

# UNDERSTANDING ESSENTIAL FATTY ACIDS

What are Essential Fatty Acids (or EFA's as they are commonly known), and why are they so darn essential?

Essential fatty acids play a very important role in the prevention of cancer and heart disease, help reduce and prevent inflammatory conditions such as arthritis, Crohn's disease, ulcerative colitis, eczema, and psoriasis; they improve the softness and smoothness of your skin and provide many other health benefits. Essential fatty acids are important components of the outer skin or membrane of every cell. The membrane determines which chemicals and nutrients will be allowed to enter and exit the cell; within the cell membrane essential fatty acids are continually activated and converted into prostaglandin hormones, a process that allows essential fatty acids to supply their disease prevention and anti-aging effects to a wide range of tissues within the body

*Anti-aging and disease prevention? Sounds amazing, right?*

Well, if your terrified of eating fat, as many people on diets are, you aren't getting enough because your body cannot make this stuff. You NEED to get it through diet and/or supplements. But hang on a second, before you think "I KNEW those high-fat, carb-free programs are the best!," because not ALL prostaglandin hormones are good for you.

*Some more boring scientific stuff:*

There are three main types of prostaglandin hormones (PG): PG-1, PG-2, and PG-3. PG-1 and PG-3 have positive impacts on our health, while PG-2 can lead to highly negative effects. It encourages blood vessels to constrict and blood platelets to clot abnormally, increasing the chance of heart attack, ischemic stroke, and high blood pressure. It also encourages inflammation, worsening arthritis and other joint, muscle and tendon conditions, including Crohn's disease and colitis. PG-2 is associated with greater risk of cancer in that it prompts rapid cell division. Finally, it can make the skin dry, rough, and scaly, and aggravate a number of common skin disorders, such as eczema, psoriasis, and possibly rosacea. :-0 YIKES!

Reading that makes you want to stay away from that stuff like the plague....but unfortunately....you love it too much. You see, PG-2 is formed from a saturated fat known as arachidonic acid, found in high-fat meats and high-fat dairy products. Yep, your steaks, burgers, milkshakes, cheese and other yummy foods. You know what else makes PG-2? The over-consumption of linoleic acid, an unsaturated fat found in your typical grocery store corn oil, sunflower seed oil, safflower seed oil, and mixed vegetable oils, all of which promote the production of arachidonic acid by the body. Unfortunately, the typical North American diet is a rich source of arachidonic acid and linoleic acid, and most individuals produce too much PG-2.

You can lower your tissue concentrations of arachidonic acid by choosing

chicken, turkey or fish, instead of high-fat meat products, and non-fat or 1 percent milk and yogurt products. Remove from your diet any cheese that is more than 3 percent milk fat, and use cold-pressed olive oil or organic canola or grapeseed oil in place of other vegetable oils in salad dressings. These are good sources of monounsaturated fat, which does not participate in the formation of prostaglandin hormones and is known to help reduce cholesterol and contribute to cardiovascular health in other ways.

So now you know how to reduce the formation of PG-2, but what about the good prostaglandin hormones, PG-1 and PG-3, the ones with all those health benefits?

The key building block for PG-1 is an unsaturated fat known as gamma-linolenic acid (GLA), which is found in high concentrations in borage oil or evening primrose oil. GLA can also be formed in the body from linoleic acid (the oils we consume too much of), but individuals who suffer diabetes, eczema, or premenstrual syndrome have a defective enzyme that prevents the conversion of linoleic acid to GLA. Drinking alcohol, eating refined sugars, and hydrogenated fats (margarine, shortening, pastries, chips and other snacks) tends to inhibit this conversion as well, as does the aging process itself. For all these reasons, virtually everyone has suboptimal cell membrane concentrations of GLA, so it's a good idea to supplement especially if you have one of the conditions mentioned.

PG-3, on the other hand, is formed from an omega-3 unsaturated fat called eicosapentaenoic acid (EPA), which is found in cold-water marine fish such as salmon, mackerel, anchovies, sardines, and tuna. This is the reason that fish oil supplements are so popular, and rightfully so. The body can also convert the omega-3 fat alpha-linolenic acid (ALA) found in flaxseed oil, and chia seeds as well as walnuts, into EPA, increasing the production of PG-3, but as you can see from the chart below, it's a much quicker process to go directly from fish oil to PG-3. Fish oil, by the way, also contains docosahexaenoic acid (DHA), which enhances immune function and the development and function of the brain, and is essential to good vision. (This is why a higher DHA to EPA ratio fish oil supplement is often recommended for kids with ADHD).

PG-3 is considered very important for total body wellness, as it reduces risk of heart attacks by dilating blood vessels and discouraging abnormal blood clotting. It slows the rate of cell division and so reduces the risk, especially of breast, prostate, and colon cancer. PG-3 is also known to reduce inflammation, including skin inflammatory responses, a role it shares with PG-1.

*If you are looking to build muscle, you'll like this one:*

For exercisers, particular relevance is the anti-oxidant and acute, exercise-related anti-inflammatory nature of EPA and DHA. Since high-intensity exercise and weight training cause increases in inflammation and oxidation, reducing this response may be beneficial in improving exercise recovery. Even more interesting for people looking to build muscle, EPA and DHA supplementation has been suggested to support muscle protein synthesis and

limit muscle protein degradation. This can mean less muscle breakdown and more muscle growth.

### *Why supplement?*

Most individuals suffer unknowingly from an essential fatty acid deficiency or imbalance, thanks to modern agricultural and food processing methods and the typical North American diet. To ensure optimal essential fatty acid nutritional status, it is highly recommended to take a quality EFA supplement, preferably in the form of professional-quality fish oil. This simple practice can result in significant benefits for your health, your appearance, the rate at which your body will age, and your risk of future illness.

### *The bottom line?*

Taking fish oil daily may seem disgusting, but high quality brands like those found in our [Online Dispensary](#) make great-tasting fish oils, free from mercury and other impurities. I also highly recommend [Organic Atlantic Salmon Oil](#) from Vital Choice. Give either of those a try, you'll be glad you did! On a personal note, I used to have high cholesterol as a teenager (if you're thinking that's insane, you'd be right!) and even after changing my dietary habits it still stayed on the border. Taking a fish oil supplement daily has helped bring the levels down to normal, with no other meds required.

*A handy chart, which may or may not clarify things: :p*

# Metabolic Pathways of Omega-3 and Omega-6 Fatty Acids

## Omega-6

Linoleic Acid (LA)

Polyunsaturated oils, including flax, corn and safflower

Delta-6-desaturase

Gamma-Linolenic Acid (GLA)

Black Currant, EPO, Borage (18-24% GLA)

Dihomo-Gamma-Linolenic Acid (DGLA)

Delta-5-desaturase

Arachidonic Acid (AA)

Lipoxygenase

Cylooxygenase (COX2)

**LBT-4**  
Pro-inflammatory

**PGE-2**  
Pro-inflammatory

**PGE1**

Series One Prostaglandin  
Anti-inflammatory

**EPA appropriately blocks Omega 6 delta-5-desaturase downstream conversion**

## Omega-3

Alpha-Linolenic Acid (ALA)

Black Currant (15%) Flax (85%)

Delta-6-desaturase

Steridonic Acid (SDA)

Eicosatetiaenoic Acid (ETA)

Delta-5-desaturase

**EPA/DHA**

Fish Oil & Cod Liver Oil

Cylooxygenase

Lipoxygenase

**PGE-3**  
Anti-inflammatory

**LBT-5**  
Anti-inflammatory

Delta 6 enzymes impaired by aging, alcohol and nutrient deficiencies, trans fatty acids and elevated cholesterol.

