About Omega-3 and Omega-6 Essential Fatty Acids

The omega-3 and omega-6 oils are the essential fatty acids (EFA's). There are omega-9 oils, but these are not essential because the body can produce omega-9 oils from other oils. However, omega-3 and omega-6 oils MUST come from your diet because the body cannot make them. Not only must you eat both of these oils, but you must eat them in approximately the right proportion relative to each other. Too much omega-3 will lead to omega-6 deficiency, and too much omega-6 will lead to omega-3 deficiency. The human brain contains omega-3 and omega-6 EFA's in a ratio of 1:1. For a healthy person, eating these oils in a 1:1 ratio may be ideal. However, the present day typical diet has these oils in a ratio of about 1:10 due to a preponderance of vegetable oils in the diet that contain virtually no omega-3 and lots of omega-6. For therapeutic purposes, to restore balance in the body a ratio of 2:1 is useful.

The EFA's are MAJOR nutrients needed in tablespoon amounts each day (adults need about one tablespoon for every 50 pounds of body weight). If you eat enough of the omega-3 and omega-6 essential fatty acids in proper balance, then they are used by the body to produce energy (improving strength and endurance, plus faster recovery from fatigue), they improve the quality of your blood so that oxygen and nutrients are transported more efficiently, and the mind is more alert. Animals also benefit from eating a proper balance of omega-3 and omega-6 essential fatty acids, though the quantity they need will vary according to body size and other factors.

Other benefits from consuming the omega-3 and omega-6 essential fatty acids in proper balance include:

- you have more energy so you feel inclined to exercise more, with all the benefits that exercise brings;
- cravings for sugar and carbohydrates are less. If not used by the cells as fuel, these carbohydrates are converted by the body to saturated fat and stored. Here is a reason why eating the right fats helps you lose weight;
- the brain is made mostly from fat. Eating omega-3 and omega-6 essential fatty acids in proper balance leads to better brain development, higher IQ, greater alertness and calmness of mind. It is very important that pregnant mothers consume these essential fats for proper development of the fetus. These essential fats are of great help for children with learning problems, hyperactivity and other behavioral problems;
- improvements are seen in many disease situations including depression, mental illness such as schizophrenia, Alzheimer's disease and senile dementia, Parkinson's, Lou Gehrig's disease (ALS), and multiple sclerosis;
- skin becomes softer, tans better, and problem areas (dry, flaky, oily) tend to clear up. Hair and nails improve. The EFAs are sometimes considered to be "edible cosmetics";
- the EFA's come out as part of sweat, and carry with them fat soluble pesticides and other harmful chemicals that they encounter in the body. This makes the essential fats a useful aid to hyperthermia;
- the EFA's help prevent "leaky gut", food allergies, and reduce inflammation;
- all the organs and glands require the essential fats in order to function properly;
- the EFA's are required for sperm formation;
- women need more EFA's than men because EFA's are taken up by the fetus during pregnancy. Not knowing this, many women experience extreme deficiency in EFA's, with all the problems this involves. This is a reason why women experience more of certain diseases than men, including depression (including post-partum depression), fibromyalgia, lupus, thyroiditis, multiple sclerosis, Lou Gehrig's, and other degenerative conditions. The health of the fetus is also at risk as the mother's EFA's become depleted;

- blood platelets are less "sticky" leading to improved circulation, lower blood pressure, lower risk of heart attacks and strokes, the kidneys function better resulting in removal of excess water from the body (a partial cause of overweight), mineral metabolism is better resulting in stronger bones, the immune system functions better;
- plus many other benefits as listed on Udo Erasmus' web site http://www.udoerasmus.com/articles/udo/fthftk.htm

If your diet is insufficient in either omega-3 or omega-6 oils, then you will experience a range of deficiency diseases or symptoms. Omega-3 deficiency is probably the most common nutrient deficiency in the modern world. Omega-6 deficiency is rising as a result of people eating low fat diets.

Ratio of Omega-3 EFA's / Omega-6 EFA's in Edible Oils

	Omega-3 EFA's	**Omega-6 EFA's**
Pumpkin	0 - 15%	42 - 57%
Walnut	5%	51%
Soya Bean	7%	50%
Hemp	20%	60%
Chia	30%	40%
Flax	**58%**	**14%**
Olive	**None**	**10%**
Sesame	None	45%
Corn	None	59%
Grape	None	59%
Sunflower	None	65%
Safflower	None	75%

Due to the widespread use of refined oils such as corn, soy, canola, sunflower and safflower, the modern diet contains insufficient omega-3 and too much omega-6 . This is a situation that contributes to cancer and many other diseases. However, too much omega-3 can also cause health problems. A healthy balance between omega-3 and omega-6 essential fatty acids must be achieved. Regarding the balance between omega-3 and omega-6, Udo Erasmus has concluded that 3.5 : 1 is too high and the modern diet containing 1 : 10 is too low. He suggests that for therapeutic purposes the upper limit should be about 2.5 : 1 with 2 : 1 being optimum. This allows a little extra omega-3 oil to balance previous excess omega-6, plus it balances omega-6 coming from foods.

This is why we recommend a half and half mix of flax oil and extra virgin (green) olive oil for use in salad dressings, etc. From the above table we see:

	Omega-3	**Omega-6**
Flax Oil	58%	14%
Extra Virgin Olive Oil	none	10%
Total	58%	24%

By combining equal quantities of flax oil and olive oil, the resulting combination oil has a ratio of approximately 2 : 1 between omega-3 and omega-6 oils.

Conversion of Oils by the Human Body

Omega-3 Essential Fatty Acids	**Omega-6 Essential Fatty Acids**
ALA alpha-linolenic acid, the basic omega-3 fatty acid found in flax oil and green leafy vegetables	LA linoleic acid, the basic omega-6 fatty acid found in olive oil
EPA eicosapentaenoic acid found in fish oils	GLA gamma-linolenic acid found in evening

	primrose oil
DHA docosahexaenoic acid found in fish oils	AA Arachidonic acid, the major n-6 in the brain, found in meat, eggs and dairy products
DPA docosapentaenoic acid found in liver lipids of cattle; herring oil	DGLA dihomogamma-linolenic acid is used by the body to make hormones.
SDA stearidonic acid found in hemp seed, black current seed.	

The basic omega-3 essential fatty acid is alpha-linolenic acid (ALA). There are two omega-3 derivative oils found in fish oils. These are EPA and DHA. The body has the capability to convert ALA into EPA and DHA when required. The conversion process is facilitated by having lots of ALA for the body to work with. If you wish to bypass the conversion process by eating fish oil, then Dr. Williams recommends that you eat tinned sardines. Sardines are short-lived fish that do not have time to accumulate mercury such as is found in larger fish. Also, eating sardines bypasses the many potential problems involved in extracting fish oils that can significantly reduce its healthfulness. Plus, sardines are one of the best sources of nucleotides, an anti-aging nutrient with many health benefits.

The basic omega-6 essential fatty acid is linoleic acid (LA). Given enough LA to start with, the body converts LA into GLA, DGLA, and AA in various tissues, according to need.

Vitamins (B_3, B_6, C) and minerals (zinc, magnesium) are necessary for this conversion to take place.

Conversion between omega-3 and omega-6 does not take place in the body. This is why BOTH are considered ESSENTIAL.

From "Saturated Fats and the Kidneys" by Mary G. Enig, PhD. "the conversion of the flax oil-type omega-3 fatty acid (alpha-linolenic acid) to the fish oil-type omega-3 fatty acids (EPA and DHA) is enhanced when the diet contains saturated fat such as coconut oil. This conversion is hindered when there is extra omega-6 oils in the diet.[4]" 4. Gerster, Int J Vitam Nutr Res 1998;68:159

About Omega Oils

Fats and oils are chains of carbon atoms. These carbon atoms link to each other and can also link to oxygen and hydrogen (in other words, fats and oils are hydrocarbons). With saturated fat, all possible links for hydrogen atoms are occupied by hydrogen atoms. With unsaturated fats, some of the links are still available.

Sometimes there is a double bond between two of the carbon atoms. A monounsaturated fat has one double bond. A polyunsaturated fat has multiple double bonds.

Omega-3 is the name of a family of polyunsaturated fatty acids. In this family, the first double bond is between the third and fourth carbon atoms as counted from from the methyl end, hence the name Omega-3 or N-3. The word omega comes from "alpha and omega" with "alpha" representing the beginning and "omega" the end.

Omega-6 is also the name of a family of polyunsaturated fatty acids. All fatty acids in the omega-6 family contain their first double bond between the 6th and 7th carbon atoms as counted from the methyl end, hence the name Omega-6 or N-6.

For more information read:

Enig, Mary G., Know Your Fats: The Complete Primer for Understanding the Nutrition of Fats, Oils and Cholesterol, Bethesda Press, 2000.

Erasmus, Ph.D., Udo, Fats that Heal, Fats that Kill, Alive Books, 1993.