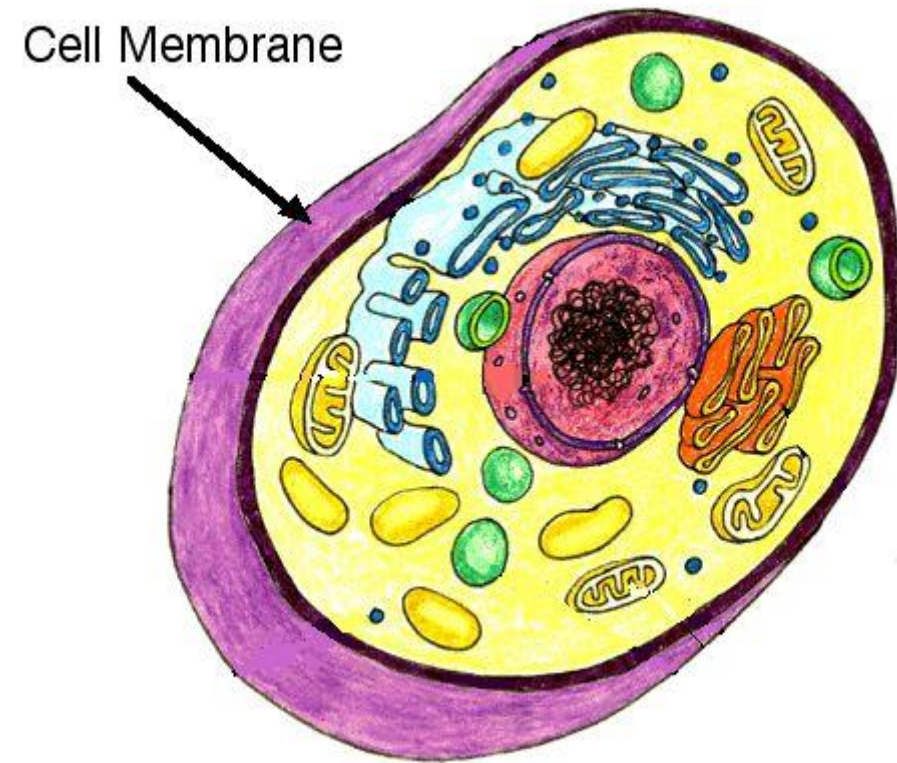


Nutrition: Fats

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What do Fats do?

- Provide energy (9 calories/gm)
- Give structure (flexibility) to cells
- Cell communicators (eicosanoids-polyunsaturated fats only)
- Transporters (HDL or LDL)
- Bile acids
- Fat soluble vitamins and antioxidants (A, D, E, K, carotenoids)



Dietary Fats

- Fats are usually determined healthy or unhealthy based on how they impact cholesterol levels: total cholesterol, HDL, LDL
- Studies clearly show that what is most important is how stable fats are in our warm blooded fully oxygenated bodies.
- Fats that are unstable are prone to a process called lipid (fat) peroxidation.
- Lipid peroxidation is where fats (lipids) are damaged primarily by heat, light oxygen, toxins.
- Polyunsaturated fats are by far the most prone to lipid peroxidation, followed by monounsaturated fats then saturated fats

Dietary Fats and Health: Dietary Recommendations in the Context of Scientific Evidence
Journal of Advances in Nutrition Vol. 4 Issue 3 May 2013; pp 294-302

- Over the years, data revealed that dietary saturated fatty acids (SFAs) are not associated with CAD and other adverse health effects or at worst are weakly associated in some analyses when other contributing factors may be overlooked
- The evidence of omega-6 polyunsaturated fatty acids (PUFAs) promoting inflammation and augmenting many diseases continues to grow, whereas omega-3 PUFAs seem to counter these adverse effects.
- The replacement of saturated fats in the diet with refined carbohydrates and polyunsaturated fats has resulted in increased obesity and its associated health complications.
- Lipid peroxidation is invoked as a mechanism for numerous adverse health effects, such as aging, cancer, atherosclerosis, and tissue necrosis.

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- Small amounts of omega-3 supplements in a sea of dietary omega-6 oils would have relatively little chance of changing the course of an inflammatory response.
- Predominantly Saturated fat in the diet results in far less inflammation than diets with either omega-3 or omega-6 PUFAs.
- Saturated fats are benign with regard to inflammatory effects, as are the Monounsaturated fats.
- Various aldehydes produced in the oxidation of Polyunsaturated fats, as well as sugars, are known to initiate or augment several diseases, such as cancer, inflammation, asthma, type 2 diabetes, atherosclerosis, and endothelial dysfunction.

Types of Dietary Fat

- **Polyunsaturated Fat**

- *omega 3 fat

- *omega 6 fat

- **Monounsaturated Fat**

- *omega 9 fat

- *omega 7 fat

- **Saturated Fat**

- **Trans (Transformed) Fat**

- Shortening (partially hydrogenated vegetable oil)



Polyunsaturated Fat (Omega 3)

- Omega 3:

ALA(alpha linolenic acid is the parent omega 3 in plant and animal foods)

*flaxseed, walnuts, greens

EPA (eicosapentaenoic acid in animal foods only)

Hormones (eicosanoids)

DHA (docosahexanoic acid in animal foods only)

Brain structure (30%)

*animal foods depending on diet

Supplement Facts

Serving Size 1 Teaspoon (5 mL)

	Amount Per Teaspoon	% DV
Calories	45	
Calories from Fat	45	
Total Fat	5 g	8% **
Saturated Fat	1 g	5%
Cholesterol	20 mg	7%
Vitamin A (from cod liver oil and retinyl palmitate)	850 IU	17%
Vitamin D3 (from cod liver oil and cholecalciferol)	400 IU	100%
Vitamin E (as d-alpha tocopherol & mixed tocopherols)	10 IU	33%
100% Norwegian Cod Liver Oil	4.6 g	†
Omega-3 Fatty Acids*	1,100 mg	†
DHA (Docosahexaenoic Acid)*	500 mg	†
EPA (Eicosapentaenoic Acid)*	400 mg	†

** Percent Daily Values are based on a 2,000 calorie diet.

† Daily Value (DV) not established. *Reported as triglycerides.

Other Ingredients: Natural lemon flavor. Contains fish (cod).

1352B-3b

Polyunsaturated Fat (Omega 3)

- Essential in small quantities
- Anti-inflammatory
- Decrease platelet aggregation
- Increase vasodilation
- Decrease arrhythmia

Americans currently eat way too many omega 6 fats and too few omega 3 fats. The ratio is critical.



Polyunsaturated Fat (Omega 6)

- Omega 6:

LA (Linoleic acid is the parent omega 6 fat in plant and animal foods)

*grain and seed oils (we eat way too much of this one)

GLA (gamma linolenic acid)

borage and evening primrose oil

**reduces inflammation*

AA (arachidonic acid in animal foods only)

*Hormones (eicosanoids)

*animal foods depending on diet

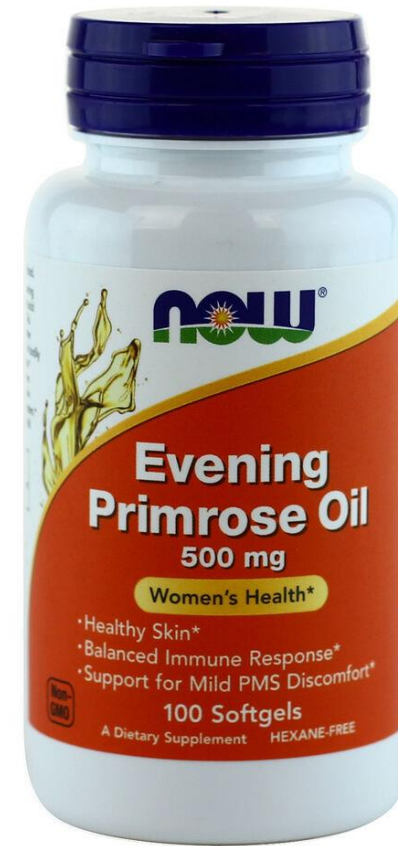


Polyunsaturated Fat (Omega 6)

- Essential in small quantities
~1-2% of total calories
- Pro-inflammatory
- Increases platelet aggregation
- Increases vasoconstriction
- Increases arrhythmia



Gamma Linolenic acid



Monounsaturated Fat

- Promoted in Mediterranean diet
- Olive oil, avocados, nuts
- Much healthier than omega 6 fats
- Not essential
- Oleic acid and palmitoleic acid are primary sources in diet
- Palmitoleic acid is antimicrobial

Chicken soup for colds/flu?



Saturated Fat

- Resistant to peroxidation (damage)
- Makes LDL cholesterol large and buoyant
- Raises HDL
- Best at helping to absorb fat soluble anti-oxidants



Saturated Fat

- Short chained saturated fats:

acetic acid- vinegar

propionic acid

butyric acid- butter

*Produced in gut by bacterial fermentation of fiber

- Medium chained saturated fats:

capric

caproic

caprylic

lauric

Found in coconut, palm kernel, and dairy

- Long chained saturated fats:

palmitic acid-palm oil, main human fat

stearic acid- beef



Standard American Diet (SAD) 2009

- ~70% Processed foods
 - 32% polyunsaturated oils
 - 21% refined sugar
 - 17% refined grains
- ~29% Whole real food

Medical Hypotheses 109 (2017) 184–198



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The 'Displacing Foods of Modern Commerce' Are the Primary and Proximate Cause of Age-Related Macular Degeneration: A Unifying Singular Hypothesis

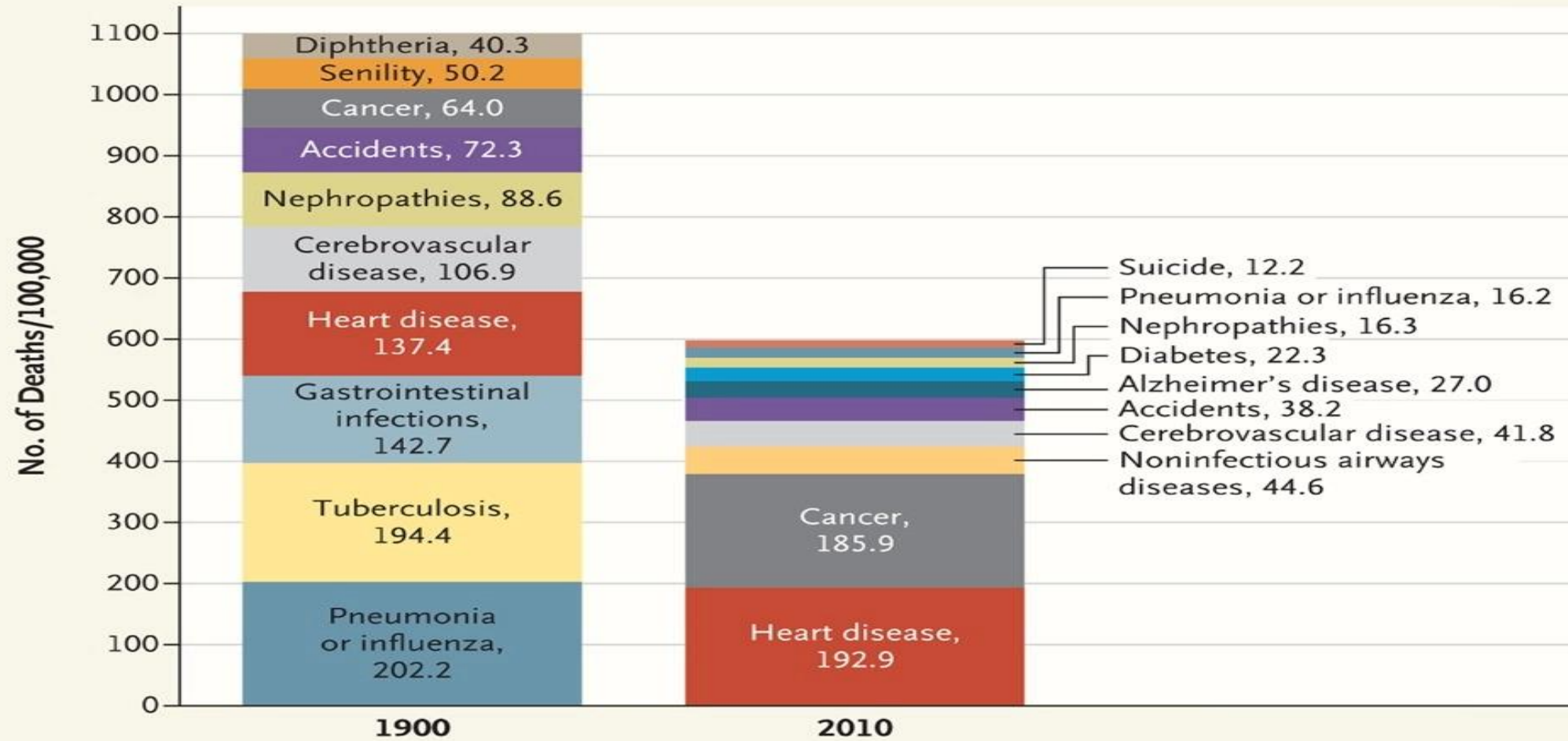


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Causes of Death: Then and Now



Heart Disease in USA

- 19th Century- 8 reported MI's
- 1897- Dr. William Osler reports 6 cases of chest pain, no MI
- 1900- 12.5% death to heart disease, valvular, not MI
- 1912- Dr. John Herrick Publishes first known case of MI
- 1930's- heart disease becomes leading cause of death
- 2010- 32% of American deaths due to Coronary Heart Disease



JAMES BRYAN HERRICK
11 AUG 1861 - 07 MAR 1954

Cancer Deaths in USA

- 1811- 1 in 188 deaths due to cancer
- 1900- 1 in 17 deaths due to cancer (5.8%)
- 2010- 1 in 3 deaths due to cancer (31.1%)

Due to Living longer?

1800- 43% of children did not live to see their 5th birthday

1900- 36% of children did not live to see their 5th birthday

Dietary Increases

- Refined sugar introduced early 1700's
- "Vegetable" oils introduced 1866 (cottonseed oil)
- Roller mills introduce refined flour in 1880
- Crisco (trans fats) introduced in 1911
- Fast food- White Castle 1921

50 million people eat fast everyday



Polyunsaturated Omega 6 oils

- Cottonseed oil
- Soybean oil
- Corn oil
- Sesame seed oil
- Safflower oil
- Grapeseed oil
- Sunflower seed oil
- Rice bran oil

Canola and peanut oil are mostly monounsaturated fats but have a high percentage of omega 6 fats



Procedure to Make Food Oils

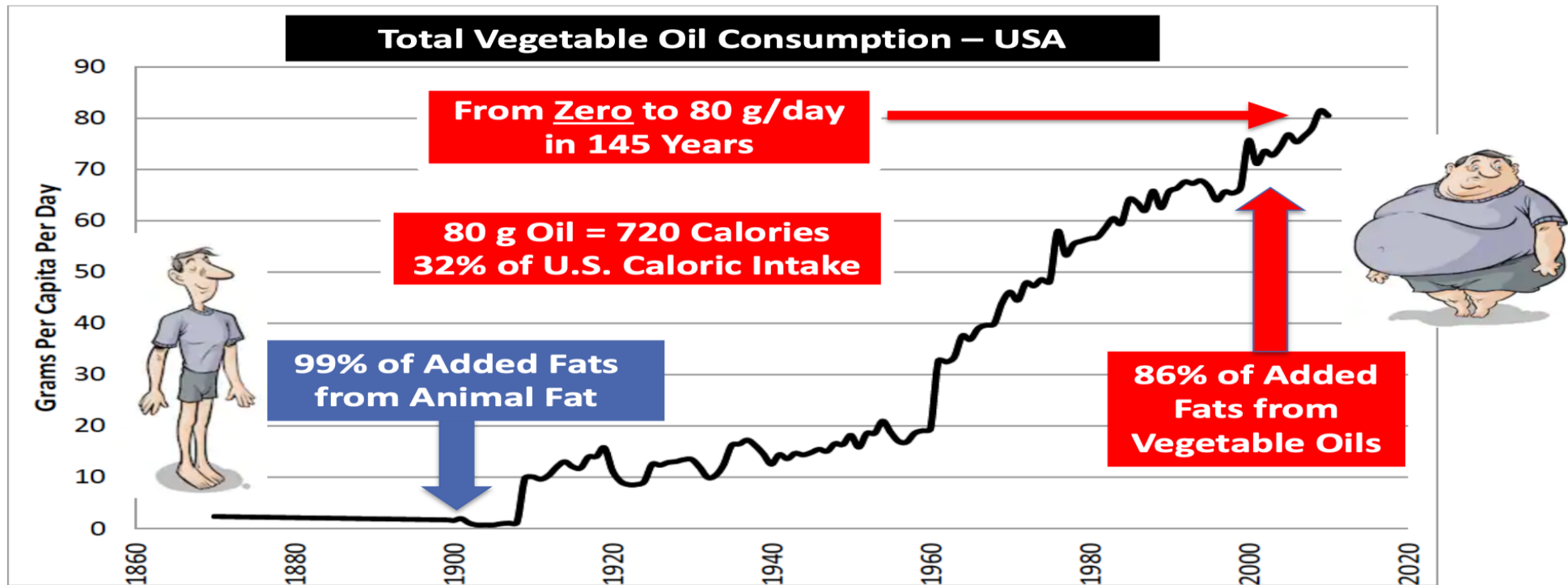
• Precook > Dehull > Crack > Crush > Flaking > Grinding > Expeller press >
Solvent extraction > Degumming > Dewaxing > Bleaching > Filtering >
Deodorize > Packing

**Unrefined oils go from expeller pressing > filtering > packing*

“Vegetable” oil Refinery



“Vegetable” Oil Explosion: 0gm in 1865 to 80gms/day in 2010! 720 calories and 32% of calories in US diet



Knobbe C, Stojanoska M. Med Hypotheses. 2017;109:184-198.

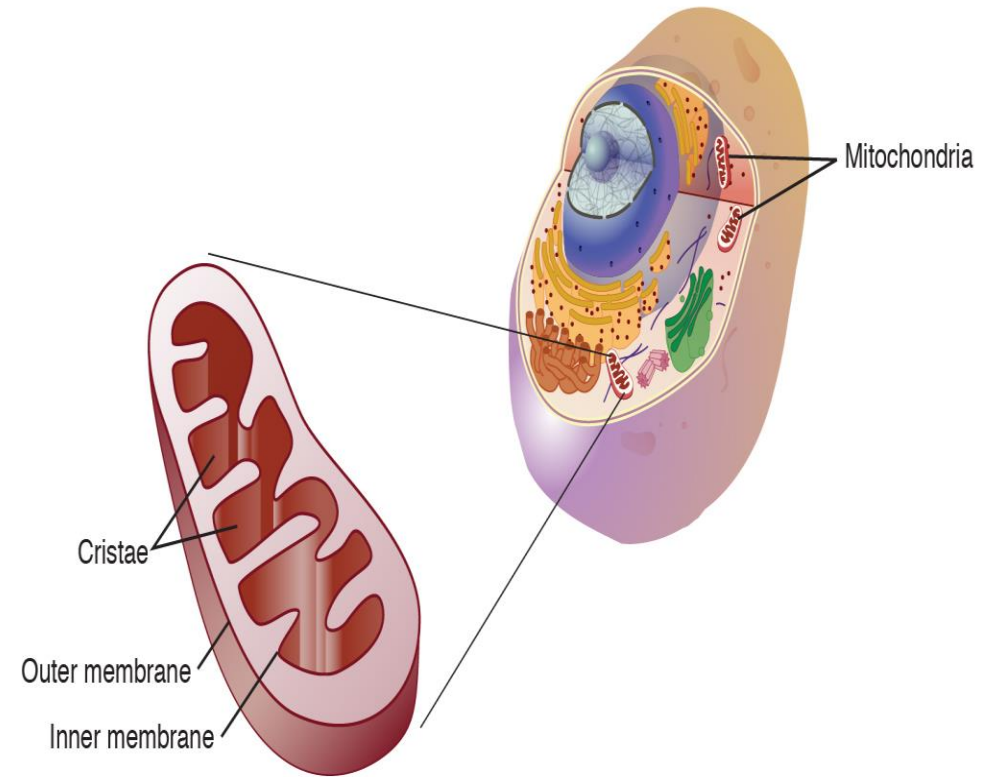
Knobbe C., Presentation from the Ancestral Health Symposium, San Diego 2019

The Average American Intake of “Vegetable” Oils is 5-10 TBSP’s/day

- 5 Tablespoons corn oil- ~100 ears of corn
- 5 Tablespoons sunflower seed oil- ~2,800 sunflower seeds
- 5 Tablespoons of grapeseed oil- ~625 grapes
- 5 Tablespoons rice bran oil- ~40 cups brown rice

Do Not Eat Grain and Seed Oils

- Omega 6 fats increase disease causing eicosanoids
- Omega 6 and omega 3 fats are not good “fuel” macronutrients. They are cell signaling and structural fats.
- Omega 6 and Omega 3 at the amount we eat today disrupt a structural framework in or mitochondria called Cardiolipin which helps us burn all fuels.
- Omega 6 and omega 3 fats are unstable and produce a lot of toxic free radicals in our bodies. 4-HNE
- Omega 6 and Omega 3 fats use up many of our antioxidants: vitamin E, vitamin C, etc.
- Fats have a half life of up to 2 years in the body.
- The omega 6 to omega 3 ratio in our diet should be low and close to 1:1. The current American diet is ~17-1. We are eating 17 time more omega 6 than omega 3. VERY BAD!



4-HNE

4- Hydroxynonenal

- Discovered in 1991
- 4-Hydroxynonenal is generated in the oxidation of lipids containing polyunsaturated omega-6 acyl groups, such as arachidonic or linoleic groups, and of the corresponding fatty acids
- These compounds can be produced in cells and tissues of living organisms or in foods during processing or storage,^{[6][7]} and from these latter can be absorbed through the diet.
- Since 1991, 4-HNE by-products are receiving a great deal of attention because they are being considered as possible causal agents of numerous diseases, such as chronic inflammation, neurodegenerative diseases, adult respiratory distress syndrome, atherogenesis, diabetes and different types of cancer

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Wikipedia page with references

High Oleic Soybean Oil



High Oleic Sunflower Seed Oil



Which Fats are Best?

- Fruit oils:

- * Coconut oil- Rich in medium chain fats which are stable and have antimicrobial properties.

- Olive oil- Monounsaturated and some antioxidants

- Avocado oil- Monounsaturated and some antioxidants

- Red Palm Oil- Stable and very rich in carotenoids and all 8 vitamin E compounds

These oils are low in polyunsaturated fats and offer nutrients so they are not “empty” calories.

They are stable to cook with, but do not burn them.



Animal Fats

- Lard
- Tallow
- Suet
- Butter or Ghee

In small amounts these fats are very stable, low in polyunsaturated fats, and have all of the fat soluble vitamins

