

# Health PERSPECTIVES

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## Natural Medicine

O N L I N E

### Life in the Balance

#### The Critical Need for Omega-3 Supplementation

By Jade Beutler R.C.P.,R.R.T.

Imagine the impact of a shift in dietary patterns so rapid and radical that it adversely effects thousands of bodily metabolic functions simultaneously. Perhaps a world-wide famine, global water or atmospheric pollution and/or radiation could pose such a threat by contaminating or robbing our food of nutrients. The fact of the matter is the scenario given here is not hypothetical but exists here and now. Though not as obvious as a global catastrophe, the true cause is much more insidious and began with the industrial revolution and the processing of food stuffs to facilitate national and global transportation, packaging and stability.

Throughout human history mankind has ingested an approximate equal proportion (1/1 ratio) of Omega-6 to Omega-3 fatty acids. The Omegas 6 and 3 are two of forty-nine known *essential* nutrients. As essential nutrients they cannot be synthesized by the body, but must be ingested directly in foods or in the form of dietary supplements. The relationship of equivalence between the two Omegas is critical because they self-check each other in a delicate balance to regulate thousands of metabolic functions through prostaglandin pathways. (Fig. 1) Nearly every biologic function is somehow interconnected with the delicate balance between Omega-6 and Omega-3. Omega-3s are intimately involved in the control of inflammation, cardiovascular health, myelin sheath development, allergic reactivity, immune response, hormone modulation, IQ, and behavior. A seemingly minor, yet major change in Omega balance

dictated by dietary ingestion has absolute deleterious health effects. The rapid change in dietary fat ingestion within only the last 50-100 years has bewildered human bio-physiology created to function optimally on equal proportions of dietary omegas.

Diets that provide Omega-6 oils at the expense of Omega-3 stimulate pro-inflammatory pathways in the body. While Omega-3's on the other hand stimulates anti-inflammatory pathways. As a result Omega-6 has been coined as "bad" and Omega-3 as "good." In fact both are *essential* for human health and it is the balance of the two in relation to each other that is important. Dominant Omega-6 in the body can create a

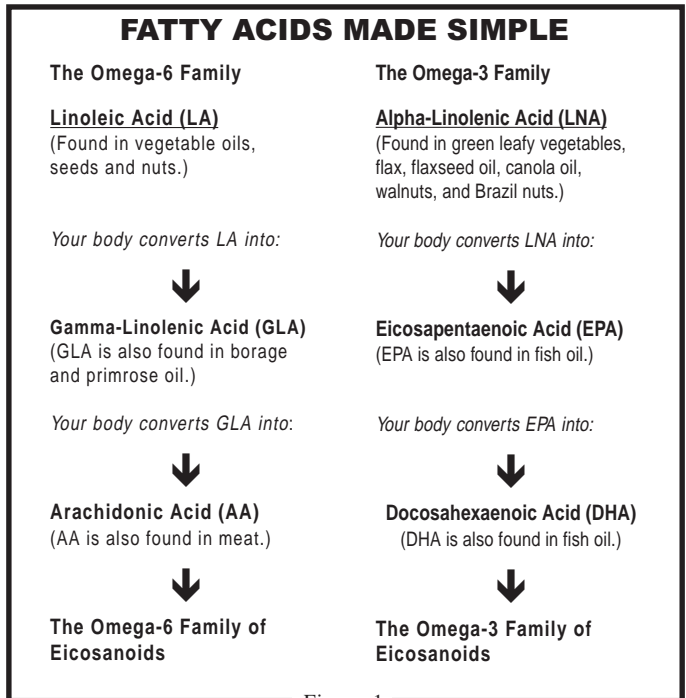


Figure 1

situation that promotes chronic inflammation, propagation of cancer, heart disease, stroke, diabetes, arthritis and auto-immunity.

The body's inflammatory response is intimately regulated by Omega-3s. The inflammatory response was created to respond to acute injury or microbial attack. However, if the inflammatory response is needlessly provoked, damage to tissues and organs of the body occurs. The reduction of Omega-3 in the diets of industrialized nations has created a situation of chronic inflammation in these people. In this case, the symptom of inflammation precedes the disease. However, as inflammation leads to disease a vicious circle of inflammation and disease is formed.

### Landmark Study Identifies Leading Cause of Degenerative Disease

How important is the balance between Omega-6 and Omega-3? A deficiency of Omega-3 is positively correlated with over 50 diseases and illness including the dreaded diseases of Cancer, Heart Disease, Diabetes, Stroke and Arthritis. (Fig. 2) The so-called Western degenerative diseases have risen in a near perfect linear fashion with the elimination of Omega-3, and the over-provision of Omega-6 in the food chain. In many regards saturated fats may have been ruled guilty by association as the genesis of cardiovascular disease appears to be more closely related to a rise in vegetable

oil ingestion than it does to saturated fat. (Fig. 3) Perhaps it should come as no surprise that supplemental ingestion of Omega-3 greatly improves all of the 50 known Omega-3 deficiency conditions.

In a landmark study, Japanese researchers have discovered the leading cause of westernized degenerative diseases in Japan, if not the world. Their work has gone far to confirm the landslide of emerging scientific research which is beginning to reveal that the genesis of degenerative diseases is owed to a drastic reduction in the ingestion of Omega-3 in relation to increased ingestion of Omega-6. Their findings came after an exhaustive review of over 500 peer-reviewed studies and after accounting for all known and suspected causes for degenerative illness. Perhaps most impactful are the words of the Japanese researchers themselves excerpted from the study summary:

"In this review, we summarize the evidence which indicates that increased dietary linoleic acid (Omega-6) and relative Omega-3 deficiency are major risk factors for western-type cancers cardiovascular and cerebrovascular diseases and also for allergic hyper-reactivity. We also raise the possibility that a relative Omega-3 deficiency may be affecting the behavioral patterns of a proportion of the young generations in industrialized countries." It is proposed that

### Afflictions Associated with a Deficiency of Omega-3 Fatty Acids

- |                        |                           |                        |                    |
|------------------------|---------------------------|------------------------|--------------------|
| • Acne                 | • Cancer                  | • Kidney Disease       | • Psoriasis        |
| • AIDS                 | • Cystic Fibrosis         | • Learning Disorders   | • Reyes Syndrome   |
| • Allergies            | • Dementia                | • Leukemia             | • Schizophrenia    |
| • Alzheimer's          | • Diabetes                | • Lupus                | • Stroke           |
| • Angina               | • Eczema                  | • Malnutrition         | • Vision Disorders |
| • Atherosclerosis      | • Heart Disease           | • Menopause            |                    |
| • Arthritis            | • High Blood Pressure     | • Mental Illness       |                    |
| • Autoimmunity         | • Hyperactivity           | • Metastasis           |                    |
| • Behavioral Disorders | • Infection               | • Multiple Sclerosis   |                    |
| • Breast Cancer        | • Immune Deficiencies     | • Neurological Disease |                    |
| • Breast Cysts         | • Inflammatory Conditions | • Obesity              |                    |
| • Breast Pain          | • Intestinal Disorders    | • Post Viral Fatigue   |                    |

*Reference: Medline Medical Database 1999: Review of 1757 peer-reviewed articles*

Figure 2

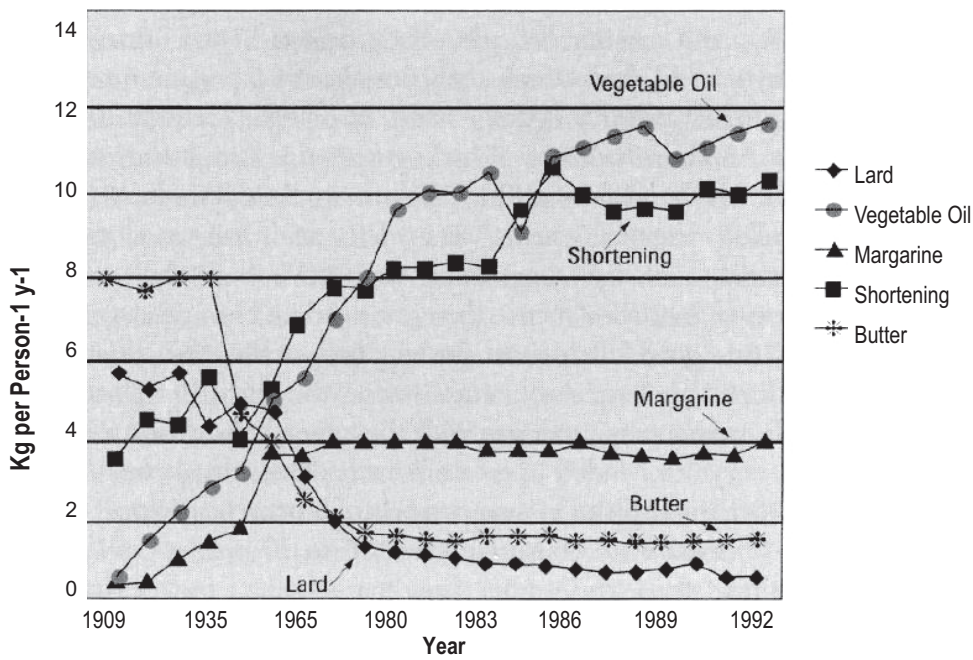


Figure 3

dietary intervention with Omega-3 supplementation, and the reduction of Omega-6 in the diet - could successfully reverse rising trend toward westernized degenerative diseases in Japan, and the world. The dietary transition to a westernized diet in Japan occurring in the last 50 years and the subsequent rise in degenerative disease is merely a microcosm of the transition which occurred in the United States beginning with the Industrial Revolution.

### Omega-3 • Nature's Endangered Nutrient

With the coming of the industrialized revolution roughly 100 years ago came the advent of the screw-nut expeller press for the processing of vegetable/seed oils. Vegetable oils and seeds are dominant in Omega-6 fatty acids, but most are completely devoid of complementary Omega-3 fatty acids. The processing of oils derived from corn, peanut, safflower and sunflower created an extremely concentrated source of Omega-6, at the expense of Omega-3.

Meanwhile, modern methods of animal husbandry were developed to purposely fatten livestock for slaughter. The protocol to date involves pen feeding livestock with carbohydrate rich grains teeming with Omega-6, yet devoid of Omega-3. As a result, the tissues

of domestic livestock contain considerably more Omega-6, at the expense of Omega-3, compared to livestock raised as range-free and wild game. Eggs, once a good source of Omega-3, have also fallen victim to progress. Chickens, like cattle, are fed a diet absent of Omega-3, and as a result their eggs are also deficient. Fish, perhaps the most well known source of Omega-3, have also been negatively effected. Chances are the fish on your dining table was

"farm" raised and did not eat phytoplankton that creates Omega-3. Refined food manufacturers were quick to learn that Omega-3 significantly decreased the shelf-life and therefore the marketability of their products. Dietary sources of Omega-3 are purposely avoided in the production of processed foods.

Making matters worse was the invention of hydrogenation, a chemical reaction occurring when polyunsaturated vegetable oils are exposed to high heat in the presence of hydrogen and a catalyst such as nickel. Hydrogenation "trans" forms formerly liquid polyunsaturated fats to semi-solid saturated fat-like molecules. Any trace of remaining Omega-3 is hence trans-esterified into a toxic compound. An astounding study released by Harvard Medical School and published in the American Journal of Clinical Nutrition exposes the ingestion of "trans" fatty acids as the cause for 30,000 premature deaths annually. Hydrogenation affords savvy food manufacturers the shelf stability they desire and the "mouth feel" consumers crave. As a result it is nearly impossible to find a processed food stuff that does not include partially hydrogenated oil as a primary ingredient. Strong consumer backlash of the dangers of trans fatty acids has forced the U.S. government and the FDA to consider listing

### Polyunsaturated Fatty Acid Content in Typical Western and Hunter-Gatherer Diets\*

Diet	Linoleic and Linolenic Acids	Long-Chain w6 and w3 PUFA	w6/w3 Ratio
<i>g fatty acid type/person/day</i>			
Western diet	12.3	0.2	12
Hunter-gatherer diet	3.3	2.3	2.4

\*Modified from Sinclair AJ., O'Dea K. Fats in human diets through history: Is the Western diet out of step? In: Wood JD, Fisher AV, eds. *Reducing fat in meat animals*. Elsevier: London, 1990: 1-47.

Figure 4

"trans" fatty acids in the Nutrition Facts Panel under the designation of a saturated fat.

The combination of the above factors has resulted in the near extinction of Omega-3 in the food stream, amid a glut of commercially processed and refined Omega-6. If Omega-3 were an animal, it would be on the endangered list. With the exception of the trace amount of Omega-3 found in greens, sea-vegetables and some nuts and seeds, dietary sources are nil to none. The exception comes in the form of deep water ocean fish and flaxseeds, and flaxseed oil. Unfortunately for people of industrialized nations, dietary habits have shifted from whole-foods consisting of fresh fruit, vegetables, beans, legumes and lean cuts of wild game and free ranging cattle to that of highly refined foodstuffs, domesticated meats and soft-drinks. Consequently, very little Omega-3 is consumed in the average diet. (Fig. 4)

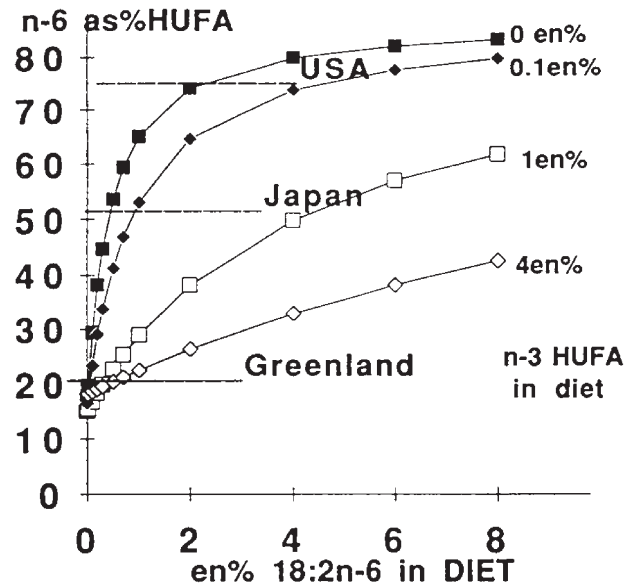
### A Journey Back to Balance

Rapid changes in food processing technology and animal husbandry have created a severe imbalance of Omega-6 to Omega-3 that defies correction through dietary modification alone. However, the good news is that we can work to correct this imbalance in our body by supplementing our diet with Omega-3.

Currently the ratio of Omega-6 to Omega-3 in the American Diet ranges from 10/1 to 20/1, and in Japan 4/1 - all grossly in favor of Omega-6. So much so that in North America Omega-6 constitutes 7% of calories consumed or about 15 grams per day. Compare this with

only 0 - to 0.3% of calories consumed as Omega-3 per day! Despite these extremely low levels a long-term study in the U.S. showed that people in the upper quintile of Omega-3 ingestion (a mere 0.66 g/day) had 40% fewer cardiovascular deaths. (Fig. 5)

Therefore the first practical advice is to consciously limit the amount of Omega-6 in the diet. This can be accomplished by limiting the use of Omega-6 dominant vegetable oils such as safflower, sunflower, peanut and corn oils. Nearly all processed foods contain Omega-6 usually, but not always in the form of "partially" hydrogenated oil. Partial hydrogenation contains both toxic trans-estrified molecules and viable Omega-6, a particularly harmful combination. Despite your best efforts it is simply impossible to eliminate the majority of extraneous Omega-6 your diet.



The proportion of n-6 eicosanoid precursors maintained in phospholipids. Ingestion of n-3 HUFA decreases the relative proportion of n-6 HUFA (ordinate axis), which reflects the probable intensity of n-6 eicosanoid response when stimulated. Reported values for U.S., Japan, and Greenland are indicated on the ordinate axis.

Figure 5

## Omega-3 Supplements

There are currently over 200 products sold under the category of Supplemental Oils in natural foods stores. Every conceivable variation and blend of therapeutic oils exist, many are contradictory and formulated in complete disrespect for the current Omega-6 to 3 crisis. So called "balanced" oils containing a 50/50 ratio of Omega-6 to Omega-3 do nothing more than sustain the status quo in the body - fanning the flames of inflammation and disease. (Fig. 6) A 50/50 ratio would seem to make sense since this is the exact ratio that is desired in the body. However supplementing with a 50/50 ratio when the body already has 20 times more Omega-6 does little or nothing to correct imbalance. The only way to begin the journey back to balance is by consumption of oils rich in Omega-3. This process of elimination reduces the field from 200 product variations to two, fish oil and flax oil.

Flax oil is the world's most abundant source of Omega-3 containing a whopping 55% by weight. Flax oil provides the true *essential* Omega-3, alpha-linolenic acid (LNA). LNA is further converted by the liver to Eicosapentaenoic acid (EPA) and Docosapentaenoic acid (DHA), long-chain Omega-3 fatty acid molecules. Fish oils are by-products of the fishing industry and a direct source of EPA and DHA. The question is which to take, flax oil or fish oil? Given your unique nutritional needs, either or both may be the answer. Important therapeutic, safety, economic and ecological considerations should be made.

## Therapeutic Considerations

The Omegas LNA, EPA, and DHA each offer unique and varied therapeutic and preventative properties. Ideally the body converts the precursor LNA to the derivatives EPA and DHA, thus providing a rate limiting effect tailored to your specific biological needs. However there has been some debate as to whether LNA is efficiently converted to EPA and DHA. A study published in the American Journal of Clinical Nutrition revealed that when the diets of 30 men were supplemented with flax oil, EPA concentrations increased 2.5 fold in plasma fractions and neutrophil phospholipids. Ironically, when the men supplemented with flax oil were compared to men supplemented with fish oil, the flax oil group maintained higher EPA concentrations. A subsequent study revealed that approximately 3 - 6% of LNA is converted to EPA and 1.9 - 3.8% to DHA. This would equate to approximately 231-462 mg. of EPA and 146-292 mg. of DHA per every Tablespoon of flaxseed oil consumed. These levels fall slightly short of the proposed recommended daily intake of combined EPA/DHA of 650 mg. on the low end, and in excess of 650 mg. on the high end as elucidated at a recent symposium held at the National Institutes of Health in Bethesda, Maryland. Taking the recommended dosage of 1-2 tablespoons of flax oil daily fulfills the requirement for LNA, EPA and DHA.

Figure 6

## Fueling the Fire

**Foods, vegetable oils and nutritional supplements dominant in, or equal in proportion of Omega-3 to Omega-6 fatty acids.**

	Omega-6	Omega-3	Ratio
Processed Foods	varies	None	100/0
Safflower Oi	79%	None	100/0
Sunflower Oil	69%	None	100/0
Corn Oil	60%	None	100/0
Peanut	30%	None	100/0
Walnut	51%	5%	5/1
Soy Oil	50%	8%	6/1
Canola Oil	24%	10%	2.5/1
50/50 Oil mix	50%	50%	1/1



Two Tablespoons of Flax Oil containing 15,400 mg. of Omega-3 goes far to negate the approximate 15,000 mg of Omega-6 consumed on a daily basis. On the other hand, it is rare to find fish oil supplements that exceed 500 mg. of Omega-3. Therefore, flax oil is the only realistic choice for addressing overt Omega-6 to Omega-3 imbalance.

### Safety Considerations

Lipid peroxidation occurs when oil containing polyunsaturated fatty acids are exposed to excessive heat, light or oxygen. The more highly unsaturated a fatty acid molecule, the more susceptible to peroxidation. Therefore LNA is more stable than EPA, and EPA more stable than DHA. Fish oils must undergo complex refining to reduce odor, peroxides, free fatty acids and potential toxins due to contaminants such as DDT and methylmercury. Despite these measures standards of quality for fish oils have proven extremely inconsistent. Many companies have been penalized for manufacturing fish oils in excess of toxicity guidelines. Furthermore, several studies have revealed that when fish oils are randomly tested for peroxide values, many of these products exceed the guidelines set by the World Health Organization (W.H.O.) of 10 meq/kg determining rancidity.

In comparison, most of the flax oil products on the market are gently expeller pressed without harsh refinement and are derived from organic seeds. The result is a product that is free of chemical contaminants and extremely low in lipid peroxides. For example, one well known American manufacturer of flax oil maintains peroxide levels between 0.1 - 0.5 meq/kg post extraction. Liquid flax oil products are generally found refrigerated offering further protection.

### Economic Factors

An estimate of cost for a daily fish oil supplement providing a therapeutic dose can exceed \$60.00 per month. Whereas a month's supply of flax oil at a dose of 1 Tablespoon a day will cost less than \$14.00. (Fig. 7) According to researchers reporting in the American Journal of Clinical Nutrition on the use of flax oil vs. fish oil on tumor regression, "...this stratagem is unsuitable for widespread use because of the high cost of encapsulated fish oil or fish oil concentrates and because of the inconvenience of daily ingestion of moderately large numbers of capsules."

### Ecological Considerations

A recent fishing moratorium in China based on dwindling supply sheds light on the fact that the worlds provision of fish may not be a sustainable resource. While fresh (non-farmed) fish are an excellent source of long chain Omega-3's EPA and DHA, fish oil supplements have proven less reliable. Flax oil, manufactured from flaxseeds, is a sustainable resource and is valuable in the rotation and promotion of organic crops.

COST COMPARISON OF EFA PRODUCTS		
Source	Daily Dosage*	Average Mo. Cost
<b>Omega-6 Oils</b>		
Evening Primrose Oil (9% GLA)	1.4 9 GLA	\$90.00
Black Currant Oil (17% GLA)	1.4 9 GLA	\$90.00
Borage Oil (capsules) (22% GLA)	1.4 9 GLA	\$90.00
Borage Oil (Liquid)	1.4 9 GLA	\$60.00
<b>Omega-3 Oils</b>		
EPA (fish oils) (180 mg TPA/1000 mg)	1.8 9 EPA	\$70.00
Flax Oil (capsules) (55% alpha-LA)	5.0 9 alpha-LA	\$18.00
Flax Oil (liquid) (55% alpha-LA)	5.0 9 GLA	\$12.00

\*Estimated therapeutic dosage based on clinical data.

Figure 7

## Summary

A global dietary shift unprecedented in human history favoring the ingestion of Omega-6 at the expense of Omega-3 is being owed as a primary, if not the leading cause of westernized degenerative diseases. In light of this information it is highly advisable to make conscious dietary choices to reduce the amount of extraneous Omega-6 in the diet and to ingest Omega-3 supplements in an effort to return the body to balance. The absolute best choice in accomplishing this goal is Omega-3 rich organic flax oil at a dosage of 1 - 2 Tbsp. per day.



### Biography

Mr. Jade Beutler is a board certified health care practitioner, medical investigator, journalist and author of **Understanding Fats and Oils** and **Flax for Life**. He also serves as CEO of NatureMed Research Inc., a health and nutrition research, development, sales, marketing and consultancy firm.

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