

## A NUTRITIONAL EDUCATION BULLETIN

BY

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# Essential Fatty Acids Natures Pharmacopia

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### Alpha Linolenic Acid (Omega 3)



### Gamma Linolenic Acid (GLA)



### Linoleic Acid (Omega 6)



Figure 1

Low fat has become the standard for selecting food for a healthy diet. But the general public is often confused or misinformed about the effects - *positive and negative* - of fats and oils (collectively referred to as lipids).

Despite sometimes conflicting data, the evidence is mounting showing a direct relationship between the typical high-fat Standard American Diet (the **SAD** diet) and the major degenerative diseases of our time such as cancer and heart disease.

There is now direct evidence that excessive dietary fat may well function as a carcinogen.<sup>1</sup> *However, fats (lipids) are needed in our diet.* They serve as the most efficient source of calories (9 per gram) and are essential to many body functions, particularly the production of hormones.

### The real question is how much fat (lipids) and what kind of fat do we need?

Dietary studies suggest that the most likely protective benefit of a low fat diet does not begin to appear until the fat content of the diet dips below 25% of total calories.<sup>2</sup>

Other studies indicate that it is not just the amount of fat, but the type of fat that we consume that is linked to cancer and heart disease.

Fats are classified as saturated, mono-unsaturated and polyunsaturated.

### The human body cannot function properly without two polyunsaturated fats: Linoleic (Omega 6) and Alpha-Linolenic Acid (Omega 3).

Collectively these are called **Essential Fatty Acids** (EFAs) because they are essential to normal cell structure and body function.

An essential nutrient is one that must come from the diet because the body cannot manufacture it. (Nutrients like cholesterol are nonessential because the body can make them from other nutrients.)

Both Linoleic (Omega 6) and Alpha-Linolenic Acid (Omega 3) function as components of nerve cells, cell membranes and hormonelike substances known as *prostaglandins*.

But each of these EFAs have some basic differences which, in part, explains why we need to consume both in our daily diet. Although both are 18 carbon length fatty acids, Alpha-Linolenic Acid has three unsaturated bonds, while Linoleic Acid only has two.

The different location of the first unsaturated bond gives them the more common names by which they are frequently called: Alpha-Linolenic Acid's first unsaturated bond occurs at the third carbon (see Figure 1). It is known as an

Omega 3 oil. Linoleic Acid's first double bond is at the sixth carbon. Thus, it is referred to as an Omega 6 oil (see Figure 1).

Due to these distinct differences, Linoleic Acid and Alpha-Linolenic Acid form entirely different prostaglandins. *A deficiency in either Essential Fatty Acid is associated with decreased synthesis of anti-inflammatory prostaglandins.*

Many of the beneficial effects of choosing a diet rich in plant foods are the result of the low levels of saturated fat and the relatively higher levels of essential fatty acids.

### Now there is increasing evidence that the ratio of Omega 3 to Omega 6 in the diet can play a crucial role in the development of many degenerative diseases.

**Dr. Rashda Karmali** of the Memorial Sloan-Kettering Cancer Center in New York is one of the leaders in the study of the relationship between the essential fatty acids and cancer. At a NATO Conference, *she stated that she has found that the best ratio of Omega 3 to Omega 6 for preventing cancer is a one to one ratio.*<sup>3</sup>

Most diets have become unbalanced due to the extensive processing of our food supply. Many food processors go to great lengths to remove the Omega 3 in order to increase the shelf life of foods.

Milling and refining grains to produce white flour eliminates Omega 3. Also, the refining and hydrogenation processes effectively remove Omega 3 from commercially available vegetable oils.

Another problem exists in the way our animals are currently raised. In "the good old days", animals wandered around eating a varied diet. Today, most animals raised for food are kept in feed lots where they are fed a processed grain diet from which most of the Omega 3 has been removed. Animals are like humans. They cannot manufacture Omega 3 and Omega 6. *As a result, those who consume high amounts of animal meat are likely to have an unbalanced ratio of essential fatty acids, particularly the Omega 3.*

In our body Omega 3 and Omega 6 go through a number of changes and are converted into other, more familiar families of fatty acids.

Several steps down the line in the Omega 3 family, fats called eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA) are produced from Alpha-Linolenic Acid.

On the Omega 6 side, fats like Gamma Linolenic Acid (GLA) are produced if all of the components are available, including arachidonic fatty acids.

## We need a balance and proper ratio of Omega 3 and Omega 6

The most compelling reason we need this balance is because **these essential fatty acids are precursors for prostaglandin production in the body.**

The prostaglandins are a very important group of hormonelike chemicals that regulate virtually every major body function, including blood pressure, fluid retention, blood cell stickiness, inflammation, allergies, fever, and the immune system, just to name a few!

Over fifty different prostaglandins have been discovered so far and scientists speculate that hundreds will eventually be found.

Sometimes we refer to these prostaglandins as "good" and "bad" because they can have both negative and positive effects. However, this is not technically correct because we often need both effects, but at different times.

## Blackcurrant Seed Oil one of the best sources of Omega 3 and Omega 6.

There are several plant oils available that provide some essential fatty acids: Borage, Primrose, Safflower, and Flax. Some oils, such as Flax and Safflower, lack GLA. Oils like Borage and Primrose do not contain Alpha-Linolenic Acid. While all of these oils can be good if taken in the proper ratio and balance, one oil, **Blackcurrant Seed Oil**, appears to provide a balanced profile of Linoleic, Linolenic, Alpha Linolenic (ALA) and Gamma Linolenic Acid (GLA).

Typical fatty acid profile of various oils that contain EFAs					
Oil	Blackcurrant	Flax	Primrose	Borage	Safflower
<b>Saturated</b>					
Palmitic	5-6%	4-6%	5-7%	9-12%	5-8%
Stearic	1-2%	3-5%	1-2%	2-5%	1-3%
Arachidonic	0	0	0.5-1%	0	0
<b>Unsaturated</b>					
<b>Mono</b>					
Palmitoleic	0	0	0	1-2%	0
Oleic	10-12%	16-22%	10-12%	14-19%	10-11%
<b>Poly (Omega 6 &amp; 3)</b>					
Linoleic	45-50%	12-19%	68-22%	36-40%	71-76%
Linolenic	26-30%	50-60%	9-10%	22-28%	0.4%
<b>18:3</b>					
Alpha Linolenic Omega 3	10-12%	50-60%	0	0	0
Gamma Linolenic (GLA) Omega 6	16-18%	0	9-10%	22-28%	0

Figure 2 Source: Traco Labs Product Bulletin 1996

For example, too much platelet stickiness produces blood clots that can cause strokes and heart attacks. Consequently, the prostaglandin that causes platelet stickiness is often labeled a "bad" prostaglandin. But what if you cut your finger? Now you need some platelet stickiness to form a scab so that you don't bleed to death. Now we refer to it as a "good" prostaglandin.

We need both reactions. We need different prostaglandins and, as such, we need the Essential Fatty Acid balance and ratio that provides the right response from the right prostaglandin.

Unfortunately, the Standard American Diet (SAD) frequently produces too much prostaglandin (an imbalance) which leads to platelet stickiness and blood clots. This is a major problem, as this is a contributing factor to cardiovascular disease, heart attacks, strokes and countless other problems.

Therefore, it is necessary for us to consume oils that have the proper ratio of Omega 6 to Omega 3. (See Dr. Karmali's statement above: "The best ratio is a one to one ratio.")

## Why we need Gamma Linolenic Acid (GLA)

As you can see, from Figure 1, not all sources of Essential Fatty Acids contain Gamma Linolenic Acid (GLA). In fact, in nature, there are only a few sources. One is mother's milk, which scientists have determined helps the baby develop a strong immune system. Additional plant sources include Borage, Evening Primrose and Blackcurrant Seed Oil.

In essence, GLA is the form Linoleic Acid takes when it is broken down properly in the body. However, research shows that individuals with diabetes and people who

cannot form GLA from Linoleic Acid should be sure that they have an adequate source of GLA in the diet. GLA supplementation in diabetes has been shown to improve nerve functions and prevent diabetic nerve disease.<sup>4</sup>

**GLA has a remarkable range of therapeutic properties, including a pivotal role in PGI prostaglandin production.**

In 1980, **Dr. David F. Horrobin** and scientists at the Efamol Research Institute in Kentville, Nova Scotia, suggested that, "*Cancer cells cannot make a substance that converts Linoleic into Gamma Linolenic Acid.*" This lack "may be the critical step in the malignant change in many forms of cancer." By providing Gamma Linolenic Acid, Dr. Horrobin concluded, "*physicians could normalize malignant cells and reverse cancer's growth.*"<sup>5</sup>

In a critical test of Horrobin's theory, **South Africa scientists** showed that GLA Supplements produced a "*highly significant reduction*" in the growth rate of human liver cancer cells in the test tube, up to 87 percent, and "*requires urgent further investigation at all levels, including trials in human cancer patients.*"<sup>6</sup>

**Doctors at the Children's Research Hospital of Kyoto Prefectural University of Medicine, Japan**, studied the effects of GLA on two types of human nerve cancer cells. Growth was inhibited and this was associated with "*striking membrane fatty acid changes.*" Researchers concluded that the anticancer effect of GLA is probably due to the "*cellular dysfunction*" of tumor cells after GLA was incorporated into their structures. Kyoto scientists further concluded that GLA by itself shows antitumor activities in various cell cultures.<sup>7</sup>

While scientists generally try to stop free radical activity, GLA may work by causing deadly free radicals to form in cancerous, but not in normal cells. GLA was more effective than Linoleic Acid in this regard.<sup>8</sup>

Researchers at **Rhodes University** in South Africa studied the effects of purified Linoleic Acid and GLA on melanoma cells. They also looked at the effect of Safflower Oil and Evening Primrose Oil

## The Benefits of GLA

*The rationale for supplementing the diet with GLA is to support the weakened or missing step in the production of PGI prostaglandins.*

**PGI prostaglandins play a pivotal role in:**

- Reducing the tendency of blood to clot
- Widening blood vessels and preventing vessel spasms
- Reducing the severity and extent of heart damage during a heart attack
- Preventing and relieving angina pains
- Healing ulcers caused by faulty circulation
- Supporting the immune system
- Reducing or preventing inflammation of arthritis
- Relieving the painful inflammation of arthritis
- Maintaining healthy, positive mood and mental functioning
- Supporting a healthy brain and nervous system

**Therapeutically, GLA supplements, which boost the body's natural supply of PGI, have been used to:**

- Relieve premenstrual syndrome
- Slightly improve the condition of people with multiple sclerosis
- Lower high blood pressure
- Reduce the tendency of the blood to clot
- Improve circulation and relieve pain in people with intermittent claudication
- Restore healthy skin condition in people with eczema
- Relieve inflammation and pain in arthritis

(which contain Linoleic Acid) on melanomas grown in mice. Both were found to have equal potency in inhibiting the growth of such cells.<sup>9</sup>

A group of **Scottish doctors** concluded that a fatty acid deficiency may predispose people to develop bladder cancer,

rather than itself be a result of the cancer.<sup>10</sup>

Nutritional intervention to increase the proportion of Essential Fatty Acids in the diet may have a role in the management of breast carcinoma.<sup>11</sup>

## Recommendations to achieve a balanced ratio of EFA, ALA & GLA

**1** Select a good source of cholesterol free marine lipids (derived from deep cold water fish) providing a minimum of :

540 mg of EPA\*  
360 mg of DHA

Fish oil is a good source of Omega 3 fatty acids, particularly EPA (eicosapentaenoic) and DHA (docosahexaenoic).

Biochemically EPA and DHA actually compete with, displace and inhibit arachidonic acid (a sometimes bad fatty acid) metabolism.<sup>12</sup> Recent evidence suggests that chemicals derived from Arachidonic Acid can produce a variety of metabolites that can initiate and promote tumor function and vascularization, cell proliferation, tissue invasiveness, metastasis and suppression of the immune surveillance system.<sup>13</sup>

**2** Consume a high quality plant source of Blackcurrant Seed Oil providing:

560 mg of pure Blackcurrant Seed Oil\*\*  
80 mg of GLA.

For those on a strict vegetarian diet, the consumption of additional Blackcurrant Seed Oil (a total of at least 1000 mg of Blackcurrant Seed Oil and at least 120 mg of GLA) or a variety of plant oils is recommended to achieve an adequate and balanced profile of EFAs and GLA.

Individuals with diabetes and people who cannot form GLA from Linoleic Acid should be sure that they have an adequate source of GLA in their diet. GLA supplements in diabetics have been shown to improve nerve function and prevent diabetic nerve disease.<sup>14</sup>

**3** Add healthy Essential Fatty Acids to your diet everyday. New Spirit has food based products that can easily be added to your diet to support your need for these important dietary components: **Green Magic, Golden Omega-Omega** (includes Flax Oil), and **Lecithin**.

**4** Take a minimum of 400 IUs of Natural Vitamin E daily. The best supplement is one that contains a mixed source of Vitamin E, Wheatgerm Oil & Lecithin. Vitamin E is essential to help prevent lipid peroxidation.

\* Most marine lipids will contain 180 mg of EPA & 120 mg of DHA per capsule. Therefore, it is necessary to take a minimum of 3 capsules.

\*\* It usually requires two capsules to achieve this level. The oil should be cold processed, without solvents.

## Conditions improved by Omega 3 oils\*

High Cholesterol levels  
Stroke and heart attack  
Angina

High Blood Pressure  
Rheumatoid Arthritis  
Multiple Sclerosis

Psoriasis and eczema  
Cancer (prevention & treatment)

\*Source: Julian Whitaker M.D., Dr. Whitaker's Guide to Natural Healing. Prima Publishing, 1995. p. 849-50.

*The ideas, procedures and suggestions in this article are intended to supplement, not replace, the medical advice of trained professionals. In addition, all matters regarding your health require medical supervision. Consult your physician about any condition that may require diagnosis or medical attention.*

### References

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- <sup>10</sup> Ibid.
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