

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?

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

WE CONTAIN A LOT OF NECESSARY FAT

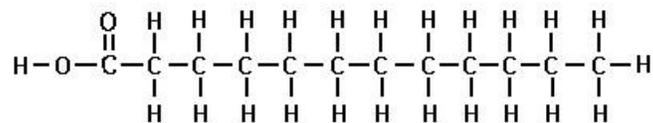
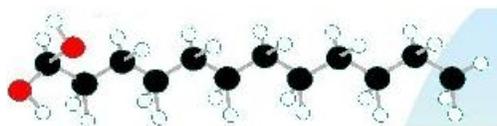
- ◆ After you remove water from your body, half of what is left is fatty acids – they make up every cell membrane, all the hormones, and also the hormone-like messengers (E.g. prostaglandins, leukotrienes), which control reactions to what is happening in the vicinity of each cell. They

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

- ◆ 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

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- [Light /Oxygen /Heat Exposure Oxidizes Unsaturated Oils](#)
- [Hydrogenation Process produces Altered Fatty Acids](#)
- [Partial Hydrogenation produces Altered Fatty Acids](#)
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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.

NUTS, SEEDS, BEANS

(cleaned, hulled)

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

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

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

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

damage our genes)
when heated above
320 °F

Deficient, containing 0.5-1%
MUTAGENIC unsaturated fatty
acids

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 **TRANS**fers 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 hydrogenated 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;
- **Dairy study on obese women says no**
Dairy and industrial sources of trans fat do not impair peripheral insulin sensitivity in overweight women, 2009, Amer. J. Clin Nutr.

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.