Return to Balance™

A return to our ancestral EFA ratio increases disease resistance and reverses the trend toward chronic disease promotion by the Western Diet.

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Until recently, investigations on the effects of essential fatty acids (EFAs) on cholesterol and serum lipids, cardiovascular health, inflammation, immune function, bone density, neurological and brain development, depression, and aging have focused primarily on understanding omega-3 and omega-6 metabolism and their contribution to health and disease. Collectively, these two EFAs and their derivatives make up the highly unsaturated fatty acids (HUFA) and have led to recommendations for increasing them in the diet while lowering saturated fat and total fat to reduce the risk of cardiovascular disease, obesity, diabetes, inflammatory disorders and cancer. The abundance of these studies have not yet persuaded the US government to recommend EFAs in the diet or establish a recommended daily value. Rather, the official Nutrition Pyramid reminds us only to eat fats and oils sparingly. This policy of politics neglects the most important component of fats in the human diet - the EFAs, and especially omega-3 fats. Simply stated, eating a low fat diet does not necessarily provide adequate EFA nutrition, nor does a high fat one.

Both omega-6 and omega-3 EFAs (linoleic and linolenic acid) are profoundly necessary and essential to the diet. They are the key regulators for most biological functions in the body and provide the structural matrix for cell membranes and intracellular transport with linkages to saturated fat and protein.

Much of the regulatory functions are hormonal-like coming from the prostaglandins and eicosanoids formed from EFA derivatives -- gamma linolenic acid (GLA) and di-homo-gamma-linolenic acid (DGLA), arachidonic acid (AA), eicosapentaenoic acid (EPA) and decosahexaenoic acid (DHA). These must be produced in collective harmony to each other, otherwise disease resistance is severly weakened.

The first prudent diet recommendations for maintaining a higher HUFA / saturated fat ratio emerged in the 1960's. Unfortunately, the food and oil industry has responded with more hydrogenation, margarine, vegetable shortening and refined vegetable oils. All of which negatively impact the HUFA / saturated fat ratio and suppress EFA metabolism.

EFA research continues at a fast pace. We now have a good understanding of our EFA dietary history over the last 100,000 years and our genetic adaptation establishing an optimal EFA ratio. The most significant challenges to the nutritional stability of the human diet has taken place much more recently. Wide shifts in the omega-6 / omega-3 dietary ratio began around 1920 with the introduction of refined vegetable oils and hydrogenated fats. It wasn't until the late 1950's that more prudent diet recommendations actually began to address the importance of the essential fats. However, this emphasized the desirability of omega-6 while largely ignoring omega-3 until very recently.

Today, the advancing knowledge of EFAs and their metabolism within the pool of all fatty acids, including recently introduced trans fats since the 1960's, has brought the importance of the EFA ratio to the forefront. This *essential balance* has emerged as being fundamental to growth and development, healthy disease free living, and longevity. Also, research on specific diseases has shown increasingly that EFAs are useful and necessary therapy.

What is reaffirmed most here is *what was then, is still the best now.* The human species is most genetically suited to consume a daily diet balanced in essential fatty acids – within a narrow rage less than a 4:1 omega6 / omega-3 ratio. In fact, an even ratio of 1:1 was typical of our ancestral ratio. This would mostly be provided from wild fish and game, plants and seeds. Complimentary fatty acids

included moderate amounts of monounsaturated fats and smaller amounts of unhydrogenated saturated fats.

The omega-3 family consisting of alpha-linolenic acid (LNA) and it's downstream derivatives eicosapentaenoic acid (EPA) and decosahexaenoic acid (DHA) are the most highly unsaturated and biological active EFAs, yet they are now grossly under-consumed. This is reduction in omega-3 intake is recent to the last few hundred years and unprecedented in human dietary history. LNA, derived mainly from plants has been largely stripped from modern food supply. Commercial availability of LNA in the Western diet is now confined mainly to flaxseed, canola and soy oil and walnuts. Whether canola and soy should be included here is in question because most is consumed in a highly refined and chemically processed form. The mention of "cold pressing" on bottled oils is not a guarantee of intact EFAs and oil quality as most are deodorized after pressing at temperatures up to 450°F! EFAs are easily damaged or destroyed by excessive heat.

Flaxseed oil liquid and capsules has emerged as the health food industries most popular vegetarian source omega-3 food supplement. Borage and evening primrose supply synergistic gamma linolenic acid (GLA) and most recently hemp seed oil which provides a mixture of both EFAs including GLA. Fish oils if processed with advanced molecular distillation and anti-oxidant stabilization methods to increase omega-3 concentration, eliminate pesticides and toxins and preserve freshness with low peroxidation potential provide pharmaceutical quality preformed EPA and DHA. Compared to fish oil conversion of LNA to EPA in the body is slow but adequate and little if any converts to DHA. However, LNA in itself has independent cardiovascular and anti-inflammatory health benefits. Therefore, including both sources of omega-3 in the diet is recommended.

Unfortunately, he majority of the US population does not include flaxseed or any other significant source of omega-3 in their diets compared to our ancestral diets. The current omega-6 / omega-3 ratio has been forced away from our traditionally adapted diet of 4:1~1:1 and is now on the order of 10:1~ 20:1. This is mainly due to the increase of refined vegetable oil in the diet, which a significant portion has been partially hydrogenated during the past 40 years. This is not to discredit the importance of maintaining some unrefined omega-6 linoleic acid (LA) in the diet, after all it is an essential fat. The average diet is actually lacking this EFA in it's most beneficial form -- as obtained fresh from plants, seeds and nuts. The caveat to take home here is the *essential balance* between these two highly unsaturated fatty acids – omega-6 and omega-3, is much more important than the absolute amount of one over another.

This was recently summarized in the paper, *Ratios of Linoleic to Alpha-Linolenic Acids in the Diet: Implications in the health of Humans and Companion Animals*, by Charles M. Bibus, Ph.D. of the Hormel Institute at the University of Minnesota. He presented this paper at the 1998 Proceedings of the Flax Institute of the United States. He is a renowned fatty acid researcher and expert on alpha linolenic acid, e.g. flaxseed oil. He warns that the typical Western diet has excessively high omega-6 / omega-3 ratio which seriously weakens the omega-3 status and causes an imbalance between the EFAs. This EFA ratio elevates C-reactive protein in the body an indicator of an overproduction of pro-inflammatory prostaglandins. Elevated CRP is now considered a strong risk factor for heart disease, hypertension, stroke, diabetes, Alzheimer's and cancer. He points out that lowering of the dietary omega-6 / omega-3 must occur to offer disease resistance against these inflammatory disorders. This imbalance of EFAs is among an average total fat intake of 35%-40% fat of which refined vegetable oils make up a large portion. Once abundant in the diet, the unrefined and unprocessed highly unsaturated fatty acids (HUFAs) providing omega-6 and omega-3 directly from plant vegetable, nut, seeds, wild game and cold water fish now comprise a very small amount of fat in the American diet. This is on the order of only 200 mg per day or 0.25% of the total fat intake. This may explain the finding of deficiencies of either omega-6 or omega-3 levels in men with cardiovascular disease. Therefore, the modern diet is seriously EFA depleted and imbalanced in the midst of a sea of dietary fat.

The current recommendations for the dietary EFA ratio vary in range from 3:1 to 8:1, which still leaves open the question of what is optimal? This ideally would be a EFA ratio which:

1. Does not lead to the suppression of alpha linolenic acid (ALA) metabolism or down regulates omega-3 metabolism.
2. Does not increase the arachidonic acid / EPA ratio which leads to inflammation.
3. Promotes a healthy balance of PGE1 and PGE3 prostaglandin and eicosanoid production, which are anti-inflammatory.
4. Is not being negatively impacted by the presence of partially hydrogenated trans fats, which block EFA metabolism and are highly pro-inflammatory. Trans fats also fuel the Metabolic Syndrome, such as promote abdominal obesity, insulin resistance, HDL lowering, and hypertension.
5. Works in harmony with monounsaturated fats, such as unrefined extra virgin olive oil.
6. Strengthens an individuals quality of health through disease resistance and lower mortality.

To achieve this goal, the optimal EFA ratio must include both EFAs from their most unrefined "fully reactive" sources – such as wild salmon, flaxseed, soy, walnuts, etc. It must be adequately protected from auto-oxidation and loss of EFA activity and be included as part of a background diet which removes refined and processed vegetable oils, hydrogenated fats and is not dominated by saturated fat. This will set a new dietary framework for a healthy *Return to Balance* between each EFA, linoleic and linolenic acid.

When examining the diets of free range animals vs. feed lot animals it is observed that most free range animals consume nearly a 1:1 omega-3 / omega-6 ratio. This is reflected by the high percentage of linolenic acid in their tissues. Eggs from chickens allowed to free range in the barnyard also contain a 1:1 EFA ratio. The developing brains of humans require large amounts of EFA during the first 3-5 years following conception. The adult human brain has an EFA ratio of 1:1. Apes and dolphin species also share this. The traditional diets of people living in Crete and Japan have the lowest disease risk indexes, e.g. the lowest cancer and heart disease rates in the world. They consume vastly different diets yet share a common dietary link. They consume 7-10 times higher amounts of linolenic acid from plant sources than the US / Canadian diet. They also eat an abundant amount of fish containing EPA / DHA. They eat less red meat, and more fruit and vegetables, and consume no processed vegetable oils. This is reflected in their average dietary EFA ratio of 3-4:1. This is our closet living example of a modern society population consuming a near ancestral EFA ratio. Is this optimal ratio for the new century or should the goal be lower yet?

An experimental study by Bibus, has attempted to improve the omega-3 status of humans subjects by consuming 20 grams of ground flaxseed per day. This provides around 4 grams of omega-3. He showed that it is possible to reduce the omega-6 / omega-3 ratio (LA / LNA) over a feeding period of one year by an average of 28% from 7.9 to 5.7. This ratio was reduced in a linear fashion throughout the study and reached its lowest point of 4.12 at month twelve. If sustained this would be close to a 50% reduction in the EFA ratio. But is this enough to be disease preventive rather than disease promoting? Also, what is the relative relationship between an optimal EFA intake ratio and optimal plasma and tissue ratios? Do they eventually become one and the same? The answer obviously depends on the total of all fatty acids in the diet, including saturated and monounsaturated fats and the ratios and amounts compared to EFAs. In other words, it's all a question of balance.

According to Bibus, though the results of this flaxseed study met the recommended values of 3-8:1, it fell short of its intended target of 3-4.1. Because linoleic acid actually tended to increase in the plasma toward the latter part of the study he has suggested there was still adequate linoleic acid in the diet to suppress the metabolism of linolenic acid. Meaning subjects also need to simultaneously reduce refined vegetable oils to not suppress linolenic acid. However, it may have been enough to reduce cardiovascular mortality because other studies have shown fish consumption a few times per month

appears to reduce mortality. Shedding some insight on this, one serving of fatty fish per week corresponds to an EPA+DHA intake of about 600 mg per day. The conversion of linolenic acid to EPA in the presence of a high saturated fat diet is approximately 6% and 3.8% for DHA. When the diet is rich in omega-6 (e.g. greater than 35 grams per day and a omega-6 / omega-3 ratio of 10-20:1), the conversion is reduced by 40% to 50%. It therefore can be estimated that 5-7 grams of linolenic acid daily, even in a high saturated fat diet, most likely offers cardiovascular protection. Even greater conversion to EPA + DHA can be expected when omega-6 vegetable oils are removed and saturated fats are reduced (but not entirely restricted).

This flaxseed study attempted to examine the impact of lowering the dietary linoleic / linolenic ratio through flaxseed feeding containing a rich source of omega-3. Bibus recommends that future studies should be designed to address what EFA dietary intake will be needed to reduce the ratio to the range of 1:2 - 3:1. If we are to model our diet to other cultures with better health and better omega-3 status, this must occur. It is also reasonable to suggest now that our ancestral ratio of 1:1, being present up until 100 years ago, should be the goal for a healthy *Return to Balance.*