

TO YOUR HEALTH Session 2 – FATS

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There are four main categories of natural fats for human consumption (scientifically referred to as fatty acids):

SATURATED – called saturated because all the carbon atoms are saturated with hydrogen atoms which gives this fat unique characteristics such as being solid a room temperature.

Sources: Meat and dairy products, Tropical fats (coconut and palm kernel)

Properties: Different types of saturated fat have fat molecules that vary in length. The longer the molecule, the more stable the fat and also the longer it takes to break down in the body. Melting temperature for most saturated fats is over 100° F (solid in the body) They can be heated to high temperatures because of their stability.

Use in the body: Primarily it is used for energy, but in the presence of high blood sugar, it is stored in fat cells. However, short to medium chain saturated fats are rarely stored in the body and are burned up quickly for energy (e.g. goat cheese (6-10 carbons, vs. cow cheese 18-20 carbons). The longest chains – found in beef, pork and fried foods create a load on the liver and can produce a heavy, tired feeling. Coconut oil has 50% lauric acid which functions as an anti-virus and anti-bacteria. Caprylic acid (goat's milk products) is a medium chain saturated fat and reduces the growth of yeast and fungus.

MONO-UNSATURATED – also known as **Oleic Acid** and also known as **Omega 9** oil. The molecule has one double bond and therefore is not saturated with hydrogen, hence the term mono-unsaturated.

Sources: Olive, Peanut, Canola oils, avocados, and many nuts (e.g. pecans, almonds), poultry

Properties: Liquid at room temperature. Melting points typically about 40°F. Readily available in unrefined form in virgin olive oil. Fairly stable - can be stored at room temperature. Heat on low-med.

Use in the body: Primarily used in cell functions (cell membrane, etc). Lowers cholesterol, increases HDL, lowers triglycerides. Stimulates bile activity and pancreatic enzymes.

POLY-UNSATURATED – also known as **Linoleic Acid** and also known as **Omega 6** oil. The molecule has two or more double bonds, hence the term poly-unsaturated

Sources: Safflower, sunflower, corn, sesame and soybean oils, poultry

Properties: Liquid at room temperature. Melting points typically about 23°F Fairly stable – store at room temp or fridge. Heat on low-med. It is an “essential fat” each person needs **3 tsp/day/100lbs weight**.

Use in the body: Primarily it is used in producing potent chemical messengers (prostaglandins series 1 and 2 – Pg1 and Pg2). Secondarily used for cell functions, chromosome stability and to remove fat soluble toxins. Lastly, in excess, it can be stored as fat.

PG1 reduces blood platelets stickiness, removes sodium and excess water, relaxes blood vessels, slows cholesterol production, decreases inflammation, aids effectiveness of insulin, & improves nerve function. PG2 has all the opposite effects of PG1. Note that PG2 is created when there is excess saturated fat in the diet, or extended stress (physical or emotional) on the body.

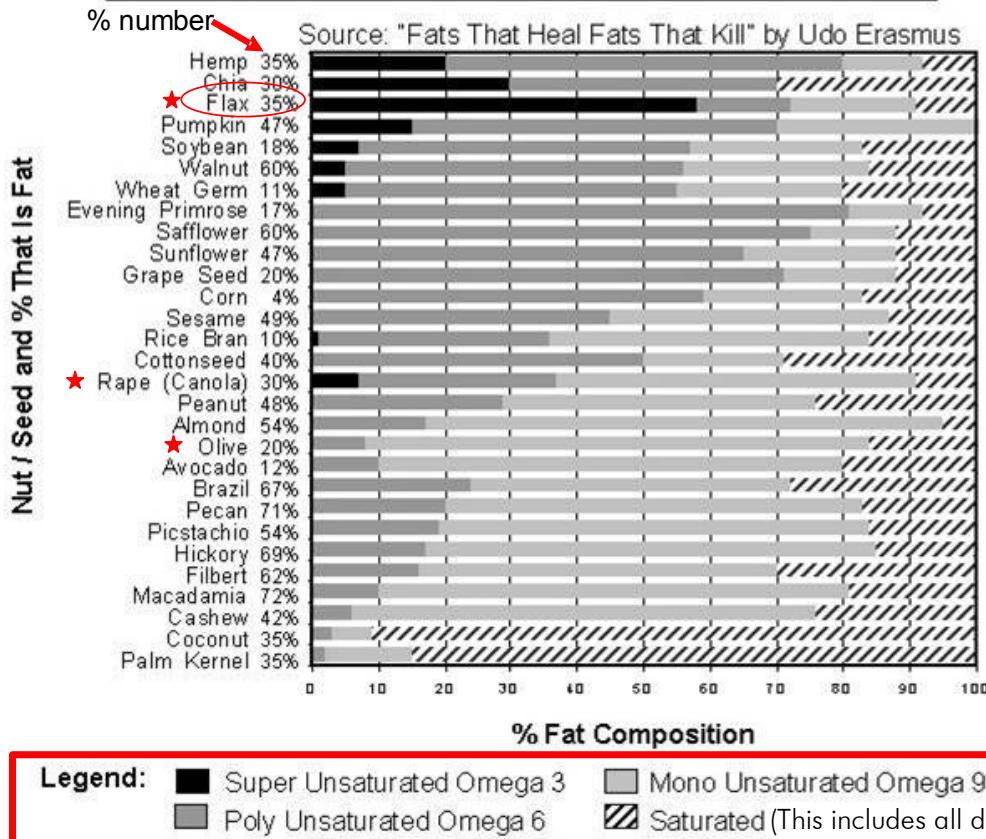
SUPER-UNSATURATED – also known as **Alpha Linolenic Acid** and also known as **Omega 3** oil. The molecule has three or more double bonds and at a closer location than poly-unsaturates making it more reactive, hence the term super-unsaturated.

Sources: Flax seed, hemp seed, fish, snake, small amounts in walnuts, pumpkin seeds and in canola oil.

Properties: Liquid at freezing temperature. Melting points typically about 12°F. Unstable at room temp, store in or fridge or freezer. **Do not heat for cooking** but use it to pour on salads, steamed vegetables, baked potatoes or pasta. It is an “essential fat” each person needs **1 tsp/day/100 lbs weight**.

Use in the body: Primarily it is used in producing the potent chemical messengers prostaglandins series 3. Secondarily it is used for cell functions. Lastly, in excess, it can be stored as fat. Enzymes convert this fat four times faster than poly unsaturates resulting in increased stamina and energy levels. It is also one of the few food items that can increase the metabolic rate. PG3 reduces water retention, reduces inflammation, and softens the skin. PG3 facilitates the conversion of lactic acid to water and CO2 so muscle fatigue recovery is faster and there is less muscle pain. PG3 suppresses the production of PG2 resulting in beneficial PG1 production.

Fat Composition Chart of Common Seeds & Nuts



The % number next to the name represents the % of the nut or seed that is fat, and the chart bar is the % components of different fat types in it.

For example:

3 tsp of ground **flax** seed provides 35% or about 1 teaspoon of oil of which 58% or $\frac{1}{2}$ tsp is omega 3 oil. Therefore, if you needed to have 1 tsp of omega 3 oil per day, you would need to consume about 2 tablespoons of ground **flax** seed.

Avoid altered fats: refined oils, trans fats, hydrogenated and non-calorie fake fats (e.g. olestra)

***** Note: when natural unsaturated fats are over heated, you can create trans fats. (e.g. frying)**

Cell membranes are made up of a double layer of fat molecules in the phospholipid form. Cholesterol is also in the cell membrane and supplies structure to the cell wall. However, when the cell membrane becomes stiffer from too much saturated fat in our diet, the cell signals the cholesterol to leave (where it goes out into the blood and raises the serum cholesterol level). When our diet has plenty of unsaturated fats, the cell membrane will draw cholesterol from the blood serum to help maintain a certain structure level to the membrane (thereby reducing serum cholesterol). In the event there is not enough cholesterol in the blood, the cell can produce its own. The whole cholesterol story is not this simple, but this is a large part of how the body gets involved.

Cholesterol: normal levels is less than 200 mg/dL. Three ways we obtain it: food we eat, the liver makes it and every cell in our body can also produce it. It is hard and waxy, melts at 300°F. About half of the people who have a heart attacks have normal levels of cholesterol, so it is known that *cholesterol may only be one indicator*. There are other blood tests that you can have done that are also associated with heart disease risk. Level of **Homocysteine** (this is a protein associated with "stickiness" of cholesterol. Daily intake of 400 mcg of folic acid helps reduce homocysteine) **C reactive protein** marker (CRP) – associated with inflammatory response.

There are basically only two ways to naturally reduce body fat:

1. Burn it off:

- Increase physical exercise. Turn on your fat burning hormone by simply doing a high active exercise (such as jumping jacks) for just 1 minute (do this 1 to 3 times a day.)
- Lower calorie intake so the body access the fat stores
- Include co-factors in your diet that facilitate access to the fats in the cells (e.g. Acetyl L-Carnitine)
- Eat fats that burn more easily (shorter chain saturated fats and healthy unsaturated fats)
- Make sure your thyroid is functioning normally (low thyroid lowers the Basal Metabolic Rate, or in other words does not provide the hormone necessary for burning more energy). Raise BMR with cayenne.

2. Excrete it:

- Eat adequate fiber (at least 30 grams fiber per day). Fiber helps remove excess cholesterol and bile acids from our body preventing their reabsorption and recirculation.
- Avoid altered fats that cause digestive problems and trans fats. Your body tries to eliminate fats it cannot use and if it cannot eliminate them, they can be reabsorbed and cause health problems.

Fiber - Metabolic co-factor for Fats and Carbohydrates

Fiber: Although fiber is non-nutritive, eating foods that are high in fiber has beneficial effects on glycemia, insulineamia and lipemia. Insoluble fiber, also known as roughage, does not dissolve in water and moves more quickly through the digestive tract. Soluble fiber, on the other hand, mixes with liquid and binds to fatty substances to help remove them from the body. It's important to include both types of fiber in a healthful diet.

Insoluble Fiber

Functions and Benefits of Insoluble Fiber

- move bulk through the intestines
- control and balance the pH (acidity) in the intestines
- promote regular bowel movement and prevent constipation
- remove toxic waste through colon in less time
- keep an optimal pH in intestines to prevent disease

Food Sources of Insoluble Fiber

- Whole-wheat products
- Wheat
- Oat
- Corn bran
- Flax seed
- Vegetables such as green beans, cauliflower and potato skins
- Fruit skins and root vegetable skins

Soluble Fiber

Functions and Benefits of Soluble Fiber

- bind with fatty acids
- prolong stomach emptying time so that sugar is released and absorbed more slowly
- lowers total cholesterol, especially LDL - therefore reducing the risk of heart disease
- regulate blood sugar for people with diabetes

Food Sources of Soluble Fiber

- Oat/Oat bran
- Dried beans and peas
- Barley, Flax seed
- Fruits such as oranges and apples
- Vegetables such as carrots
- Psyllium husk

If you eat at least 5 servings of fruits/vegetables as well as at least 5 servings of grain products per day, you are very likely meeting the fiber requirements

A most excellent book on fats (plus other things) is: **Fats that Heal Fats that Kill** by Udo Erasmus

ISBN: 0-920470-38-6 (paperback) 0-920470-40-8 (bound)

Body fat calculator:

www.calculator.net/body-fat-calculator.html

Cell membrane movie (very short - 30 seconds and interesting):

http://www.youtube.com/watch?feature=player_embedded&v=Rl5EmUQdkul

Cell membrane science info:

<http://bioweb.wku.edu/courses/BIOL115/Wyatt/Biochem/Lipid/Lipid3.htm#phospholipid>

All about cholesterol:<http://www.aboutyourcholesterol.com/>

SUMMARY - SIMPLE PRINCIPLES FOR FATS:

- Use unsaturated fats and eat adequate amounts of the essential unsaturated fats (omega 6 (3 tsp per day) and omega 3 (1 tsp per day) - per 100 lbs of body weight).
- Avoid over-heating oils.
- Avoid excess fats – especially saturated fat.
- Consume adequate amounts of fiber (30 gms. minimum per day)
- Exercise regularly.
- Avoid altered fats (trans fats, hydrogenated, non-calorie fats)