritis, heart disease, ME and cancer. The body's primary natural anti-inflammatories are zinc and prostaglandins made from omega 3 oils. Both will usually be deficient, and there will often be problems with absorbing and utilising these soothing nutrients. It makes sense, therefore, to choose omega 3 oils that are in a form that is already converted to EPA and DHA, such as fish oil.

A review of the anti-inflammatory effect of omega 3 oils reports that EPA-rich fish oil seems to down regulate the T-helper 1-type response which is associated with chronic inflammatory disease, as well as inhibiting the production of inflammatory prostaglandins. The report concludes that there is therefore great potential for asthma, and also for other chronic inflammatory diseases, in particular rheumatoid arthritis.⁹



A similar review written the same year considered the potential anti-inflammatory benefits of fish oil in dealing with an even wider range of chronic inflammatory conditions, including rheumatoid arthritis, Crohn's disease, ulcerative colitis, psoriasis, lupus erythematosus, multiple sclerosis and migraine headaches. The review points out that coronary heart disease, major depression, aging and cancer are characterized by an increased level of an proinflammatory substance called interleukin 1 (IL-1), and that arthritis, Crohn's disease, ulcerative colitis and lupus erythematosus are also characterized by a high level of IL-1, plus high levels of the proinflammatory leukotriene LTB(4). Both of these are produced by omega-6 fatty acids, while prostaglandins produced from the EPA in fish oils have been shown to counter this kind of inflammatory activity.¹⁰



FISH OIL AND HEART DISEASE

The anti-inflammatory effects of EPA and DHA have been shown to have cardioprotective benefits¹¹, and in fact there is a wealth of studies that relate higher intakes of fish or fish oil with much lower incidences of heart disease. These studies show benefits with the full spectrum of heart-related condition, including arrhythmia, thrombosis, heart attack and stroke¹². The EPA and DHA in fish oil seem to help keep blood vessel walls and heart tissue healthy and able to function well. Keeping levels of inflammation down will help prevent damage, and the blood thinning properties of fish oil will help to keep blood and the surrounding fluids flowing. This will have a number of benefits, not least a healthy supply of nutrients, enzymes and hormones to keep our heart beating regularly and the blood vessels walls and heart tissue in top condition.

A major underlying cause of heart failure is thought to be scarring, or fibrosis, which builds up and prevents the heart from relaxing after each contraction. Fish oil has been shown to have a "dramatic" effect in reducing this scarring.¹³

The EPA and DHA content of fish oil also modulate sodium and calcium channels in every cell in the body, including the heart's muscle cells, where they help regulate the nerve impulses that trigger our heartbeat, and so keep it regular.¹⁴ By regulating levels of sodium and calcium in each cell, fish oil will also have an influence on the pH, hydration, vitality and integrity of each cell, and so strongly effect how well all of our cells function, not just our heart cells.

DHA AND VISION

Several studies have linked omega 3 oils to healthy visual development, and also the maintenance of good eyesight. The Children's Hospital in Boston has shown how omega 3 oils can help prevent a major cause of blindness. Retinopathy is where the blood vessels in the retina at the back of the eye leak, and is responsible for blindness in millions of diabetics. The laboratory study showed an almost 50% decrease in retinopathy when fish oils were administered.¹⁵

In fact, the role of DHA in visual development has been so well proven, that EU legislation has endorsed the following claims: firstly, that DHA intake contributes to the normal visual development of infants up to 12 months of age; and secondly, that maternal intake of DHA contributes to the normal development of the eye of the foetus and breastfed infants.¹⁶ This would support the promotion of DHA supplementation for pregnant mothers, breastfeeding mothers and children up to the age of 1.

FISH OILS AND THE BRAIN: BEHAVIOUR AND ADHD

Perhaps the most attention given to fish oils has been for their ability to improve brain function and behaviour. In one episode of Robert Winston's "Child of Our Time", the BBC series that follows the development of 25 children born in 2000, two children with different behavioural problems were given daily fish oils. Within 3 months, one of them had gone from

FOR ALL THE VERY LATEST FROM
THE NUTRITIONAL INDUSTRY DIRECT
TO YOUR DESKTOP VISIT:
updates.nutrigold.co.uk

uncommunicative and withdrawn to outgoing and sociable, and the other had lost almost all signs of his previous aggression.

There is a wealth of studies that demonstrate the ability of fish oil to improve ADHD symptoms such as hyperactivity, cognitive problems, anxiousness and shyness,¹⁷ as well as poor attention and impulsive behaviour.¹⁸ Children with ADHD have also been shown to have lower levels of EPA and DHA in their blood, as well as lower levels of arachidonic acid, the long chain omega 6 oil that is also needed for the brain. The study of 53 boys that highlighted this concluded that this may not be just due to deficiency in the diet, but that it could also be due to an inability to convert the parent form of omega 3 into EPA and DHA, and the parent form of omega 6 into AA, the longer chain forms used by the brain.¹⁹

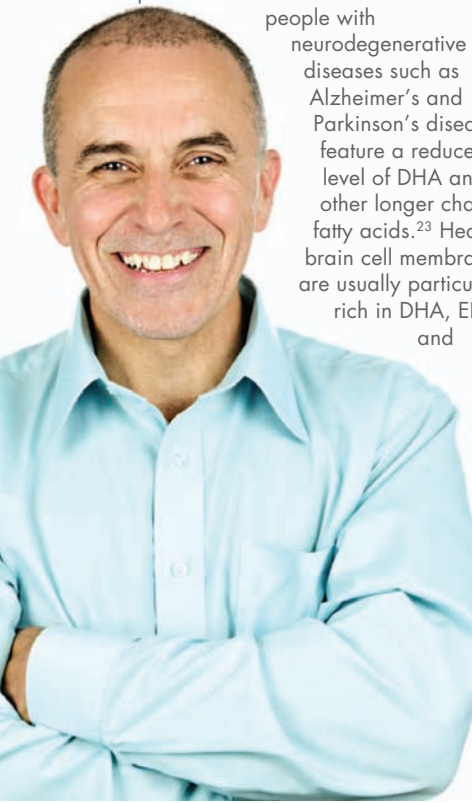
BRAIN FOOD FOR CHILDREN AND BABIES

Trials with fish oil also noted an improvement in reading and spelling skills in children²⁰, demonstrating how EPA and DHA can help children as their brains are developing and learning new skills. Several trials have also highlighted the importance of essential fatty acids for babies, and show their levels of these crucial oils to be linked to the healthy development of their brains, nervous system, and also their visual development, as acknowledged by EU legislation. It was noted that breast-fed babies usually fared better in these areas, as breast milk is naturally rich in the range of essential fatty acids required, while formula milk is not.²¹

ALZHEIMER'S AND PARKINSON'S DISEASE

Further studies with adults show a link with cognitive ability as we get older, too. A recent California study of 266 men and women aged between 67 and 100 found that those with a higher dietary intake of DHA were less likely to develop dementia.²² Indeed the brain cells of

people with neurodegenerative diseases such as Alzheimer's and Parkinson's disease feature a reduced level of DHA and other longer chain fatty acids.²³ Healthy brain cell membranes are usually particularly rich in DHA, EPA and



arachidonic acid, which suggests that they play a vital role in how our brains and nervous systems function.

FISH OIL AND AUTISM

Fish oil is a very popular supplement for children and adults on the autistic spectrum, and much has been written about its ability to benefit people with autism in a number of ways. An Egyptian study showed improvements in behaviour, concentration, motor skills and language.²⁴

A published case study reported improvements in anxiety, agitation and quality of life in an 11 year old given up to 540mg EPA daily for 8 weeks.²⁵ It has been hypothesised that the issue lies in the ability to convert parent forms of essential fatty acids to the longer chain forms used most by the brain, such as DHA. Children with autism and Asperger's have in fact been shown to have lower levels of essential fatty acids, and also to have a higher omega 6 to omega 3 ratio.²⁶ A high omega 6:3 ratio is a



feature of chronic inflammation, as we have already seen, and inflammation of the brain and other tissue is an area of much interest for research into autism

An interesting feature of autism, Asperger's, ADHD and schizophrenia is an apparent sensory overload, which leads to extreme discomfort with sensations such as noise and touch. Most of us would filter out the majority of the sensations we receive from moment to moment, so as not to be overwhelmed by them. This is an adaptive process called sensorimotor gating, and studies have showed this to be impaired with people on the autistic spectrum or with schizophrenia.

A recent laboratory study found that DHA deficient mice also exhibited signs of sensory overload, or lack of sensorimotor gating. The scientists compared their startled reaction to a sudden loud noise, to how the mice reacted to the same noise when they were prepared for it by a softer warning sound. Usually the mice, and humans in the same situation, would flinch less when prepared for the noise, but DHA deficient mice flinched just the same as if they had been completely taken by surprise.²⁷ This suggests that DHA helps our nervous

system to adapt to sensory input, and filter out much of the unhelpful information we receive through our senses. This may also explain why some "savants" are able to recall incredible amounts of detail when, for example, drawing a picture or remembering dates and events.

SCHIZOPHRENIA AND EPA

Childhood onset schizophrenia interestingly occurs most often at about the time that the frontal lobe of the brain goes through a stage of maturation that requires higher levels of essential fatty acids, a process called myelination.²⁸ Such teens have also been shown to have 4 times greater grey matter loss from their brains' frontal lobes than other children.²⁹ Adults with schizophrenia have disruptions to the oil profile of their cell membranes that would suggest that the ability to utilise essential fatty acids plays as big a role here as has been identified for dementia, Parkinson's disease and autism.³⁰

Unsurprisingly, then, EPA has been demonstrated to work well in improving the symptoms of schizophrenia.³¹ In one trial in particular, almost half the patients taking EPA supplements were able to come off their antipsychotic medication.³²

EPA AND DHA TOGETHER FOR DEPRESSION

A recent meta-analysis of 15 studies of people with depression has concluded that clear benefits can be found by taking either EPA or EPA and DHA together. "The findings are unambiguous," said Davis, Research Professor at the University of Illinois where the analysis was carried out. "Omega-3 fatty acids have antidepressant properties. Our analysis clarifies the precise type of omega-3 fatty acid that is effective for people with depression and explains why previous findings have been contradictory" Significantly, EPA and DHA are always found together in nature, including in fish oils.³³

FISH OIL REDUCES THE IMPACT OF STRESS

Mental stress has been shown to significantly increase heart rate, mean blood pressure and energy expenditure. We can also measure its effects via our production of stress hormones epinephrine (adrenaline) and cortisol, both of which are raised in times of stress. One study gave healthy men fish oil supplements for 3 weeks to see if this made a difference to their stress mechanisms, and found very promising results. After just 3 weeks of supplementation, mental stress was found to have a significantly reduced effect on stress hormone production, energy expenditure and free fatty acid concentrations, which have been linked to diabetes and obesity.³⁴

FOR ALL THE VERY LATEST FROM THE NUTRITIONAL INDUSTRY DIRECT TO YOUR DESKTOP VISIT:
updates.nutrigold.co.uk



EPA AND DHA – THE SCIENCE AND THE MAGIC

EPA and DHA have been converted into forms that are longer than alpha linolenic acid, and have more double carbon bonds. Wherever there is a double carbon bond in the structure of an unsaturated fat, there is potential activity, an opportunity for a reaction, in the form of a negatively charged particle called an electron. Saturated fats, such as coconut oil, have no double carbon bonds – all of their opportunities for activity have been taken up by hydrogen ions, and that is why they are described as saturated. Of the unsaturated omega 3 oils, alpha linolenic acid has 3 double carbon bonds, EPA has 5 and DHA has 6, making it the most reactive of the three. Omega 6 oils have between 2 and 4 depending on the form.

The more double carbon bonds an oil has, the more potential it has to capture the energy from light photons. Nobel nominated scientist Johanna Budwig was the first to describe how the electrons at each double carbon bond capture sunlight, and subsequent research has shown how this light can be used for energy or heat, or stored, or transported to another part of the body.³⁵ This would suggest that omega 3 oils can help us to use sunlight as an additional source of energy to our food.

It is unsurprising, then, that people in darker parts of the world, such as the Antarctic, have a greater reliance on the

more electron-rich oils, while there is more of an emphasis on saturated fats with no electrons in parts of the world where there is a lot of light, such as the tropics. Where there is less light, we need all the help we can get to bring light into the body. Peroxidation of unsaturated fats is also believed to be one of the ways in which light can be produced in the body.³⁶

Quantum physicists also describe how charged particles such as electrons can communicate via light activity. It would follow that the greater the number of electrons each of our cells holds, the more our cells are able to communicate with each other and with their environment. Science writer April Holladay explains the quantum physics behind this: "Photons [light particles] are the carrier particles for electromagnetic interactions. That means charged particles (for example, electrons and protons) interact by exchanging photons. One electron (for instance) radiates a photon; another absorbs the photon. The absorbing electron necessarily absorbs the photon's energy, spin and momentum. That's the tip-off. The photon carries the information in its spin and momentum."³⁷

This would make the essential fatty acid content of our cell membranes vital for both energy and communication, in addition to the role it plays in easing

transport of nutrients in and out of the cell. It would also explain why the brain needs those essential fatty acids that are highest in double carbon bonds, and therefore electrons, namely DHA, EPA and arachidonic acid. It is no wonder that the oil profile of our brain cells has such a profound effect on our cognitive function.

"Of the unsaturated omega 3 oils, alpha linolenic acid has 3 double carbon bonds, EPA has 5 and DHA has 6, making it the most reactive of the three"

RANCID FATS AND FREE RADICALS

We also know that the electrons at each kink in the structure of unsaturated fats make them highly reactive. They can be likened to children with lots of energy: give them something to play with and the result can be magical; shut them in a room full of ornaments with nothing to do and things may well get broken! This is when they turn from magical sparks of life to free radicals, creating damage wherever they go. So it's important to make sure that we're not just taking fish oils in isolation, but as part of a programme that works on our whole being, so that our bodies are in a position to make full and proper use of them. Such a programme will vary from person to person, and you may wish to seek advice from a professional.

This is also why it's important to protect all unsaturated fats, including fish oil, from air, heat and light during their manufacture and storage: they will react with the oxygen in air and become rancid, a process that speeds up in the presence of heat and light. If we use rancid oils, they will have lost their ability to react, and so we will have a reduced ability to bring oxygen and light to the cell.



FISH OIL AND CANCER

There are many theories about what causes cancer. Some of the more holistic approaches focus on how disconnected a cancer cell has become. It seems to be lacking the necessary information it needs in order to know how to behave. Johanna Budwig's work with flax oil and cancer – flax oil containing a parent source of omega 3 oils – explored the ability of unsaturated fatty acids to bring light into body and how that constituted for her a viable therapeutic approach to chronic illness.

Inspired by Nobel Award winner Otto Warburg, many also focus on the lack of oxygen in the cell, which means that it is unable to make energy efficiently, and instead needs much larger amounts of glucose to feed it. Many feel that this is largely responsible for why cancer cells multiply, as when oxygen levels drop below a certain point, the cell starts to behave as though it is a foetus, as the conditions mimic those in the womb.

This is why many cancer patients seek out ways to bring more oxygen into the body. It has been pointed out, however, that there is often plenty of oxygen available to cancer of the blood, so perhaps the cell's ability to take up or utilise oxygen may be more of an issue. It may be that essential fatty acids such as those in fish oil can help with our oxygen uptake and utilisation. These unsaturated fats help keep the cell membranes more permeable, and their assistance with regulating sodium channels will have an effect on the cell's pH, which according to Warburg is important for

oxygen levels: an acidic cell will be low in oxygen, where an alkaline cell will have more oxygen.

Where there is a decreased level of energy being produced, either from oxygen-deprived mitochondria in the cells or from sunlight, cancer patients sometimes progress to a stage where their bodies are breaking down skeletal muscle tissue, and so literally seem to be wasting away. This is called cachexia. EPA supplementation has been shown in several studies to improve weight gain and appetite in advanced cancer patients with cachexia.^{38, 39}

It is also widely accepted that there is a level of chronic inflammation with cancer, and so many of the studies that demonstrate the anti-inflammatory properties of fish oil will also be relevant here.⁴⁰

So on many levels fish oils would seem to be beneficial for cancer prevention. A review of evidence for fish oil in relation to breast cancer, prostate cancer and other hormone-related cancers acknowledges that fish oil has been shown to inhibit

proliferation of cancer cells in many laboratory studies. The same review points out, however, as do other reviews of cancer generally, that increasing dietary intake of fish and fish oil has inconsistent results outside of the laboratory. This supports our understanding that not everyone is able to fully utilise essential fatty acids, even when they are in EPA and DHA form: these oils still need to be absorbed and transported to where they need to be, and our bodies need to actively place them in the cell membrane (in phospholipid form). All of this relies upon certain conditions and supporting nutrients being in place.

We also know that working holistically isn't about identifying one missing ingredient and then supplying it. It's about supporting the whole of the person, seeing the bigger picture of why that nutrient might be missing, and what other factors may be involved. Using essential fatty acids may be a useful and magical part of most people's approach to health and vitality, but just a part of their approach.

“EPA supplementation has been shown in several studies to improve weight gain and appetite in advanced cancer patients with cachexia^{38,39}”

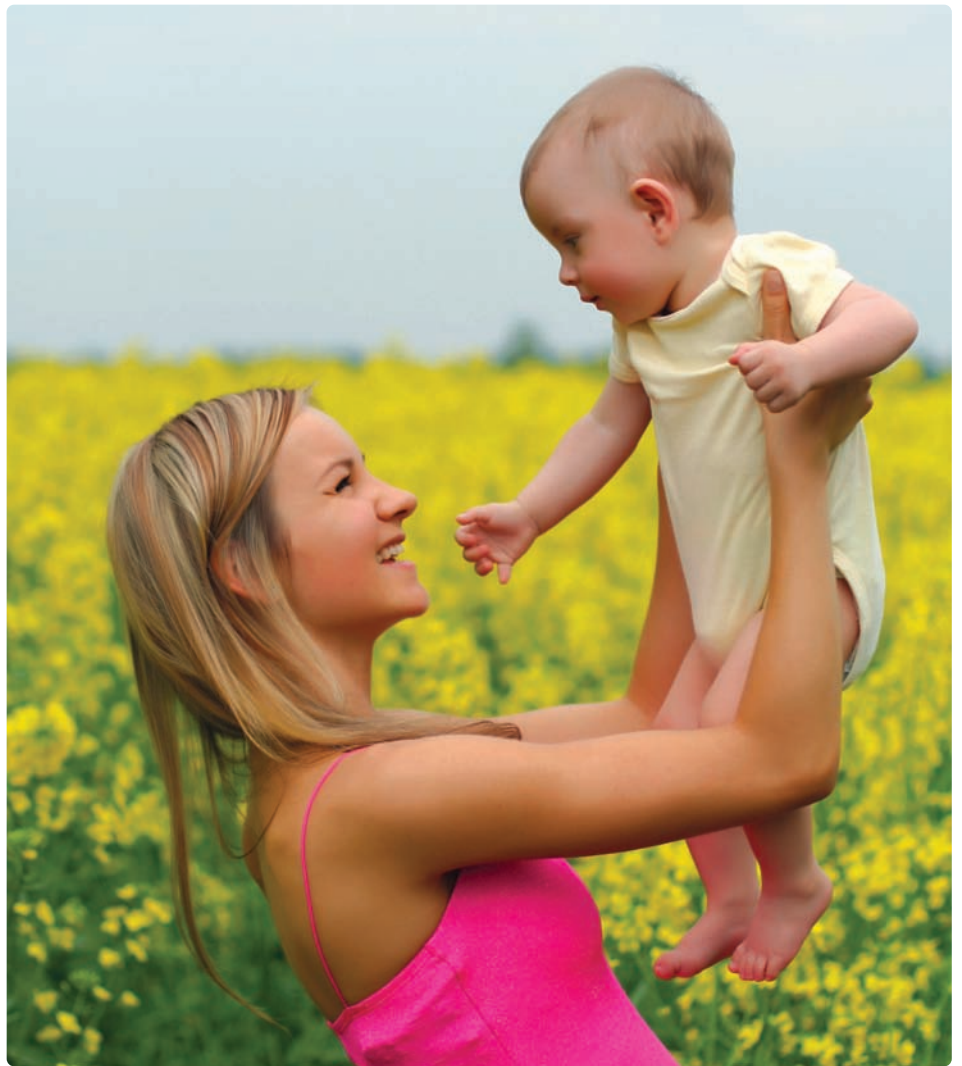
QUALITY OF FISH OIL SOURCES

When looking for a fish oil supplement, it is therefore advisable to find out how mindfully the oil has been pressed, packaged and stored. Also look at the ingredients list to see if the oil is pure, or if it has been diluted with a cheaper oil.

In terms of food sources, oily fishes such as salmon, herring, sardines, tuna and mackerel are among the richest in EPA and DHA, but predatory fish from some parts of the world, including the Mediterranean, can be heavily contaminated with toxins such as methyl mercury.

High levels of methyl mercury has been linked to adverse effects on the brain, nervous system and heart. Its ability to cross both the blood-brain barrier and the placental barrier has heightened concern for developing fetuses. An episode of widespread methyl mercury poisoning in Japan in the 1950s resulted in at least 30 cases of cerebral palsy in children born to mothers contaminated during pregnancy. Further studies have shown a correlation between methyl mercury contamination in pregnant women and lower IQ in the babies born, as well as poor scores on a wide range of memory, attention, language, and visual-spatial perception tests.⁴¹

As a result of an independent survey, the Food Standards Agency now recommend that pregnant and breastfeeding women, as well as those planning to become pregnant, should limit their intake of tuna to no more than 1 fresh tuna steak or 2 medium sized cans per week. The same group of women and children under the age of 16 are also advised to avoid swordfish, marlin and shark altogether.⁴² For similar reasons, it is advisable to ensure that any fish oil supplement you are taking has been tested for toxins such as mercury, lead and PCBs. PCBs are a group of synthetic chemicals now widely banned that can have a detrimental effect on our hormonal and nervous systems.



HOW MUCH FISH OIL SHOULD I TAKE?

As with all supplements, once you have found a good source, it is advisable to start on a low dose and build up gradually. A comfortable and useful dose for many will be around 4000mg daily, which should ideally be in split doses, so perhaps half with lunch and half with dinner. Some may find that they can build up to this over a couple of weeks, some people may need longer.

Children and babies need lower levels, depending on their size, ranging from a drop a day to perhaps 2 capsules.

Because the EPA and DHA in fish oil can be used to make phospholipids that increase the permeability of cell membranes, and also assist the sodium and calcium channels, taking fish oil supplements can create more movement at cellular level. As cellular activity is then able to improve, cells will often be able to detoxify more effectively, and so there will be an increase in toxic load for the lymph, blood and liver to deal with. So the more toxic a person is, the more gentle an approach is needed, and often the routes of elimination will need a helping hand. Techniques such as packing, dry skin brushing and enemas can be useful here, depending on what is appropriate for the individual. A practitioner experience in such techniques will be able to put together an individual programme of these in addition to dietary advice and recommendations for further supporting nutrients.

WHEN NOT TO TAKE FISH OIL

As fish oil is very effective for thinning the blood, it will perform a similar role to anticoagulant and anti-platelet medication such as aspirin, warfarin and heparin. If you are taking such medication, then fish oils should be avoided in order to avoid over-thinning the blood.

HOW TO TAKE FISH OIL

Fish oil usually comes in capsule form, so that the capsule can protect the oil from going rancid. If you would prefer not to swallow the capsules, they are easily pierced, and then the contents can be squeezed into smoothies, juices or onto foods. This is a great way to get children to take fish oils, and also enables you to give just a drop of fish oil to babies.

I would also recommend that fish oils be taken with a meal or snack that contains some form of protein, such as fish, eggs, meat, nuts, peas and beans.

FOR ALL THE VERY LATEST FROM
THE NUTRITIONAL INDUSTRY DIRECT
TO YOUR DESKTOP VISIT:
updates.nutrigold.co.uk



Should you need a more detailed approach, or should you have any questions or concerns that are not addressed in this article, you are always welcome to contact our nutritional advice team on 01395 227850 (9.00am – 5.00pm Monday – Friday).

Alternatively if you would like a more personalised approach, addressing dietary recommendations, lifestyle changes etc., we would suggest you consider consulting a qualified nutrition adviser or therapist, which you can do by either asking us for details of your local

practitioners, or contacting The Federation of Nutritional Therapists on 0870 312 0042 or by emailing them at admin@fntp.org.uk

For more information visit the website at: www.fntp.org.uk

Kirsten Chick is a qualified and practising Natural Nutritionist and member of the Federation of Nutritional Therapists. To find out more please visit www.connectwithnutrition.co.uk.

- ¹ Davis, BC and Kris-Etherton, PM (2003). Achieving optimal essential fatty acid status in vegetarians: current knowledge and practical implications. *Am J Clin Nutr* 78(3 Suppl): 640S-646S.
- ² Dunne, N and Slater, W. *The Natural Diet Solution for PCOS and Infertility (How to Manage Polycystic Ovary Syndrome Naturally)* 2006 pp.132-133
- ³ Ibid.
- ⁴ Ulven, SM et al Metabolic effects of krill oil are essentially similar to those of fish oil but at lower dose of EPA and DHA, in healthy volunteers. *Lipids*. 2011;46(1):37-46.
- ⁵ Budwig, J. *Flax oil as a true aid against arthritis, heart infarction, cancer and other diseases.* (3rd ed.) Apple Pub. 1996
- ⁶ Subsequent research has failed to show fish oils and sulphur amino acids connecting in the same way, but still noted that the two substances worked well together to lower serum lipid concentrations: Kawasaki M et al. Effects of simultaneous dietary fish oil ingestion and sulfur amino acid supplementation on the lipid metabolism in hepatoma-bearing rats with hyperlipidemia. *J Nutr Sci Vitaminol (Tokyo)*. 2010;56(4):247-54.
- ⁷ Simopoulos, AP (2000). Human requirement for N-3 polyunsaturated fatty acids. *Poult Sci* 79(7): 961-70.
- ⁸ Simopoulos, AP. The importance of the ratio of omega-6/omega-3 essential fatty acids. *Biomed Pharmacother*. 2002 Oct;56(8):365-79.
- ⁹ Calder, PC et al. (2002). Fatty acids and lymphocyte functions. *Br J Nutr* 87 Suppl 1: S31-48.
- ¹⁰ Simopoulos, AP (2002). Omega-3 fatty acids in inflammation and autoimmune diseases. *J Am Coll Nutr* 21(6): 495-505.
- ¹¹ Tapiero, H et al. (2002). Polyunsaturated fatty acids (PUFA) and eicosanoids in human health and pathologies. *Biomed Pharmacother* 56(5): 215-22
- ¹² Penny M et al. Fish Consumption, Fish Oil, Omega-3 Fatty Acids, and Cardiovascular Disease. *Circulation*. 2002;106:2747
- ¹³ Chen, J et al. Omega-3 fatty acids prevent pressure overload-induced cardiac fibrosis through activation of cyclic GMP/protein kinase G signaling in cardiac fibroblasts. *Circulation*. 2011 Feb 15;123(6):584-93. Epub 2011 Jan 31.
- ¹⁴ Kang, JK and Leaf, A (2000). Prevention of fatal cardiac arrhythmias by polyunsaturated fatty acids. *Am J Clin Nutr* 71(1 Suppl): 202S-7S.
- ¹⁵ *Science Translational Medicine*, February 14, 2011.
- ¹⁶ http://ec.europa.eu/food/food/labellingnutrition/claims/community_register/authorised_health_claims_en.htm
- ¹⁷ Richardson, AJ and Montgomery, P. The Oxford-Durham study: a randomized, controlled trial of dietary supplementation with fatty acids in children with developmental coordination disorder. *Pediatrics*, Vol. 115, May 2005, pp. 1360-66
- ¹⁸ Sinn, N and Bryan, J. Effect of supplementation with polyunsaturated fatty acids and micronutrients on learning and behavior problems associated with child ADHD. *Journal of Developmental & Behavioral Pediatrics*, Vol. 28, April 2007, pp. 82-91
- ¹⁹ Stevens, LJ et al. Essential fatty acid metabolism in boys with attention-deficit hyperactivity disorder. *American Journal of Clinical Nutrition*, Vol. 62, No. 4, October 1995, pp. 761-68
- ²⁰ Richardson, AJ and Montgomery, P. The Oxford-Durham study: a randomized, controlled trial of dietary supplementation with fatty acids in children with developmental coordination disorder. *Pediatrics*, Vol. 115, May 2005, pp. 1360-66
- ²¹ Agostoni, C and Giovannini, M. (2001). Cognitive and visual development: influence of differences in breast and formula fed infants. *Nutr Health* 15(3-4): 183-8.
- ²² Lopez, IB et al. High Dietary and Plasma Levels of the Omega-3 Fatty Acid Docosahexaenoic Acid are Associated with Decreased Dementia Risk : the Rancho Bernardo Study. *J. Nutrition , Health and Aging*, 15: 25-31, 2011 .
- ²³ Youdim, KA et al. (2000). Essential fatty acids and the brain: possible health implications. *Int J Dev Neurosci* 18(4-5): 383-99.
- ²⁴ Meguid, NA et al. Role of Polyunsaturated Fatty Acids in the Management of Egyptian Children with Autism. *Clinical Biochemistry*, Volume 41, Issue 3, p. 1044-1048, (2008).
- ²⁵ Johnson, SM, and Hollander E. Evidence that Eicosapentaenoic Acid is Effective in Treating Autism. *J Clin Psychiatry*, Volume 64, Issue 7, p. 848-849, (2003).
- ²⁶ Bell, JG et al. Essential Fatty Acids and Phospholipase A2 in Autistic Spectrum Disorders. *Prostaglandins Leukot Essent Fatty Acids*, Volume 71, Issue 4, p. 201-204, (2004).
- ²⁷ Fedorova, I et al. Deficit in Prepulse Inhibition in Mice Caused by Dietary n-3 Fatty Acid Deficiency; *Behavioral Neuroscience*, Vol. 123, No. 6.
- ²⁸ Sowell ER et al. In vivo evidence for post-adolescent brain maturation in frontal and striatal regions. *Nature Neuroscience*, 1999; 2(10): 859-61.
- ²⁹ Rapoport JL et al. Progressive cortical change during adolescence in childhood-onset schizophrenia. A longitudinal magnetic resonance imaging study. *Archives of General Psychiatry*, 1999; 56(7): 649-54.
- ³⁰ Berger, GE et al. (2002). Implications of lipid biology for the pathogenesis of schizophrenia. *Aust N Z J Psychiatry* 36(3): 355-66.
- ³¹ Emsley R et al. Randomized, placebo-controlled study of ethyl-eicosapentaenoic acid as supplemental treatment in schizophrenia. *Am J Psychiatry*. 2002 Sep;159(9):1596-8.
- ³² Peet, M et al. Two double-blind placebo-controlled pilot studies of eicosapentaenoic acid in the treatment of schizophrenia. *Res* 2001 Apr 30;49(3):243-51
- ³³ American College of Neuropsychopharmacology: Omega-3 Supplements Show Promise in Alleviating Depression 2010
- ³⁴ Delarue J, et al. Fish oil prevents the adrenal activation elicited by mental stress in healthy men. *Diabetes Metab*. 2003 Jun; 29(3): 289-95
- ³⁵ Ho, M-W. The rainbow and the worm: the physics of organisms. *World Scientific*. 1998.
- ³⁶ I Bökön et al. Estimation of the number of biophotons involved in the visual perception of a single object image: Biophoton intensity can be considerably higher inside cells than outside. *Journal of Photochemistry and Photobiology B: Biology*. 2010.
- ³⁷ http://www.usatoday.com/tech/columnist/aprilholladay/2006-11-27-spiders-photons_x.htm
- ³⁸ Giacosa, A and Rondanelli, M. Fish oil and treatment of cancer cachexia. *Genes Nutr*. 2008 April; 3(1): 25–28.
- ³⁹ Tisdale, MJ (2002). Cachexia in cancer patients. *Nat Rev Cancer* 2(11): 862-71 .
- ⁴⁰ Tapiero, H et al. (2002). Polyunsaturated fatty acids (PUFA) and eicosanoids in human health and pathologies. *Biomed Pharmacother* 56(5): 215-22.
- ⁴¹ Trasande, L et al. Public Health and Economic Consequences of Methyl Mercury Toxicity to the Developing Brain. *Environ Health Perspect*. 2005 May; 113(5): 590–596.
- ⁴² http://www.food.gov.uk/multimedia/pdfs/fsis40_2003.pdf

**For all the latest nutritional research and legislation why not log on to:
updates.nutrigold.co.uk**

NUTRIGOLD Ltd,
PO BOX 217, Exmouth, EX8 9AX
Tel: +44(0)845 603 5675 (local rate) Fax: +44(0)845 603 5690

This newsletter was co-written with and for Nutrigold Ltd by Kirsten Chick, a well respected qualified Natural Nutritionist who is a member of the Federation of Nutritional Therapists. To find out more please visit www.connectwithnutrition.co.uk. Newsletter designed at www.yellostudio.co.uk.



NUTRIGOLD[®]
LIMITED