The Clinical Corner
Unraveling the Mystery of Fats and Oils, part 2

To continue our discussion on fats and oils we move on to the Essential Fatty Acids. These are Polyunsaturated fatty acids (PUFAs) that we call Omega 3 and Omega 6. We cannot synthesize these in our bodies and as a result we must obtain them from diet or supplements. These oils come from cold-water fish like salmon or from vegetable sources like flax, borage or primrose.

These EFAs are a crucial component of nerve cells and all cell membranes. It doesn’t stop there. EFAs work with nutrients such as the B vitamins and key minerals like zinc to increase and sustain our rate of metabolism. Very important in the control of diseases is the conversion of EFAs to prostaglandins as a product of fatty acid metabolism.

These prostaglandins are hormone-like substances derived from the 20 carbon chain fatty acids (Eicosapentaenoic acid, Di-homogamma-linolenic acid and Arachidonic acid).

It may be a bit of an over-simplification, but think of Prostaglandin 1 (PG1) and Prostaglandin 3 (PG3) as the good prostaglandins. PG1 and PG3 regulate inflammation, swelling and the allergic response. They are critical to the regulation of nerve transmission as well as the regulation of hormone synthesis and steroid production.

Prostaglandin 2 (PG2) series can be thought of as the bad prostaglandins – but this is true only when they are produced in excess. The body’s natural aging process increases levels of PG2. Excess PG2 has been linked to platelet stickiness, leading to hardening of the arteries, strokes and heart disease. PG2 in excessive amounts has been tied to many forms of cancer, all inflammatory diseases, depression, water retention, dysmenorrhea, osteoporosis, pain, eczema and edema.

When we consume the Omega 3 fatty acids we promote the release of Series 3 prostaglandins. We can approach this synthesis in several ways. We can consume ALA (Alpha-linolenic acid) and convert through several enzymatic steps to Eicosapentaenoic acid (EPA). Alpha-linolenic acid is highly concentrated in certain plant oils such as flaxseed oil and to a lesser extent, canola, soy, perilla, and walnut oils. ALA is also found in wild plants such as purslane. The conversion is not straightforward, though. In order to accomplish this the body needs sufficient stores of magnesium, zinc, vitamin B6, niacin and vitamin C. An improper diet or vitamin/mineral deficiencies diet can block the conversion process. Excessive trans fatty acids, saturated fats and alcohol can inhibit the conversion as well. Aging further diminishes our ability to make the conversion in adequate quantities.

As I mentioned, good traditional vegetable sources of ALA are Flaxseed and Canola oil. Remember, these oils can be converted into EPA if the circumstances are right and if the key nutrients are available. Strict vegetarians will have no option but to utilize the plant sources of ALA and ensure that adequate nutrition is available to promote the conversion process.

Supplementation with EPA directly may in fact prove to be the best alternative, effectively by-passing the conversion process, which may be flawed, by disease, deficiency or age. EPA is found in cold-water fish and their oils such as mackerel, salmon and herring. Utilizing fish oils as a source of Omega 3 fatty acids has the benefit of supplying us with Docosahexaenoic acid (DHA). DHA is essential for the proper functioning of our brains as adults, and for the development of our nervous system and visual abilities during the first 6 months of life.

Omega 6 fatty acids lead to the production of both the series 1 and series 2 prostaglandins. The steps to conversion of fatty acid to prostaglandins are similar in the Omega 6 family. It can begin with Linoleic Acid (LA) which can then convert to gamma-linolenic acid (GLA) and then to dihomogamma-linolenic acid (DGLA). At this point in the process some of the DGLA converts into Arachidonic acid (AA). Of the AA 2 conversions may take place. One is conversion to PG2 and some will convert into inflammatory leukotrienes (some of these leukotrienes can be thousands of times more inflammatory than histamines).

To help visualize this we can start this process by ingesting safflower or sunflower oils (highly rich in Omega 6s) or hemp, soybean, walnut, pumpkin, sesame or flaxseed oil. This is the early LA stage or; we could enter the pathway further along at the GLA stage using Borage oil (20% GLA), black currant seed oil (15%) or evening primrose oil (10%).

Here is another factor to consider. Omega 3 consumption will tend to block the conversion or synthesis of the “bad” PG2. This occurs because there is a key enzyme called delta-5 desaturase which is needed for the production of both EPA, on the omega 3 side and AA, on the omega 6 side. It’s therefore critical to health that we consume adequate amounts of Omega 3 oils. The ideal ratio of omega 6 to omega 3 is approximately 4:1. And it’s critically important (as we’ll discuss later) to make sure all the oils are of the highest quality and not altered, oxidized or fractured by heat.

Remember that the fatty acid conversion of LA and ALA through the various pathways requires the nutrients B3, B6, vitamin C and the minerals zinc and magnesium in sufficient, available quantities. Alcohol, trans fatty acids and saturated fats can also hamper this process.

Fats That Heal Fats That Kill by Udo Erasmus is the premiere book on fatty acids. “Healing fats are required, together with other nutrients, to prevent and reverse so-called “incurable” degenerative diseases: heart disease, cancer, and Type II diabetes. Healing fats also help reverse arthritis, obesity, PMS, allergies, asthma, skin conditions, fatigue, yeast and fungal infections, addictions, certain types of mental illness, and many other conditions.”

Our next issue will focus on the practicality of what we’ve covered so far. We’ll focus on how deficiencies, excesses and particularly imbalances of these essential fatty acids are implicated in a whole host of disease states. Many of them, as you might expect, are inflammatory diseases. Most importantly though, we’ll discover how good, basic nutrition is the foundation of health and the absence of any of it main components is responsible for dis-ease.