neovos

BETTER YOU, BETTER TOMORROW

OMEGA

WHITEPAPER

3 WHAT IS OMEGA?

Do you know which fats you should be eating, avoiding or limiting? What's a saturated fat? Is omega-6 bad for you?

Don't worry, you're not the only one confused.

Perhaps this is the reason omega 3 deficiencies and imbalances are a worldwide problem, particularly in the UK and why there is such as dramatic rise chronic inflammation and associated health issues such as IBS, anxiety, depression, arthritis, allergies and acne.

FATTY ACIDS AND THE MANY DIFFERENT TYPES

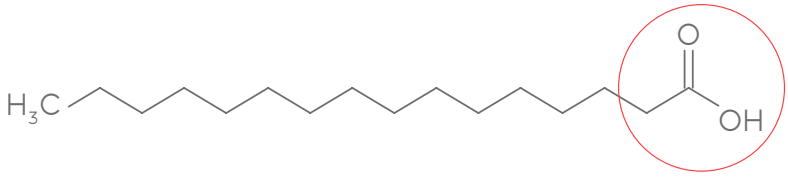
Fatty acids come in many different forms, many of which are vital to overall health. Fatty acids are a carboxylic acid, that has a long hydrocarbon chain and they vary by how their chain differs from one another. They can be divided into many different types:-

<table>
<tr><th colspan="3">TYPE</th><th>FATTY ACID</th></tr>
<tr><td colspan="3" rowspan="2">Saturated Fatty Acids</td><td>Palmitic Acid</td></tr>
<tr><td>Stearic Acid</td></tr>
<tr><td rowspan="9">Unsaturated Fatty Acids</td><td rowspan="8">Polyunsaturated Fats (PUFAs)</td><td rowspan="4">Omega-3</td><td>Alpha-linolenic acid (ALA)</td></tr>
<tr><td>Eicosapentaenoic acid (EPA)</td></tr>
<tr><td>Docosahexaenoic acid (DHA)</td></tr>
<tr><td>Docosapentaenoic acid (DPA)</td></tr>
<tr><td rowspan="4">Omega-6</td><td>Linoleic acid (LA)</td></tr>
<tr><td>Arachidonic acid (AA)</td></tr>
<tr><td>Gamma-linolenic acid (GLA)</td></tr>
<tr><td>Dihomo-gamma-linolenic acid (DGLA)</td></tr>
<tr><td>Monounsaturated fats (MUFAs)</td><td>Omega-9</td><td>Oleic Acid</td></tr>
<tr><td colspan="3">Trans-fatty acids</td><td>Elaidic Acid (trans-oleic acid)</td></tr>
</table>

Table showing main fatty acids that make up approximately 98% of fatty acids in the body.

Fatty acids can be separated into two main groups:-

- Saturated Fats - These are fatty acids whose chains consist only of single carbon to carbon bonds (C-C). They are called saturated due to the fact the chain is saturated with hydrogen. Foods high in saturated fatty acids include dairy, meats, coconut oil, palm oil, chocolate, toffee, cakes, puddings, biscuits, pastry products, processed foods and margarine.

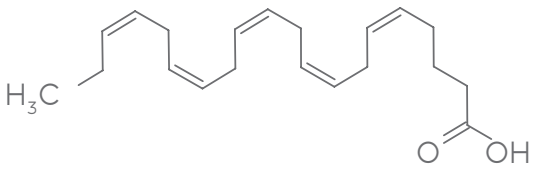


1- Palmitic acid, a saturated fatty acid (circled in red is the carboxyl group).

While saturated fats tend to get a bad reputation, it is mainly because they are eaten in such excess. Most fats can be consumed as part of a healthy balanced diet if in the right proportions.

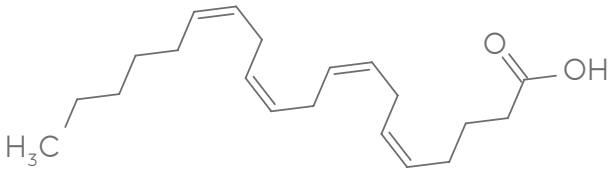
- Unsaturated Fats – These are fatty acids who's chain contains at least one carbon to carbon double bond (C=C). Having one of these changes the shape of the chain and reduces the amount of hydrogen present. Omega is a term used to describe unsaturated fatty acids based on where the first double bond from the tail/omega (ω) end. Unsaturated fats are then divided into:-
  - Polyunsaturated fats (PUFAs), which contain more than one double bond.

    Omega-3 – Have their first double bond on the third carbon from the end.



2- Eicosapentaenoic acid (EPA), an omega-3 fatty acid.

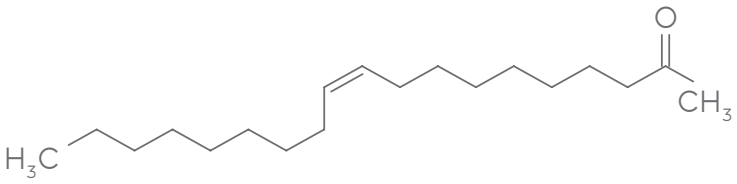
    Omega-6 – Have their first double bond on the sixth carbon from the end.



3 - Arachidonic acid (AA), an omega-6 fatty acid.

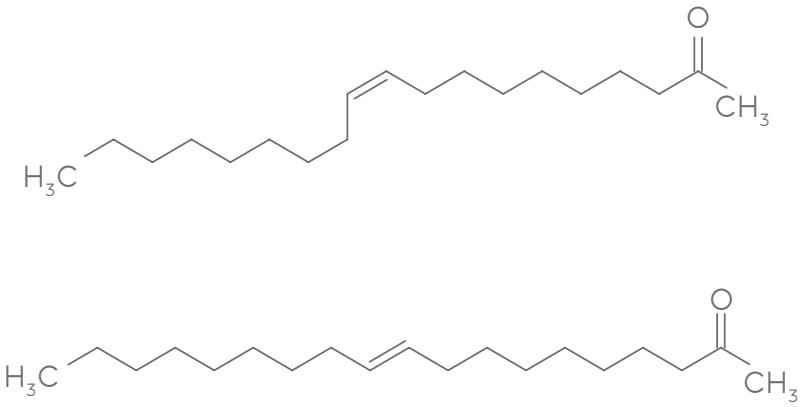
  - Monounsaturated fats (MUFAs),which contain a single double bond.

    Omega-9 – Have their double bond on the ninth carbon from the end.



4 - Oleic acid, an omega-9 fatty acid.

- Trans-fatty acids – Trans-fatty acids are fats that differ in the direction they arrange themselves from the normal cis-fatty acids. While there is a small amount of trans-fats found naturally, it is the unnatural industrial trans-fats which are known to have strong negative side effects; including poor heart health and increased cancer risk.[2059/60]



5 - cis-oleic acid (top) and trans-oleic acid (bottom).

There are no positive health benefits associated with industrial trans-fats and should be avoided more than anything else. Common sources of trans-fats include, margarine, processed foods, commercial baked goods and fried fast foods.

WHAT'S SO SPECIAL ABOUT OMEGA-3 FATTY ACIDS?

Omega-3 fatty acids are key fats that are required for many roles in the body. Like other fatty acids they become part of the cell membrane and affect the cell receptors in the membranes. They are involved in the production of hormones that regulate blood clotting, artery contraction/relaxation and inflammation.[2014] Docosahexaenoic acid (DHA) is present in the eyes & brain at high levels and is an important component in their formation and maintenance.

Healthy levels of omega-3 have been found to:

- Reduce inflammation and inflammatory related diseases[2015/39/40] including IBS, arthritis and allergies.
- Improve the skin barrier[2019]
- Improve brain function and mental health[2021/22]
- Help prevent individuals from developing autoimmune diseases[2027]
- Lower triglyceride, cholesterol and LDL levels (Low density lipoproteins)[2031]
- Increase HDL (High density lipoproteins) levels[2031]
- Can provide some reduction of the symptoms of menstruation[2076]

Increased omega-3 doses have been shown to improve health conditions including:

- Depression & anxiety[2021/41]
- Skin conditions e.g. dermatitis[2019] & acne[2020]
- Neurodegenerative disorders[2022]
- Inflammatory disorders e.g. arthritis[2024]
- High blood pressure[2030]

The most common omega-3 fatty acids are alpha-linolenic acid (ALA) eicosapentaenoic acid (EPA) & Docosahexaenoic acid (DHA). ALA is normally found in/derived from plant based sources whilst EPA/DHA also known as marine fatty acids are mostly found in fish, seafood and the marine algae. ALA is an essential fatty acid, meaning that it cannot be produced by the body. ALA can be converted by the body into EPA and DHA, however the conversion is inefficient.

LOW OMEGA-3 INTAKE

It's no surprise that because omega-3 forms part of the cells in the body, when our intake is insufficient, it can effect many aspects of our well-being. Having low amounts of omega-3 can cause a wide range of health issues, so much that it can be hard to notice that they may be related. Most people in the UK have inadequate levels of omega-3 in their diet, many of whom are likely to be unaware of this.[2026] One of the main side effects of long-term omega-3 deficiency is poor cardiovascular health. Omega-3 deficiency along with high omega-6 levels leads to the production of excess pro-inflammatory eicosanoids which in turn, promotes inflammation. This can lead to a variety of health issues/side effects.[2015]

Symptoms of omega-3 deficiency include:-

- Dry and irritated skin[2019]
- Acne[2020]
- Depression[2021]
- Dry eyes[2023]
- Joint pain[2024]
- Unhealthy hair[2025]

TOXICITY

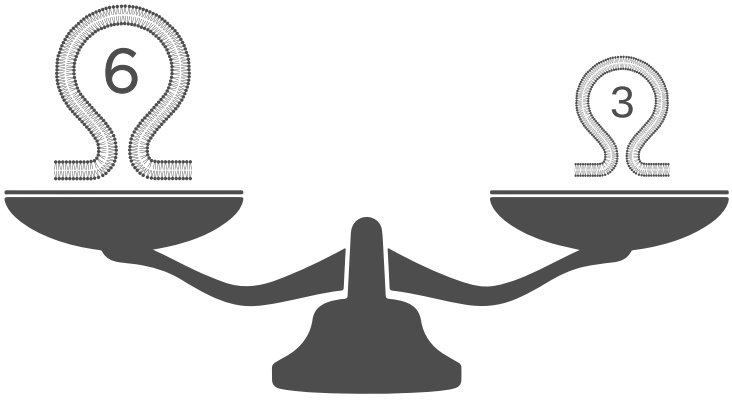
Omega-3 can have negative side effects when taken in high doses, only achievable when supplementing. Taking excessive amounts of omega-3 can cause:-

- Nosebleeds due to decreased blood clotting[2028]
- High blood sugar in diabetics[2029]
- Low blood pressure[2030]
- Diarrhoea[2031]
- Acid reflux[2032]
- Vitamin A toxicity – From select sources e.g. cod liver oil

If you start experiencing these symptoms after increasing your omega-3 dose, reduce your dosage and contact a health professional.

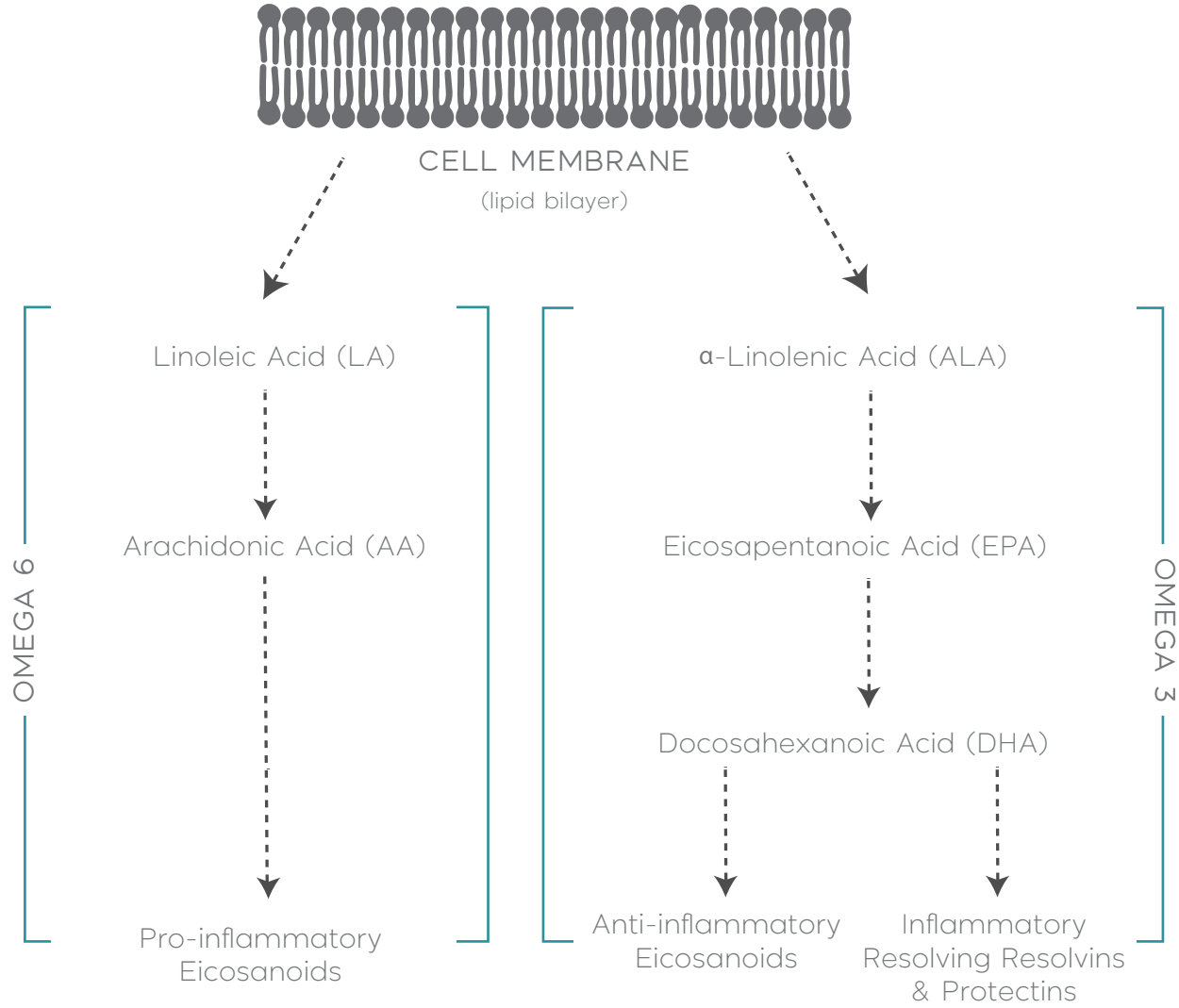
OMEGA BALANCE

All fatty acids are required to some extent, however the important thing is balance.



Omega-6 fatty acids are considered pro-inflammatory, their metabolism leading to the production of pro-inflammatory molecules called eicosanoids. Both omega 6 & 3 are essential to the bodies processes.(2014/5) Having too much omega-6 compared to omega-3 promotes inflammation in the body, this can eventually lead to the onset of many diseases. Including inflammatory diseases, autoimmune diseases, osteoporosis, cancer and cardiovascular diseases.(2044)

Omega-3 fatty acids are considered anti-inflammatory, their metabolism leading to the production of anti-inflammatory eicosanoids and inflammation resolving molecules called resolvins and protectins.



Because omega-6 is so prevalent in western diets our omega 6:3 ratios are out of balance, this leads to inflammation.

The most effect way to rebalance the scales is to add omega-3, addressing low levels at the same time. That is not to say that by intelligently reducing sources of omega-6, saturated fats and trans fats isn't also a power tool.

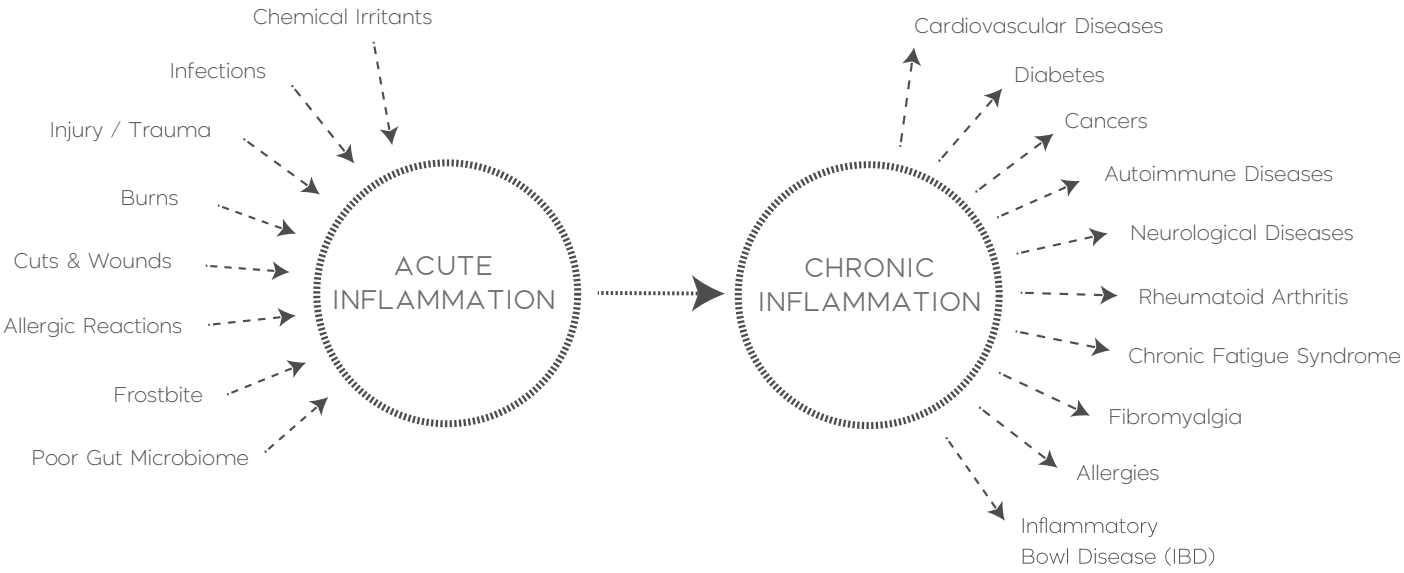
INFLAMMATION

Inflammation is mentioned a lot when it comes to health and omega-3 but what do we actually mean by inflammation?

Inflammation is an essential part of the body's natural defence mechanism and occurs when you are subject to pathogens or tissue injury. When it occurs in this way it is called acute inflammation and is present for a small amount of time (up to a few days) and is generally a good thing and may save your life. However if inflammation occurs for a longer time, this is called chronic inflammation and is a very different story. Chronic inflammation can occur for a number of reasons, including:[2070]

- Failure to eliminate the cause of an acute infection
- Exposure to low levels of foreign materials or irritants over a long period of time
- Recurring instances of acute inflammation
- Autoimmune disorders in which the body believes a normal part of the body to be a foreign body
- Auto-inflammatory disorders where the cells that mediate inflammation become defective
- Oxidative stress caused by inflammatory induction

A large amount of diseases are linked to chronic inflammation, aptly called chronic inflammatory diseases they are responsible for 3 out of 5 (60%) deaths worldwide.[2070]



7 - Example causes of inflammation and chronic inflammatory diseases

Symptoms of chronic inflammation include:[2070]

- Body pain/muscle aches
- Chronic fatigue
- Depression
- Skin conditions
- Gut issues e.g. diarrhoea & acid reflux
- Balance issues/dizziness
- Dry eyes
- Brain fog
- Frequent Infections

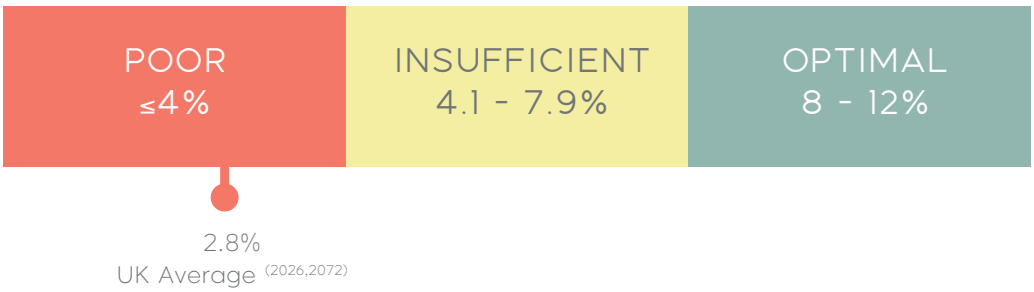
TESTING FOR OMEGA-3

There are three main metrics to measure your omega fatty acids. As your whole blood is collected and analysed, this means that your results are indicative of your omega levels over the last 120 days.

1. Omega-3 Index.

   The omega-3 index is the most comprehensive metric that measures the amount of the EPA and DHA compared to the other fatty acids in your red blood cells. It compares your EPA and DHA not just against the omega-6 fatty acids but also the other fatty acids present including saturated fatty acids.

   The index test is the most effective way of determining your risk for cardiovascular disease. A healthy omega-3 index score also indicates that you have enough EPA and DHA to benefit from the positive effects that omega-3 fatty acids provide.



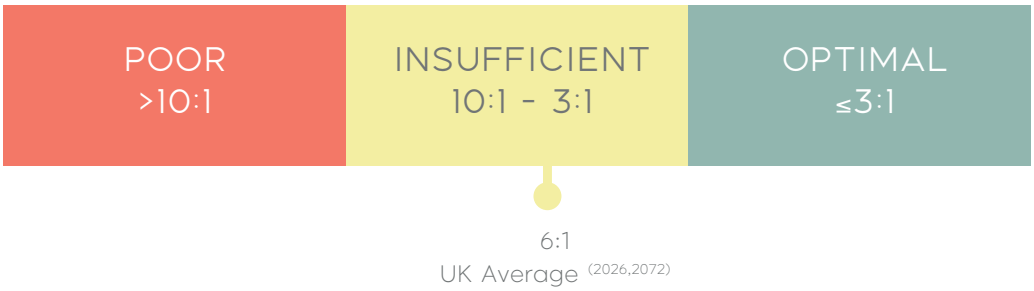
2. Omega 6:3 Ratio.

   Your omega 6:3 ratio compares your omega-6 to your omega-3 fatty acids in your whole blood. This test is used to measure the amount of inflammation caused by your omega-6 fatty acids vs the anti-inflammation of the omega-3 fatty acids. Omega-6 fatty acids are also important, therefore maintaining a healthy amount of each is important.

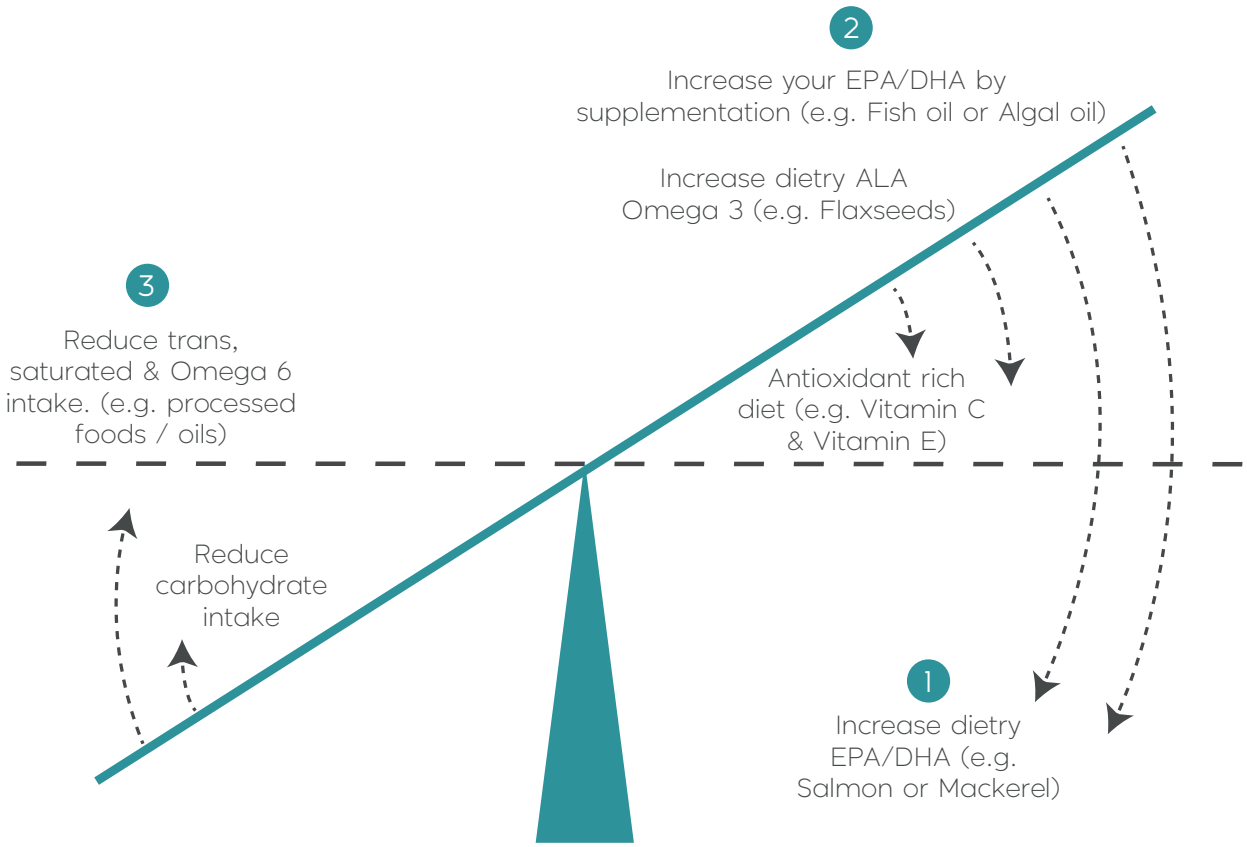
   Originally as a species we evolved when eating an omega 6:3 ratio of 1:1 and pre-industrial civilisations diets had ratios less than 4:1. These days western diets can easily reach a ratio of >15:1, this leads to an imbalance of omega acids which in turn leads to inflammation.

3. AA:EPA Ratio.

This is a comparison between your levels of arachidonic acid (AA), an omega-6 fatty acid and eicosapentaenoic (EPA), an omega-3 fatty acid. These are two fatty acids that play a key role in the bodies metabolic processes, including inflammation. Whilst both are essential fatty acids, having too high an AA:EPA ratio increases the amount of inflammation and therefore your overall health.



REBALANCING THE SCALES



NOTE: THE ARROWS ARE RELATIVE TO HOW MUCH EACH ACTION HELPS.

The vast majority of the UK and world-wide population have too minimal an amount of omega-3 relative to omega-6 and other fatty acids. These are the main ways to rebalance the scales:-

1 INCREASE OMEGA-3 FOOD SOURCES

EPA and DHA are mainly found in oily fish and for this reason they are often referred to as the marine omega-3's. An ideal way to increase your omega-3 levels is to introduce oily fish to your diet. It is recommended by the NHS that people have at least one portion of oily fish a week, however due to the fact it has very high levels of vitamin A and pollutants, it is recommended that women, in particular girls, women planning for pregnancy or are pregnant/breastfeeding should not have more than 2 portions of oily fish a week. ALA is mostly found in certain plant oils, as well as certain seeds and nuts and other vegetation such as brussels sprouts. ALA can also be found in pastured & grass fed animals, some of which may have been converted into EPA or DHA.[(2016)] Having EPA and DHA in your diet is more beneficial than having ALA, as your body will have to convert ALA into EPA/DHA but it's an inefficient process. Having EPA/DHA is considered the only practical way to raise your omega-3 levels.[(2017)]

Good dietary sources of omega-3 are:

SOURCE	I.E.	AMOUNT	OMEGA-3
Oily fish	Trout, salmon, herring, sardines, mackerel	High 2,000 – 5,000 mg	DHA & EPA
Select other seafood	Tuna, sea bass, turbot, halibut, sea bream, oysters, mussels, squid & crab.	Low – Moderate 100 – 1,500 mg	DHA & EPA
Plant oils	Flaxseed, hemp seed & walnut oils	Moderate 1,000 – 5,000 mg	ALA
Select seeds, nuts & beans	Chai seeds, flax/linseeds, hemp seeds, walnuts & beans.	Low – Moderate 100 – 3,000 mg	ALA
Plants/ plant-based products	Kale, spinach, brussels sprouts.	Low – moderate 10 – 300 mg	ALA

Some good sources of omega-3 may also have large amounts of omega-6, like soy products (e.g. tofu), beans (e.g. edamame, kidney), walnuts or rapeseed (canola) oil. Omega-6 is still an essential part of the diet and these sources shouldn't necessarily be avoided (see the benefits of linoleic acid in the other fatty acids section). Care should be taken for the amount used and should be based on your index score and your omega-6 : omega-3 ratio.

2 START/INCREASE OMEGA-3 SUPPLEMENTS

Raising your omega-3 levels can be difficult without a good source of EPA and DHA and increasing them from diet alone can also be difficult. Supplements are an ideal way to raise your levels. The following supplements can help you raise your omega-3 levels, each with their own benefits:

TYPE	AMOUNT	PROS	CONS
Fish Oil	Moderate - High	Strong doses, no vitamin A, affordable.	Non-purified versions have same toxins as fish.
Algal Oil	Moderate - High	Strong doses, sustainably sourced, vegan, toxin/heavy metal free.	Usually more expensive.
Cod Liver Oil	Low - Moderate	Also a source of vitamin D, affordable.	Lower levels than fish/algal oil. Non-purified versions have same toxins as fish. High vitamin A levels that can lead to toxicity.

Not all supplements are the same, DHA/EPA levels vary in the same types of supplements. Due to this when looking for supplements, ensure that you are getting the best DHA/EPA levels for your money. Fish based oils contain pollutants such as mercury, to avoid this you can buy purified versions of the oils with the contaminants extracted or algal oil which does not contain them. The amount of vitamin A in cod liver oil is very high and should be avoided by people who are pregnant or breastfeeding.

Supplements containing antioxidants such as vitamin E will help with the stability of omega-3 fatty acids. Avoid taking omega 3, 6 & 9 supplements combined unless advised by a health professional as these are less effective at rebalancing the omega-6 to omega-3 ratio or raising your index score.

RECOMMENDED DOSAGES

WHO	DOSAGE GUIDELINES
General note	The most effective ways to have omega-3 is by supplementing with EPA/DHA or eating oily fish. As a guide if you eat one portion of oily fish (trout, salmon, sardines, mackerel) per week, this is equivalent to around 250 mg of EPA/DHA per day.
Min	250-500 mg of EPA/DHA per day.(2018)
Max	5,000 mg of EPA/DHA per day.(2018)
If your omega-3 index score is poor i.e. ≤4%	At least 2,000 mg of EPA/DHA daily for three months and retest. (2035)
If your omega-3 index score is insufficient i.e. between 4.1-7.9%	At least 1,000 mg of EPA/DHA daily for three months and retest. (2035)
Maintenance dose if your omega-3 index score is optimal i.e. ≥8%	500-1,000 mg of EPA/DHA daily.
Pregnant, looking to get pregnant soon or breastfeeding	Take a purified EPA/DHA supplement per day which contains at least 500 mg DHA.

Age, BMI, sex, smoking, alcohol intake, dietary requirements, medical conditions and medications may affect your levels and how much is required to maintain optimum levels. Please contact your nutritionist for further advice.

3 REDUCE TRANS FATS, SATURATED FATS AND LIMIT OMEGA-6 INTAKE

Whilst consuming sources of EPA and DHA is the best way to improve your omega index score, reducing the amount of trans and saturated fats can improve your omega index and bring the same extensive health benefits. Limiting your omega-6 intake can also help improve your omega 6:3 ratio when it is out of balance.
By focusing on reducing the more unhealthy foods that are high in trans, saturated and omega-6 fats will bring other health benefits alongside the omega benefits.

To reduce trans fats, saturated fats and limit omega-6 intake, consider:-

Processed foods – The term processed foods is simply a food that has been changed from its original form. Due to this, a large amount of foods are considered processed, not all of which are considered unhealthy. Ultra-processed foods (UPFs) is a term used to describe foods that have gone through heavy amounts of processing and are generally the more unhealthy foods. These are the foods that are high in salt, sugar and oils/fats. Processed food is also the main source of trans fats. Examples of these types of foods include; crisps, commercial baked goods (e.g. cookies, cakes & doughnuts), ready-meals, sweetened breakfast cereals, chips, bacon, hot dogs, sausages, deli meats, chicken nuggets, ready noodles, microwave popcorn and margarine.

Oil awareness – The amounts and types of oils you use are a large contributor to your omega index. A large amount of the issue with a western diet is the heavy use of vegetable oils, not only are they used for cooking but they are in margarines/spreads, mayonnaise, processed foods, salad dressings and much more. Oils can be produced in different ways and usually the more processed they are the more unhealthy they are too. Hydrogenated oils/fats especially need to be avoided as the hydrogenation process produces lots of trans fats which are particularly harmful. It is usually these oils that are abundant in processed foods. Oils prepared by crushing or pressing the plants produces oils which are richer in their healthier components. Lots of commonly used oils can also contain large amounts of omega-6 fatty acids and consumed at the amounts where it can throw your omega-6 to 3 levels significantly out of balance.

OIL	OMEGA-6 (PER 100G)	OMEGA-3 (PER 100G)	6:3 RATIO
Flaxseed (linseed)	14.2	53.5	1:4
Rapeseed	19.7	9.6	2:1
Soya	51.5	7.3	7:1
Olive	7.5	0.7	10:1
Avocado	12.5	1.0	13:1
Palm	10.1	0.3	34:1
Corn	50.4	0.9	56:1
Sesame	43.1	0.3	144:1
Sunflower	63.2	0.1	632:1
Coconut	1.5	0	1.5:0

The amount of omega-6 and omega-3's are just as important as their ratios. For example, Olive oil and Avocado oil have a higher omega 6:3 ratio than Soya oil, however they have much lower amounts of either omega's or saturated fats and are considered some of the more ideal oils to have in the diet.

Carbohydrates – Carbohydrates can be converted into fatty acids by the body but never into omega-3.[2067] Maintaining a lower carbohydrate diet will limit how much is made by this method and has other health benefits. Generally reducing carbohydrate intake will aid in reducing your omega index, although the effects are less substantial than our other recommendations. Reducing simple carbohydrates specifically in the form of sugars or added sugar will reduce your omega index as well as providing other health benefits.

Cook your own meals – Cooking your own meals with fresher ingredients, using healthier cooking oils such as olive, avocado or rapeseed oil (especially the cold pressed versions) eliminates a lot of the processed foods from your diet and as such reduces your intake of trans and saturated fatty acids and can limit your omega-6 intake.

THE PROBLEM WITH PACKAGING

How much omega-6 is in your food? What about omega-3?

Nutritional Information		
	Per 100 mL	Per 15 g
Energy kJ	1000	150
Energy kcal	239	39
Fat	25 g	3.75 g
Of which is saturates	1.7 g	0.26 g
Carbohydrate	6.0 g	0.90 g
Of which is sugars	2.5 g	0.38 g

8 - Example of nutritional labelling on food.

It's hard to tell which types of fatty acids are in your food, for most packaging the nutritional data only separating fats between saturated and total. The above is good in telling us how much of the fats are saturated, i.e. 1.7g in 100g but what type of fats are in the other 23.3g per 100g of fats? Are they omega 3, omega 6, omega 9? Some companies have started including extra details about some of their key fatty acids, this is normally limited to certain products like oily fish.

Likewise, food will be labelled on the front to compare it to the recommended reference intake of the average adult with little regard to what nutritional benefit the food actually provides.

Each 100g contains				
Energy	Fat	Saturates	Sugars	Salts
1138kJ 274kcal	22g	5g	<0.5g	2.3g
14%	High 31%	High 25%	Low <1%	High 37%

9 – Typical front label on mackerel.

FORMS OF OMEGA-3

Omega-3 (in diet and supplements) are normally found in 3 main forms:

- Triglycerides – The most common form of omega-3, triglycerides are found in fish/seafood & fish oils. Triglycerides have 3 fatty acids that are bound to a glycerol molecule.

- Phospholipids – Less common than triglycerides, phospholipids usually appear in small amounts in marine oils. However, some sources have them in larger amounts. Phospholipids have 2 fatty acids that are bound to a glycerol molecule like a triglyceride and a phosphate 'head'.

- Ethyl Esters – A manufactured form of omega-3 created by reacting fatty acids with ethanol, which allows for a highly concentrated supplement. Due to this, this form is more likely to be used as the pharmaceutical form of omega-3, usually prescribed by health care professionals.

Most omega-3 supplements usually come in the triglyceride form, with a smaller amount of phospholipids also present. These are more readily absorbed by the body than ethyl esters meaning more ethyl esters are required to do the same job. All benefit from being taken with a fatty meal but especially ethyl esters. When dosages are referred to in this whitepaper we are talking about the amount required as a triglyceride source.

WHO WOULD BENEFIT FROM IMPROVING THEIR OMEGA-3 INDEX?

The research into what other factors affects your omega-3 levels is still ongoing, however there is good evidence some people are more likely to have lower levels of omega-3 and there are some people who benefit more from increased omega-3 levels. The following below circumstances may apply to you:-

- Vegan or vegetarian – Plant based sources of omega-3 contain ALA. This is converted into EPA/DHA in the body but the process is inefficient. As such, individuals with plant based diets commonly find themselves with low levels of EPA/DHA. Supplementation with algal oil is required to help vegetarians/vegans with their omega-3 levels.

- Pregnancy/breastfeeding – Having a good intake of DHA is particularly important just before pregnancy, during pregnancy and whilst breastfeeding. DHA plays a huge role to its role in foetal development, as it is important for brain, eye and immune system development and is also key in reducing the risk of early preterm birth. Having > 5% red blood cell DHA helps provide the baby with all DHA whilst helping preserve your own DHA levels.2068 Due to the levels of mercury and other pollutants, women in this category are recommended to limit their intake of oily fish and tuna but also avoid shark, swordfish and marlin altogether. Shellfish may be avoided as well to avoid the risk of food poisoning. As these are the main sources of EPA/DHA, supplementation is likely required. People who meet this criteria should contact a health professional before taking omega-3 supplements to ensure that they take a safe supplement. Cod liver oil should be avoided due to its high vitamin A levels.

- Menopausal and post-menopausal women – The investigation of omega-3 fatty acids on menopausal symptoms is a relatively new field of study. However it has been found that higher levels of omega-3 can reduce the symptoms of hot flushes.[2073] and may help with the effects the hormonal imbalances may have on mental health. As menopause causes a reduction of oestrogen, this causes an increase in inflammation which omega-3 will help reduce.[2074] It was even found that women that eating regular portions of oily fish can delay the onset of menopause. Early menopause increases the risk of cardiovascular diseases, osteoporosis and depression.[2075]

- Mental Health – Mental health issues such as anxiety can cause oxidative stress, which has been found to lower levels of omega-3 and reduce the amount of antioxidants that would help protect them.[2033] Lower levels of omega-3 can result in the production of stress hormones, leading to their levels to lower further.[2034]

- Exercise – Exercise is also source of oxidative stress, which has been found to lower levels of omega-3 and reduce the amount of antioxidants that would help protect them. However, exercise is essential to our health and should not be avoided, rather you should ensure your antioxidant levels are topped up to help protect against these side effects.[2069] Exercise is also known to lower pro-inflammatory molecules.[2070]

- Smoking & Drinking - Smoking is a source of oxidative stress and therefore lowers the amount of omega-3 and protective antioxidants. Alcohol can inhibit fat absorption and is a source of oxidative stress, reducing the amount of omega-3 you absorb and lowers the amount you have. However, drinking in moderation as part of a healthy diet and lifestyle can limit the effect it will have on your omega-3 levels.[2069]

- Anticoagulants – People on prescribed blood thinners such as warfarin are usually recommended to reduce or not to take omega-3 supplements due to the anticoagulative effects of omega 3.[2028]

- Everyone. And it's not necessarily your fault. The food in the shops, the adverts around us, convenience factors, all contain lots and lots of omega-6. It's also difficult to get plenty of omega 3 on a daily basis. UK averages are alarming, they actually one of the worst worldwide.

OTHER BENEFICIAL FATTY ACIDS

There are acids outside the of the omega-3 that have been associated with positive health effects:-

Linoleic acid – This omega-6 fatty acid has shown to have positive effects for heart health and diabetes at high levels.[2046/7] Showing that omega-6 fatty acids aren't necessarily the 'bad' fatty acids.

Oleic acid – Oleic acids is an omega-9 monounsaturated fatty acid (MUFA), it is in most oils to varying amounts but is mostly known for its high levels in olive oil and strongly associated with the Mediterranean diet. The Mediterranean diet has long been associated with low cardiovascular risk.[2048] Oleic acid has been found to have the following benefits; good heart health, good joint and bone health,[2050/1] good blood sugar levels,[2052/3] skin health[2054], anti-cancer effects[2055/6] and positive mental health benefits.[2057/8]

Steric acid – Whilst being a saturated fatty acid, it is considered healthier than the others. Steric acid has been shown to reduce LDL (bad cholesterol) and is considered not to contribute to poor heart health.[2065] Small amounts of it can be converted by the body into oleic acid.[2066] Animal fat, coconut oil and cocoa butter are good sources of steric acid.

SUMMARY

Western diets are extremely high in saturated fatty acids, trans-fats and omega-6 fatty acids whilst lacking in omega-3 fatty acids. This causes omega-3 deficiencies and low levels and an imbalance of omega-3 to other fatty acids, which brings on inflammation. Inflammation if left unchecked leads to whole raft of issues such as obesity, type II diabetes, skin conditions such as acne and mental health issues such as depression and anxiety, all of which are dramatically on the rise in the UK.

Correcting your scores will take at least three months and can have significant positive effects on your long-term health and life expectancy.

What's your omega-3 index score?

APPENDIX 1: DIETARY OMEGA FATTY ACIDS

Below is a selection of food with their amounts of omega-6 and omega-3. By seeing their ratios and their portion amounts you can see the effect these foods have on your omega levels.[2064/37] Please note that this doesn't show any of their other fats or other nutritional benefits the food may provide.

FOOD	OMEGA-6 (PER 100G)	OMEGA-3 (PER 100G)	6:3 RATIO*	OMEGA-3 PER PORTION (MG)	OMEGA-3 TYPE
Mackerel	0.41	4.05	1:10	3645	EPA DHA
Salmon (wild)	0.26	2.2	1:8.5	2640	EPA DHA
Sardines	0.24	1.32	1:5.5	1188	EPA DHA
Spinach (cooked)	0.026	0.138	1:5.5	69	ALA
Jackfruit	0.015	0.079	1:5	130	ALA
Crab	0.29	1.3	1:4.5	1950	EPA DHA
Salmon (farmed)	0.76	3.25	1:4.5	3900	EPA DHA
Tuna (tinned in brine)	0.08	0.32	1:4	320	EPA DHA
Flax/linseeds	6	22.8	1:4	3192	ALA
Chia Seeds	5.84	17.8	1:3	2492	ALA
Mango	0.019	0.051	1:2.5	77	ALA
Cod	0.03	0.08	1:2.5	100	EPA DHA
Lettuce (iceberg)	0.021	0.052	1:2.5	26	ALA
Tuna	0.04	0.09	1:1.5	108	EPA DHA
Brussels sprouts	0.045	0.099	1:2	50	ALA
Broccoli (raw)	0.08	0.17	1:2	85	ALA
Kidney beans	0.108	0.17	1:1.5	204	ALA
Seabass	0.85	1.23	1:1.5	1538	EPA DHA
King Prawns	0.09	0.12	1:1.5	120	EPA DHA
Melon (cantaloupe)	0.035	0.046	1:1.5	23	ALA
Kale (cooked)	0.289	0.371	1:1.5	186	ALA
Baked beans	0.13	0.15	1:1	180	ALA
Mayonnaise	14.1	5.83	2.5:1	875	ALA
Beef mince	0.36	0.12	3:1	180	Mostly ALA
Ice cream	0.24	0.08	3:1	32	ALA EPA DHA
Pizza (Margarita)	1.06	0.33	3:1	182	Mostly ALA
Victoria Sponge cake	1.16	0.36	3:1	14	ALA
Hemp seeds	28.74	8.68	3.5:1	1215	ALA
Chicken breast	0.41	0.11	4:1	165	Mostly ALA
Scone	0.98	0.21	4.5:1	126	ALA
Milk (semi-skimmed)	0.05	0.01	5:1	5	ALA EPA DHA
Walnuts	39.29	7.47	5.5:1	224	ALA
Edamame beans	2.33	0.42	5.5:1	504	ALA
Ham	0.44	0.06	7.5:1	45	Mostly ALA
Tofu	4.34	0.582	7.5:1	437	ALA
Bacon Rashers	2.41	0.31	8:1	186	Mostly ALA
Cheese - Cheddar	1.22	0.147	8:1	88	ALA EPA DHA
Eggs - mixed source	1.31	0.13	10:1	141	ALA EPA DHA
Chocolate	1.03	0.1	10:1	5	ALA
Biscuits (averaged)	1.85	0.155	16:1	6	ALA
Doughnuts (glazed)	2.15	0.12	18:1	77	ALA
Crisps	2.44	0.07	35:1	21	ALA
Almonds	10.19	0.27	38:1	8	ALA

WITHIN OPTIMAL OMEGA 6:3 RATIO

OUTSIDE OPTIMAL OMEGA 6:3 RATIO

BETTER YOU, BETTER TOMORROW

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