Not Eating the Right Fats

♦ The sun transfers its energy to essential fats - in the form of high-energy electrons, which form “electron clouds” at the double carbon bonds of the Omega-3 and Omega-6 fatty acids constituting the cell membrane. These *sun-derived “electron clouds” will resonate with incoming natural sun-energy and its products* (e.g. sunshine and food grown in the sun) to attract oxygen and energy to the cell, and so enhance energy producing oxidation.

♦ The integrity of the cell membrane affects nutrient transport into cell – *membrane integrity depends on it consisting of the right blend of both unsaturated and saturated fatty acids*. The membrane’s structural composition affects the proper transport of energy-making nutrients (and others) into the cell, and the waste by-products out of the cell. *Altered and damaged fats degrade the integrity of the cell*

High or Low Fat, Fake or No Fat?"

"How to get the Fats of Life"

HIGH or LOW FAT, FAKE or NO FAT?

On this Page:
- **We Don’t need a LOW fat diet, we need a good fat diet**
- **Unfortunately, in today’s typical Western diet:**
- **In order to be healthy**
- **Cholesterol – Our Hero!**

We don’t need a LOW fat diet, we need a GOOD fat diet

**WE CONTAIN A LOT OF NECESSARY FAT**

♦ After you remove water from your body, half of what is left is fatty acids – they make up every cell membrane, all the hormones, and also the hormone-like messengers (E.g. prostaglandins, leukotrienes), which control reactions to what is happening in the vicinity of each cell. They
combine with protein to form lipoproteins for nutrient transport in the blood, and they are needed for nerve conduction and healthy brain function.

♦ Some dietary fats are harmful, some are absolutely essential for health - We need the right fats, in the right quantities and proportions, and in a natural, unaltered form.

**MEET THE FAT FAMILIES:**
**SATURATED, MONOUNSATURATED, AND POLYUNSATURATED**

♦ Each of the fat families, **saturated**, **monounsaturated**, and **polyunsaturated** fats, has family members called **FATTY ACIDS** - A fatty acid is comprised of atoms of carbon (C), hydrogen (H) and oxygen (O), and can be visualized as a caterpillar, having a head, a tail and a body, with a carbon chain as its “backbone”. This diagram of LAURIC ACID, a member of the **saturated** fat family, depicts the general structure of a fatty acid. Examples of other fatty acids are **STEARIC ACID**, **OLEIC ACID**, **ALPHA-LINOLENIC ACID** and **LINOLEIC ACID**, each able to satisfy specific needs of the body.

![Lauric Acid Diagram](image)

♦ Fat-containing foods usually contain a combination of fatty acids - from the different fat families, but certain fatty acids often predominate in specific foods. E.g. Flax seed is rich in **Omega-3** **ALPHA-LINOLENIC ACID**.

♦ **ALL** of the **Fat Families** are needed by the body to maintain health - and although the body can manufacture **saturated** and **monounsaturated**
fats from dietary carbohydrates, *Polyunsaturated Fat must be Obtained from Our Diet*

- Despite the campaign against its consumption, saturated fat has numerous life-sustaining roles - not the least of which is to protect the heart.

- The health benefits of monounsaturated fat (E.g. in olive oil) have been recognized since bible times

- Two particular sub-families of the polyunsaturated fat family, called OMEGA-3 and OMEGA-6, are VITAL to the body’s health and CAN ONLY BE OBTAINED FROM OUR DIET - There is one polyunsaturated fat, Omega-9 MEAD ACID, which the body can make, and whose elevated presence in the blood is an indication of Omega-3 /Omega-6 deficiency.

- Several factors are often present which hinder the ability of enzymes to convert parent EFA fatty acids to their needed off-spring forms in the body - including pollution, aging, stress, consumption of trans fats, excess sugar or alcohol, diabetes, and viral infections.

For more detailed information on each of the fat families, see:

  Saturated Fat  
  Monounsaturated Fat  
  Polyunsaturated Fat (EFAs)

**Unfortunately, in today’s typical Western diet:**

1. OMEGA-3 fat is essentially MISSING

2. We consume WAY TOO MUCH Omega-6 fat

   *Creating an Omega-6/Omega-3 Imbalance that is having DEVASTATING Health Consequences!*

* Because of their counter-balancing effects it is necessary to consume about equal amounts of Omega-6 and Omega-3 fats - Until modern
times these essential fats were consumed in a more or less 1:1 ratio of Omega-6 : Omega-3, but today more typically the ratio is 20:1. This is primarily due to the invention of the expeller seed press (making omega-6 oils more available), the presence of predominantly omega-6 fats in most processed foods, and changes in farming methods, which keeps animals and birds indoors, where they consume grains rich in omega-6, and do not consume grass and bugs, rich in omega-3.

For details, see:

Omega-3 / Omega-6 Imbalance

(3) In addition to obtaining too much Omega-6 fat, much of it is devitalized by hydrogenization and some is made toxic by commercial processing methods and frying.

Damaged / altered (Toxic) fats are causing significant health issues

For information on trans fat, hydrogenated fat and other altered or damaged fats, and the health consequences of consuming them:

Damaged/Altered (Toxic) Fats

In order to be healthy:

(1) YOUR DIET MUST INCLUDE POLYUNSATURATED “ESSENTIAL FATS” OMEGA-6 AND OMEGA-3 CONSUMED IN BALANCED AMOUNTS

♦ The natural God-given diet contains perfect amounts of these essential fats (which cannot be made by your body), including the enzymes and minerals required to convert them into usable forms. This diet is found in native populations in temperate and tropical regions, whose intake of polyunsaturated fat comes from the small amounts found in legumes, grains, nuts, green vegetables, fish, olive oil and animal fat. Farm animals and birds generally no longer go outside to eat grass or bugs to increase their Omega-3 fat intake, and most ‘grocery store” oils
available in today’s U.S. market, containing mostly Omega-6 fat, are refined and toxic.

For enlightenment on the vital importance of these fats in our diet, and guidance on how to obtain them, see:

EFAs – “The Fats of Life”

Omega-3 /Omega-6 Imbalance

(2) CONSUME HEALTHY SATURATED AND MONOUNSATURATED FATS

♦ Although these can be made by your body, certain foods contain health-enhancing, short/medium-chain saturated fatty acids (e.g. coconut oil, palm oil and butter). Also olive oil has health-beneficial properties.

(3) SATURATED FAT INTAKE MUST BE MODERATED AND BALANCED WITH POLYUNSATURATED FAT

♦ Traditional hard fats are used for “body fuel”, cell membranes, and fat deposits - but when we consume more than we use, they cause us to gain weight - both by altering INSULIN function and by storing the excess. They also make the blood “sticky” and undo the benefits of the polyunsaturated “healing” fats.

- Unless we are “working it off”, we need to balance our intake of saturated fat with the balanced consumption of Omega-3 and Omega-6 healing essential fats - This done, we may fully enjoy moderate amounts of whole milk, cream butter and animal marbling fat, without any feelings of guilt or concern.

(4) YOU NEED TO STOP CONSUMING:

(a) Trans fat (i.e. partially hydrogenated fat), hydrogenated fat, and products containing these unnatural fats – to prolong shelf-life, commercial food processors sometimes deliberately hydrogenate or partially hydrogenate polyunsaturated oils, which largely removes the easily oxidized, but necessary-for-health, “active” essential fats. Any
fully hydrogenated oil will still contain some partially hydrogenated fats (i.e. trans fats).

(b) **Refined, polyunsaturated** grocery store oils and processed products containing these refined oils - These are the highly refined oils (refined by solvent extraction), which we find in transparent bottles on supermarket shelves, and should simply not be considered edible. These high-temperature processed oils have **lost much of their nutrient value** during their refining process, **contain altered, toxic fatty acids** (such as trans fats and lipid peroxides), and have been and continue to be degraded by light. Also, they are usually **made from the cheapest, most inferior, most intensely pesticide-sprayed plants**. To detract from their poor nutritional, refined, and toxic condition, advertising labels focus on positive aspects, such as “Low in Saturates” or “Cholesterol-free”, both naturally inherent in any plant seed oils.

- **Examples of refined oils typically contained in processed products:**

  **Corn, soybean, sesame, canola, sunflower and cottonseed oils**

  In contrast, oils that have been carefully cold or expeller pressed, which have not been refined, and have been properly stored in dark bottles without air, are excellent for dietary use. This is also true of products that contain these oils, provided they have not been heated to higher than 320 °F.

- **Beware the “0 TRANS FAT” Label** - Any commercial product listing a **polyunsaturated** oil almost always contains some **trans fatty acids** (tFAs). Most commercial oils are **refined, bleached and deodorized** to extend shelf-life. The deodorization step heats the oil to higher-than-frying temperatures, a level at which tFAs are created, and yet these oils are claimed to have “0 Trans Fat” - Under the U.S. Food and Drug Administration's rules, **trans fat does not have to be listed if there is less than half a gram per serving in a food**, which according to renowned fats expert Dr. Udo Erasmus, contains more than enough toxic molecules to cause harmful effects on health.
Damaged/Altered (Toxic) Fats

For guidance in buying, using and storing good oils:

Fats and Oils

(5) USE STABLE FATS FOR HIGH-HEAT COOKING

E.g. Use coconut oil, butter, which contain mostly saturated fatty acids.

Cholesterol

♦ Cholesterol is a fat that is being seriously maligned today (mainly for the purpose of selling cholesterol-lowering statin drugs). If you would like to learn the truth about this vitally important and needed fat in our diet, see:

Cholesterol - "Our Hero"

Damaged/Altered (Toxic) Fats and Oils

On this Page:
- Much of our Dietary Omega-6 fat is toxic by being Damaged or Altered
- How are Oils containing Unsaturated Fats Damaged/Altered?
- Commercial Seed/Nut/Bean Oil Production Methods
- Light /Oxygen /Heat Exposure Oxidizes Unsaturated Oils
- Hydrogenation Process produces Altered Fatty Acids
- Partial Hydrogenation produces Altered Fatty Acids
- Saturated Fats mistakenly given the Bad Rap of Hydrogenated Fat
- Health Effects of Trans Fatty Acids (tFAs)
- Health Effects of Hydrogenated Fat

Much of our Dietary Unsaturated fat is toxic by being Damaged or Altered

♦ If the temperature of a fat or oil is increased beyond its melting point enough to cause smoking, the molecular structure of the oil will change and a number of toxic molecular isomers will be produced in
the oil - remaining even after the oil cools down and/or resolidifies.

- The temperatures where this damage occurs is about half the temperatures reached in the refining and Hydrogenation processes of fats and oils - these processes destroy all of the nutritional value of our fats and oils for the sake of an extremely long shelf life - some virtually non-spoilable, “forever” foods. (Think Twinkies®);

- Most people are now aware of the presence of trans fats, but general use of this term refers to a slew of altered/toxic fats, NONE OF WHICH OCCUR IN NATURE - including cross-linked fatty acids, oxidized fatty acids, double-bond shifted fatty acids, fat-derived polymers, fat oxidation products, and others. Technically, trans fats are only one form of malformed fats.

♦ Primary sources of damaged fatty acids:

√ Refined, high-temperature extracted, antioxidant-poor, typical grocery-store, vegetable seed oils (with high Omega-6 content), and processed foods containing these oils - typical grocery store oils contain 0.5 to 1.0% damaged, extremely toxic molecules (although this seems like a small percentage, according to calculations by fat expert Dr. Udo Erasmus, this is more than enough to have harmful health consequences).

√ Foods fried in predominately unsaturated oils
√ Hydrogenated and partially hydrogenated unsaturated oils, and products containing them.

How are Oils containing Unsaturated Fats Damaged/Altered?

♦ Unsaturated oils (E.g. olive, corn, soybean, sunflower, safflower, peanut, and sesame oils) are damaged mostly by:

√ HYDROGENATION (hardening) – E.g. ;
√ FRYING
√ THE EXTRACTION PROCESS USED TO PRODUCE
**REFINED OILS** - i.e. the typical grocery store oils in clear plastic bottles.

**Commercial Seed/Nut/Bean Oil Production Methods**

- There are basically two methods of producing commercial edible oil – the expeller-press method and solvent extraction. In either method, keep in mind that the oil will be damaged if it is exposed to air, light or heat. Of these three, light is the most damaging, causing rancidity 1000 times more rapidly than oxygen.

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**NUTS, SEEDS, BEANS**
(cleaned, hulled)

_Fragrant and nutritious - containing EFAs, protein, minerals, vitamins, fiber, amino acids, lecithin, chlorophyll, phytosterols +_

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**EXPELLER-PRESSED OIL**

**COOKING**
(~248 °F, ~2 hours)
Cracks seed

**PRESS** (185-203 °F)
(Oil mechanically squeezed out)
Removes protein, fiber, some minerals/vitamins

Expeller-pressed, unrefined oil
Still contains EFAs, Oil soluble vitamins, Lecithin, Phytosterols, Some minerals +
These unrefined oils are not rancid if

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**TYPICAL SOLVENT EXTRACTED OIL**

**GRIND FINELY**

ADD then EVAPORATE SOLVENT (dissolves oil)
Usually using hexane or heptane (gasoline)
Can leave up to 100 parts per million of solvent in oil.

**DEGUMMING**
Using water and phosphoric acid.
Removes phospholipids (incl. beneficial lecithin), chlorophyll, calcium, magnesium, iron, copper

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protected from air during extraction process, and will remain fresh for a long time if stored in the refrigerator in dark bottles.

APPLYING HIGH HEAT to UNSATURATED OILS Produces TRANS FATTY ACIDS (tFAs)

> 320 °F tFAs begin to form
> 392 °F tFAs form substantially
> 428 °F tFAs form exponentially

(see PARTIAL HYDROGENATION below)

Unsaturated fatty acids become mutagenic (i.e. can

REFINING (167 °F)
Oil mixed with caustic soda (aka. Drano®), then separated.
Removes free fatty acids, minerals

BLEACHING (230 °F)
Filters (such as Fuller’s earth) remove pigments
Removes beta-carotene, flavor compounds.
Introduces PEROXIDES (free radicals) or altered fatty acids

DEODORIZING (428-473 °F, 30-60 mins.)
Steam distillation removes vitamin E, aromatic oils, free fatty acids. Also removes peroxides and unpleasant odors and tastes introduced by processing.
High Heat forms TRANS FATTY ACIDS (tFAs) and other altered, unnatural unsaturated fatty acids

FULLY REFINED OIL
Tasteless, Vitamin/Mineral/Antioxidant
Light /Oxygen /Heat Exposure Oxidizes Unsaturated Oils

- Peroxidation and Rancidity – Oil is damaged when oxygen combines with the weak carbon bonds of its unsaturated fatty acids, causing them to break apart into fragments, called lipid PEROXIDES, which produce free radicals. A created free radical, with its unpaired electron, starts a chain reaction which can propagate hundreds of thousands more free radicals and possible broken double carbon bonds, ultimately causing the oil to become rancid.

  - Light can increase peroxidation rate by up to 1000 times

  - Lipid peroxidation uses up fat-soluble, free-radical protecting, antioxidant supplies in the body (E.g. vitamins A, D, E and K).

Hydrogenation Process produces artificially saturated fats, but also produces partially hydrogenated fats (E.g. Trans fats)

- Hydrogenation (saturation) of unsaturated oils retards or eliminates the potential for these oils to go rancid for several years, makes a product “stiffer”, and also provides spreadability, texture and “mouth feel” - unsaturated fats exposed to light, heat or air otherwise tend to oxidize and go rancid easily.

- Hydrogenation is a commercial chemical process - patented in Germany in 1902, hydrogenation decreases the number of double bonds in unsaturated fatty acids of predominately unsaturated oils, such as soybean, corn or sunflower oil, these fully refined oils are then heated to high temperatures (248°-410° F) with metal catalysts, usually nickel or 50/50 nickel/aluminum, in the presence of pressurized hydrogen gas. (The aluminum is a concern since its presence in the body is associated with Alzheimer’s, osteoporosis + more). This enables the hydrogen to be added into (i.e. saturate) the double bonds of the unsaturated fatty acids, and
since they then contain no double bonds, makes them relatively chemically inert.

*Hydrogenated Fatty Acid*

- Hydrogenated fats also contain partially hydrogenated fats, such as trans fats – because the hydrogenation process never achieves 100% efficiency, leaving some partially hydrogenated (altered/toxic) fats.

- Foods containing hydrogenated fats - include margarine, shortening (E.g. Crisco®)

**Partial Hydrogenation produces Altered/toxic Fatty Acids (E.g. Trans Fats)**

- Fully saturated fats are usually too waxy and solid to add to food processing steps - so manufacturers typically require partially hydrogenated oils, for which the hydrogenation process is stopped when the oil has the proper consistency for its application. This process is used to make products like chocolate, “hard enough to melt in your mouth, but not in your hand!” Unfortunately, the partial hydrogenation process also results in the presence of dozens of altered, intermediate substances including trans fats, conjugated fatty acids, double bond isomers (double bonds relocated to new, unnatural positions) and fatty acid fragments.

- A NATURAL, unsaturated fatty acid is in what is called the CIS configuration - with the hydrogen atoms at a double bond on the same side of the molecule. This lack of symmetry forces a kink or bend in the carbon chain.

* CIS Fatty Acid *

- A TRANS configuration fatty acid is produced by heat-processing during hydrogenation, frying in unsaturated oils, and the high temperatures in the oil refining process - when a hydrogen atom TRANSfers to the other side of the fatty acid molecule. The TRANS configuration fatty acid has only a slight kink in its carbon chain. tFAs begin to form above 320°F, and form in substantial quantities above 392 °F.
Trans Fatty Acid

- High levels of 30-50% trans fatty acids are commonly found in these oils
  √ Highly processed oils - such as margarine, shortening
  √ Oils used for repeated frying - in restaurants oils (called "liquid shortening")
  √ “Partially-hydrogenated vegetable oils“ - found in typical ready-made french fries and many packaged goods.

E.g. Commercially processed foods / Foods with a long shelf-life - such as cookies, cakes, crackers, bread, candies, most peanut butter, pancake mixes, instant soups, chocolate, some salad dressings, junk foods, chips, croutons, granola bars.

Saturated Fats mistakenly given the Bad Rap of Hydrogenated Fat

In the 1940’s, researchers found a strong correlation between cancer and the consumption of fat. However, the fats used were hydrogenated fats, although the results were presented as though the culprit were saturated fats. Saturated fats were usually lumped together with hydrogenated fats in the various U.S. data bases that researchers used to correlate dietary trends with disease conditions. Thus, natural saturated fats were “tarred with the black brush” of unnatural, hydrogenated vegetable oils.

Health Effects of Trans Fatty Acids (tFAs)

Increased shelf life traded for fatty acid toxicity and reduced health benefits. Processed oils in “food” products certainly provide those foods a very long shelf-life, but the trade-off is that virtually all of the health benefits of their EFAs are eliminated, and worse, the processing produces altered fatty acids with the following effects on health:

♦ Oxygen-Attracting Electrons are Gone - They no longer contain double carbon bonds with their electron clouds, and yet the body still “plugs them in” to our cell membranes. However, without the negative charge in the
membranes:

- Our cells cannot attract oxygen and start to “suffocate“ - eventually reverting to a primitive, inefficient, anaerobic method of energy production, called fermentation.

- The ability to make the fats water-soluble (by incorporating protein) has been removed

♦ Cell membranes become malformed and do not function properly - Altered fats are like keys which "fit into, but do not turn in the locks" of membranes and enzyme systems, impeding the process of letting nutrition in, and letting waste out of cells.

- At the molecular level, altered fatty acids can be held responsible for many common degenerative diseases, including cancer and cardiovascular diseases – as cellular operation is impaired in the brain, nervous system, hormonal messaging, and immune system.

- Lack of membrane integrity allows unwelcome substances to have more favorable access to cells - such as allergens, undigested proteins, viruses and potential carcinogens:
  
  √ In lung cells – lowers oxygen intake.
  √ In GI tract – makes you more allergic to things you eat, viruses and carcinogens have an easier inroad from food.
  √ Cells in general - are less able to process insulin, absorb oxygen, acquire nutrients or dispose of waste.

- tFAs incorporate into brain cell membranes and the myelin sheath insulating the neurons - This alters the ability of neuron communication, causing diminished mental performance and neural degenerative disorders such as Alzheimers, Parkinsons, M.S., which exhibit membrane loss of fatty acids.

♦ tFAs are Bad for your Heart

- tFAs raise LDL and triglycerides and lower HDL cholesterol -The
net increase in LDL/HDL ratio with tFAs is approximately double that due to saturated fat, and Harvard university researchers determined that those who ate partially hydrated oils had double the risk of heart attack of those who didn’t. (Trans fats block the liver’s normal conversion of cholesterol to bile, contributing to higher blood cholesterol levels).

- tFAs increase C-reactive protein indicative of arterial inflammation

- tFAs raise blood levels of atherogenic lipoprotein(a)

"By our most conservative estimate, replacement of partially hydrogenated fat in the U.S. diet with natural, unhydrogenated vegetable oils would prevent approximately 30,000 premature coronary deaths per year, and epidemiologic evidence suggests this number is closer to 100,000 premature deaths annually."

- Top Nutritionists at Harvard

♦ tFAs Interfere with EFA Functions - They prevent the body from making good use of what few good EFAs you may be getting. By interfering with conversion enzymes, tFAs enhance the body’s pro-inflammatory prostaglandin (PGE2) and inhibit the anti-inflammatory prostaglandins (PGE1 and PGE3). This can produce detrimental changes in allergic reaction, blood pressure, clotting, cholesterol levels, hormone activity, immune function and inflammatory response.

♦ tFAs Cause Fat Deposits around Belly - Researchers at Wake Forest University found that trans fats increase the amount of fat around the belly. They do this not just by adding new fat, but also by moving fat from other areas to the belly.

♦ tFAs are partially responsible for Type II diabetes (characterized by high levels of INSULIN and glucose in your blood) – by causing cells to become resistant to the effects of INSULIN by inhibiting INSULIN receptors:

- Monkey study says yes

Trans Fat Diet Induces Abdominal Obesity and Changes in Insulin Sensitivity in
Monkeys, 2007; Study: Trans-fats increase fatness, Insulin resistance, Risk of diabetes.

- Rat study says no – however, tFAs reduced cellular energy production; Study: Ingestion of trans-fatty acids by rats does not affect insulin sensitivity;


The apparent conflict in results may be explained by the non-availability of sufficient omega-3 - it seems that tFAs and short/medium chain length saturated fats are ONLY substituted in cell membranes when there is an insufficiency of dietary omega-3 fat. The result is to affect the transport of glucose into the cell. For more detail, see:

Metabolic syndrome / Type 2 Diabetes

♦ A Sad legacy for our Children - In a Canadian study of 198 lactating mothers, the fatty acids in their milk averaged 7.2% trans fats, from partially hydrogenated fats consumed by the mother!

Health Effects of Hydrogenated Fat

♦ Hydrogenation Leaves damaging metal Residue – a side-effect of hydrogenation is that a residue of the catalytic metals (usually nickel or aluminum) is left behind in the finished product. These toxic metals accumulate in our cells and nervous system where they poison enzyme systems, alter cellular functions and increase free radical damage, causing various health problems

♦ Hydrogenated Fat Consumption is Associated with Many Diseases - cancer, atherosclerosis, diabetes, obesity, immune system dysfunction, low-birth-weight babies, birth defects, decreased visual acuity, sterility, difficulty in lactation and problems with bones and tendons.