“Fathead!”

Using Essential Fatty Acids to Improve Mental Health and Enhance Brain Function

by Randy Drake

Nature Coast Chapter Fall Symposium
Brooksville, Florida • Nov. 7, 2009

Disclaimer

Products mentioned and claims made about specific products have not been evaluated by United States Food and Drug Administration and are not approved to diagnose, treat, cure, or prevent disease. The information provided is for informational purposes only and is not intended as a substitute for advice from your physician or other health care professional. You should not use this information for diagnosis or treatment of any health problem. You should consult a healthcare professional before starting any diet, exercise, or supplementation program, before taking any medication, or if you have or suspect you might have a health problem.

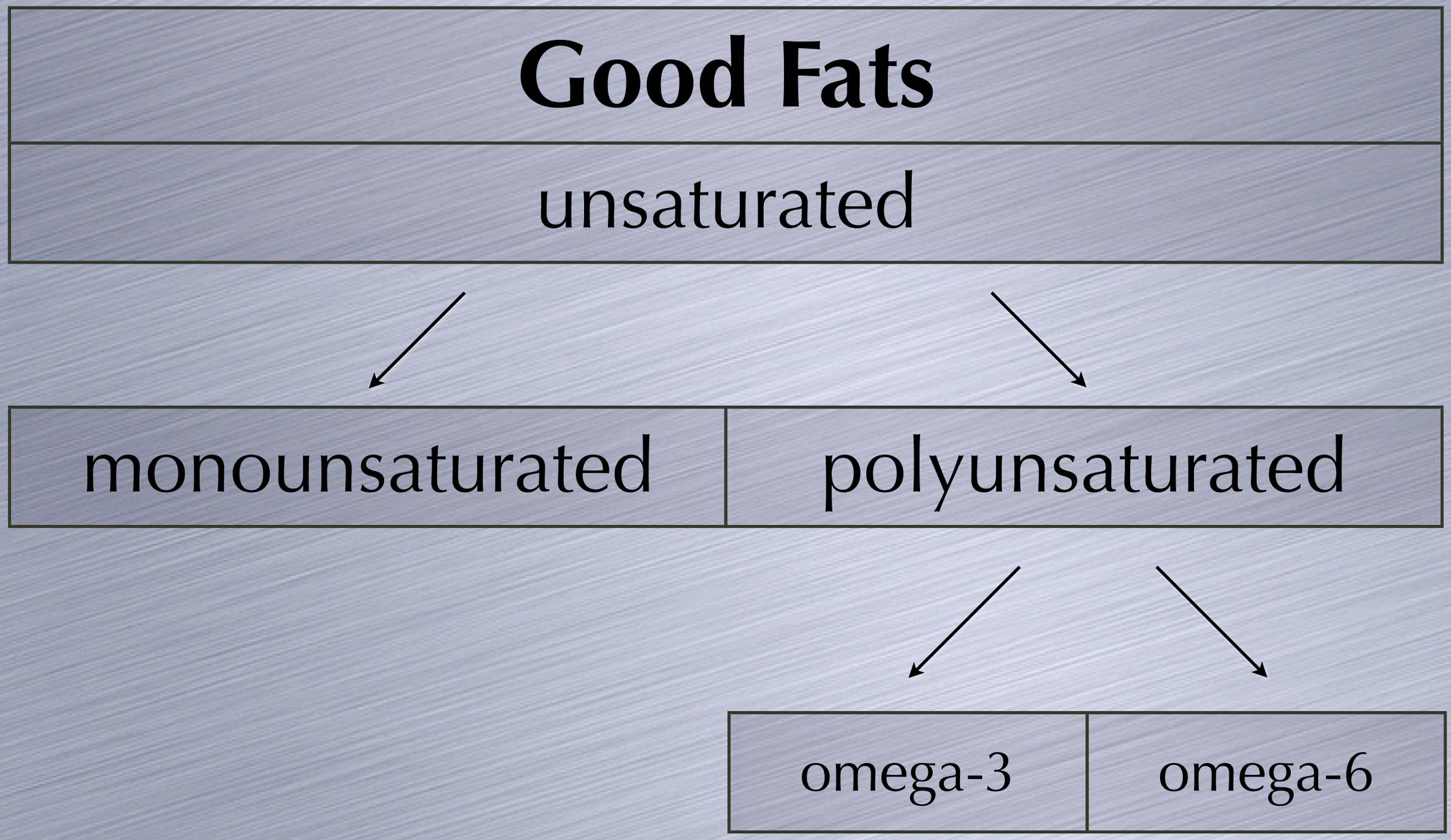
On the other hand...

Claims made about specific products that ***have*** been approved by the United States Food and Drug Administration are not necessarily accurate. Products that ***have*** been approved by the FDA to diagnose, treat, cure, or prevent disease are not necessarily safe and effective. FDA-approved drugs kill more people each year than “unapproved” natural supplements. (In fact, ***peanuts*** kill more people each year than “unapproved” natural supplements!)

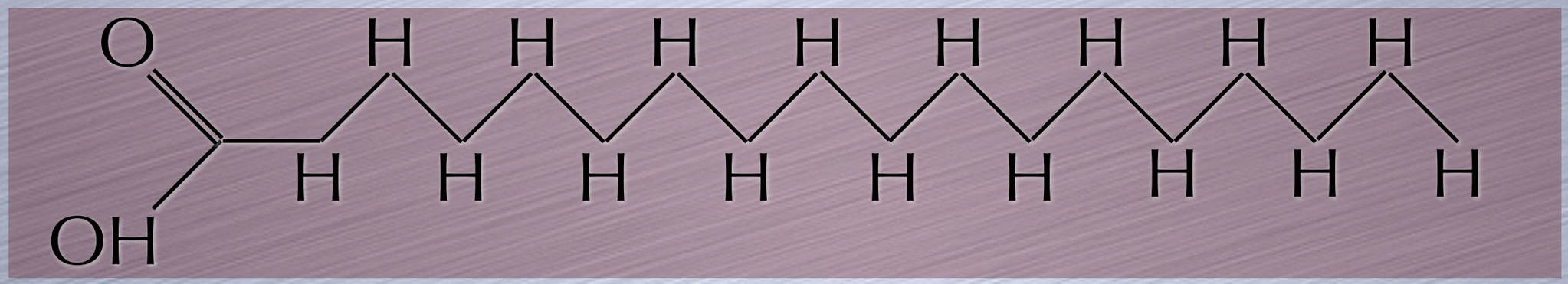
Lipid Categories

Bad Fats	Good Fats	Killer Fats
saturated	unsaturated	trans

Lipid Categories

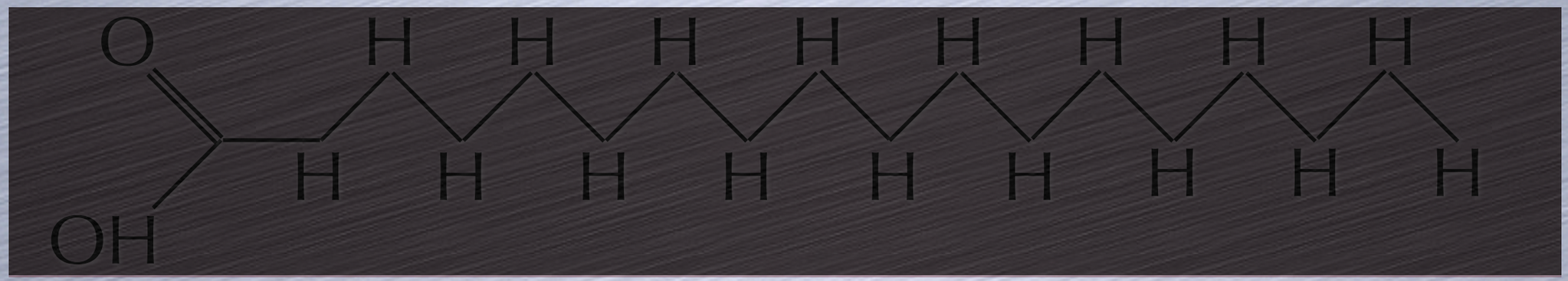


Saturated

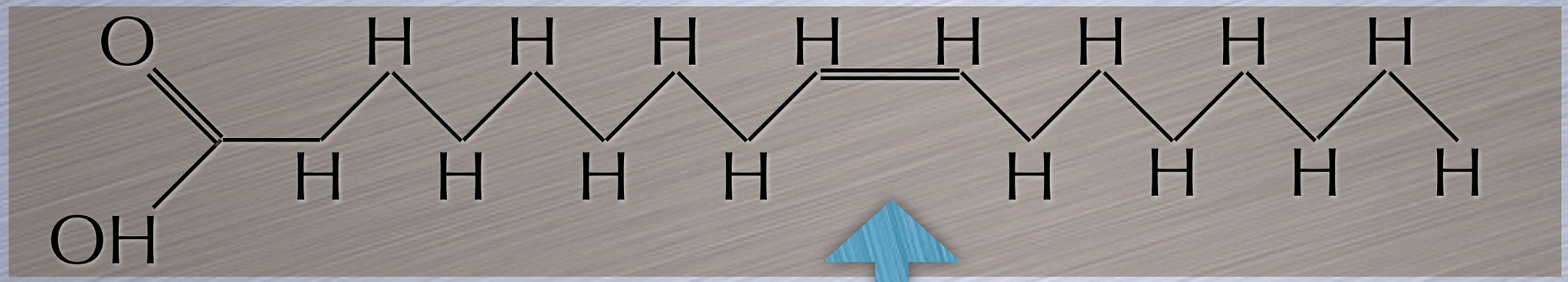


Saturated Fat

Monounsaturated



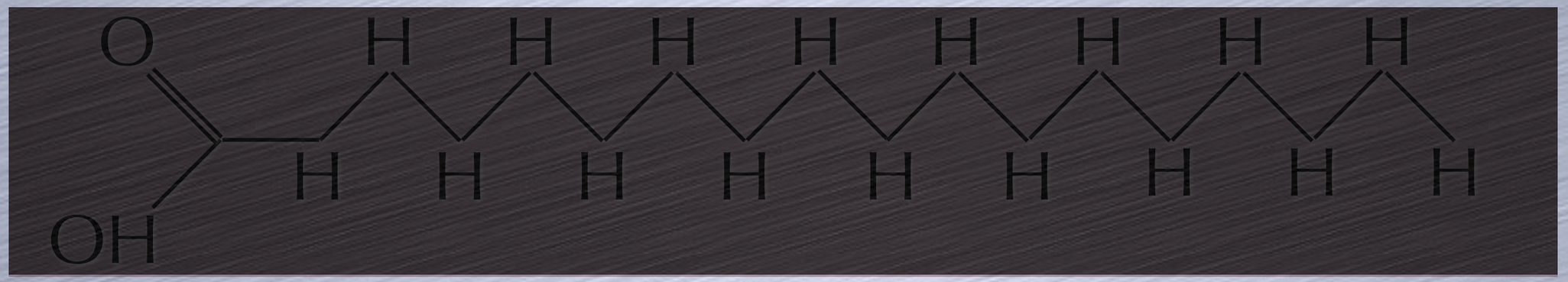
Saturated Fat



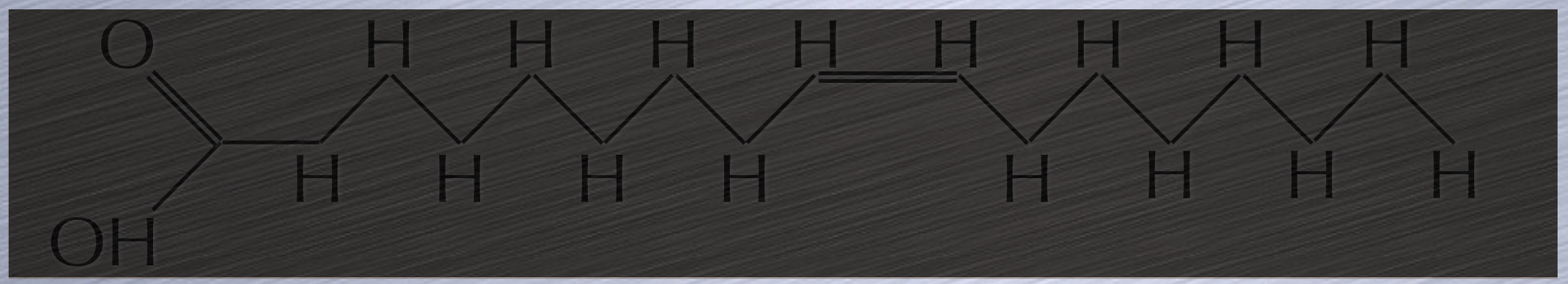
Monounsaturated Fat

9th hydrogen from the end (omega-9)

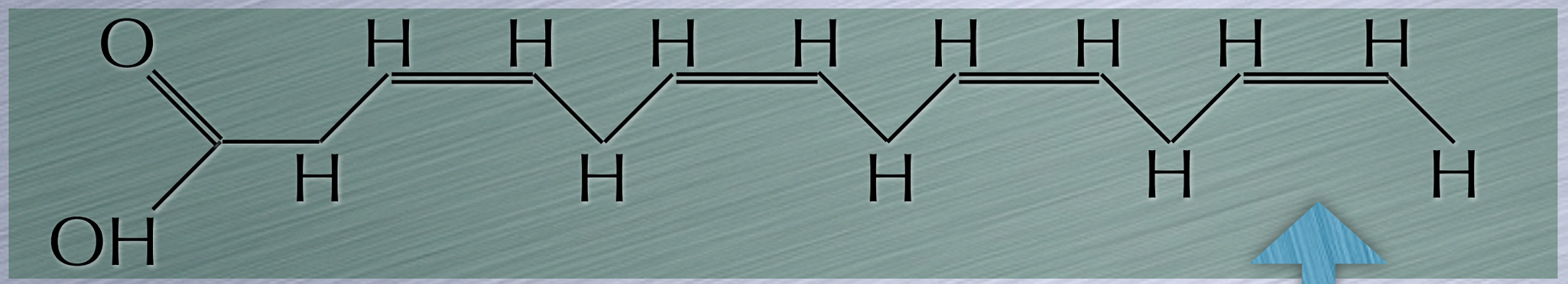
Polyunsaturated



Saturated Fat



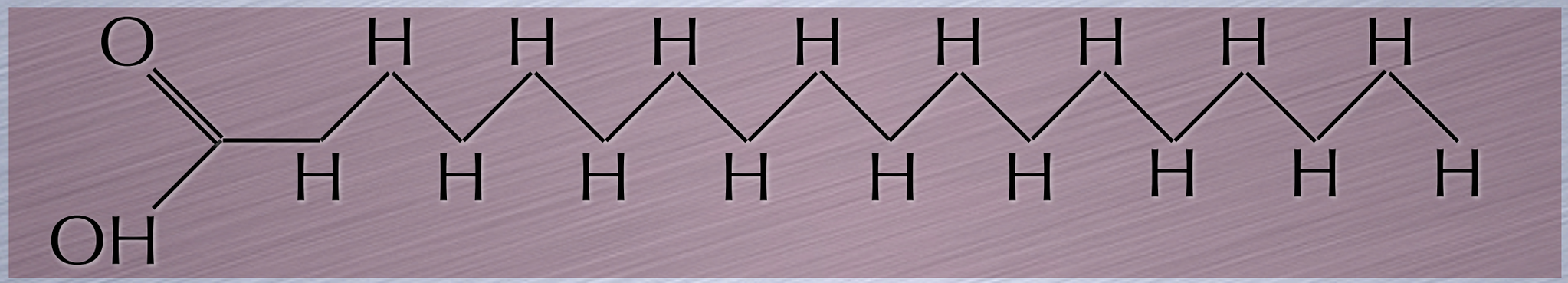
Monounsaturated Fat



Polyunsaturated Fat

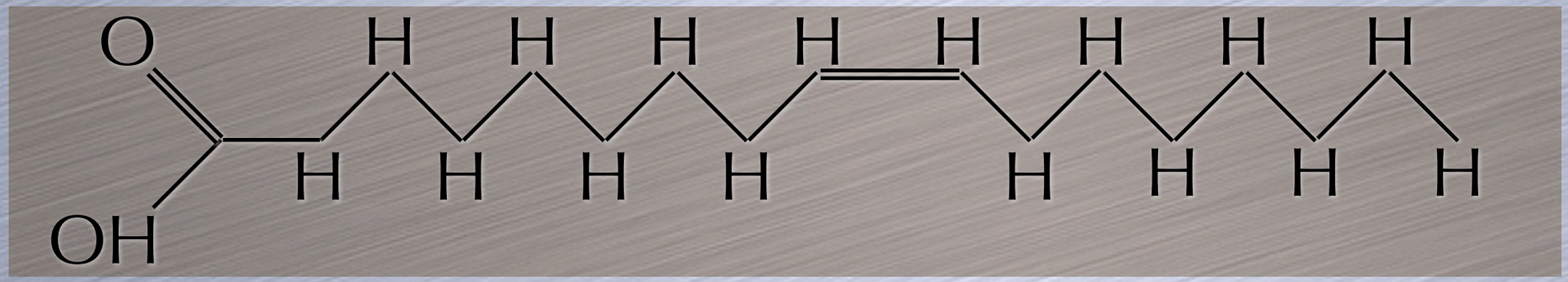
3rd hydrogen from the end (omega-3)

What's the difference?



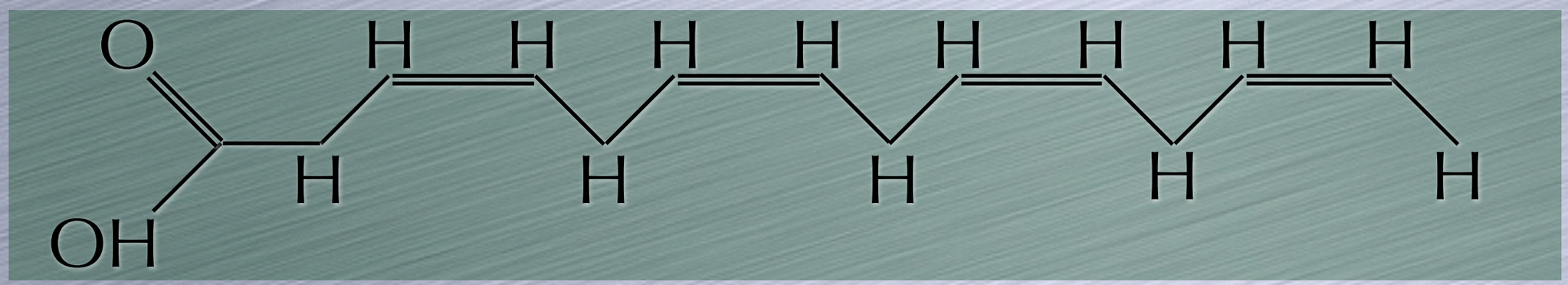
Saturated Fat

Solid at room temperature, solid in the fridge



Monounsaturated Fat

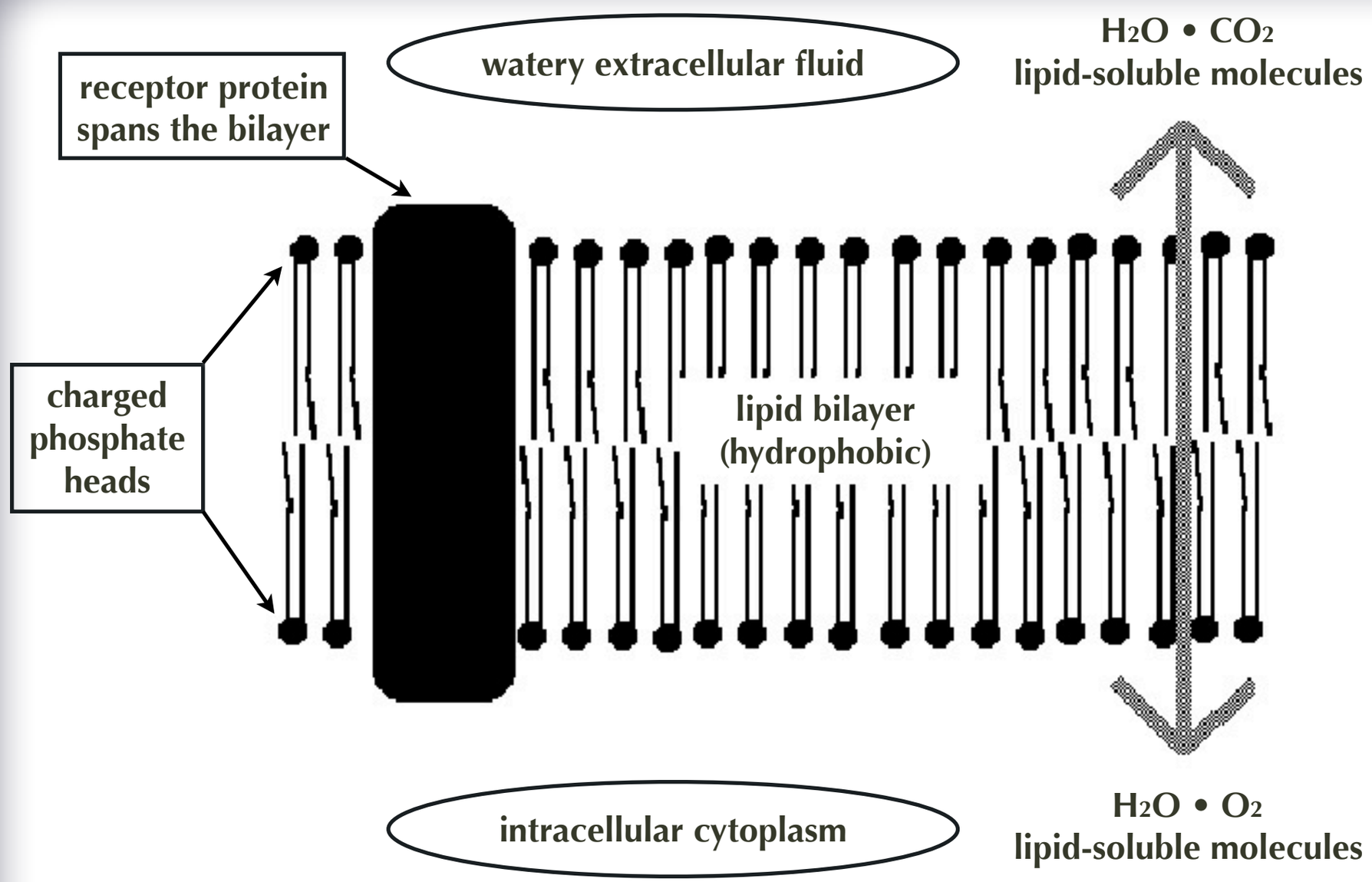
Liquid at room temperature, solid in the fridge



Polyunsaturated Fat

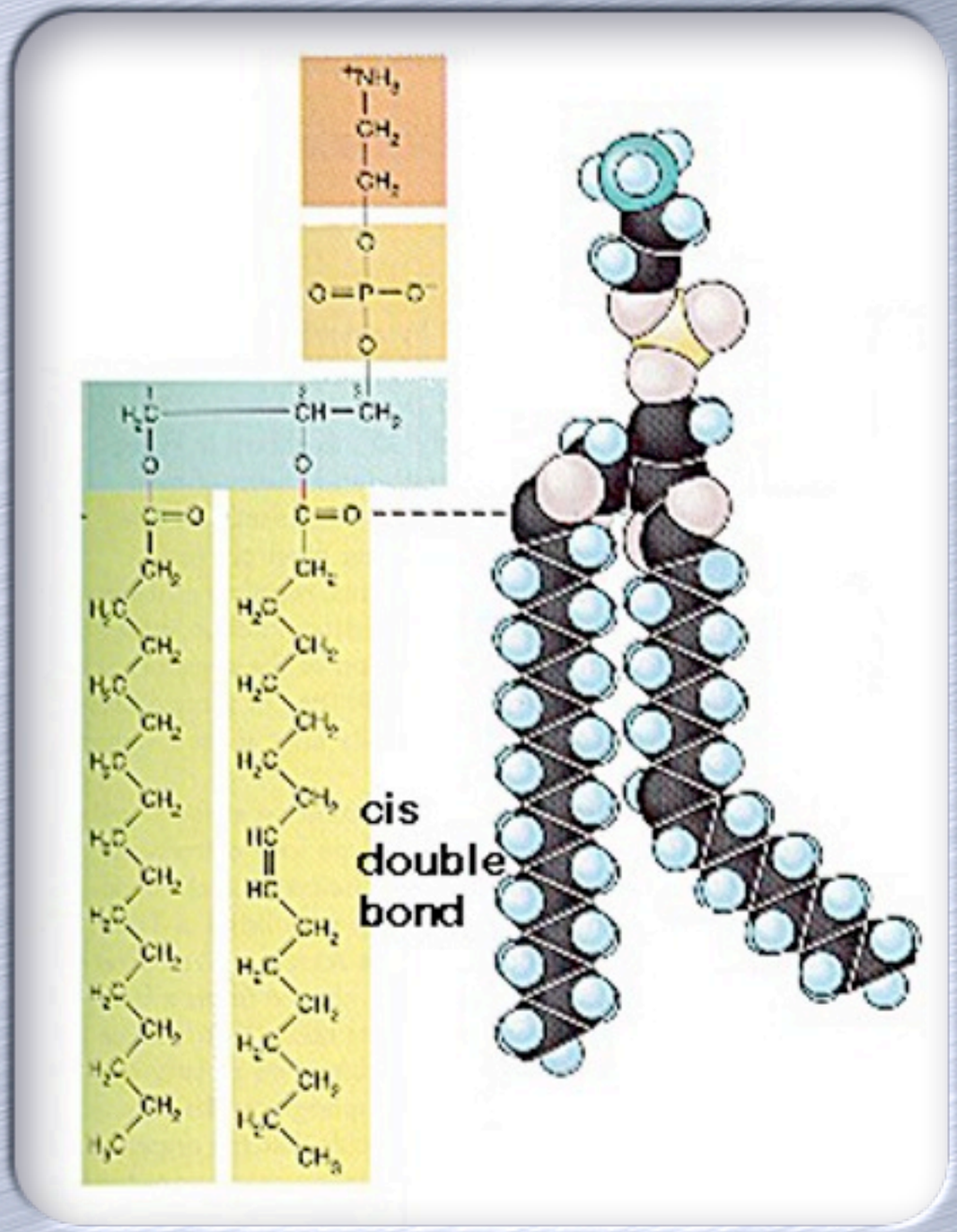
Liquid at room temperature, liquid in the fridge

The Cell Membrane

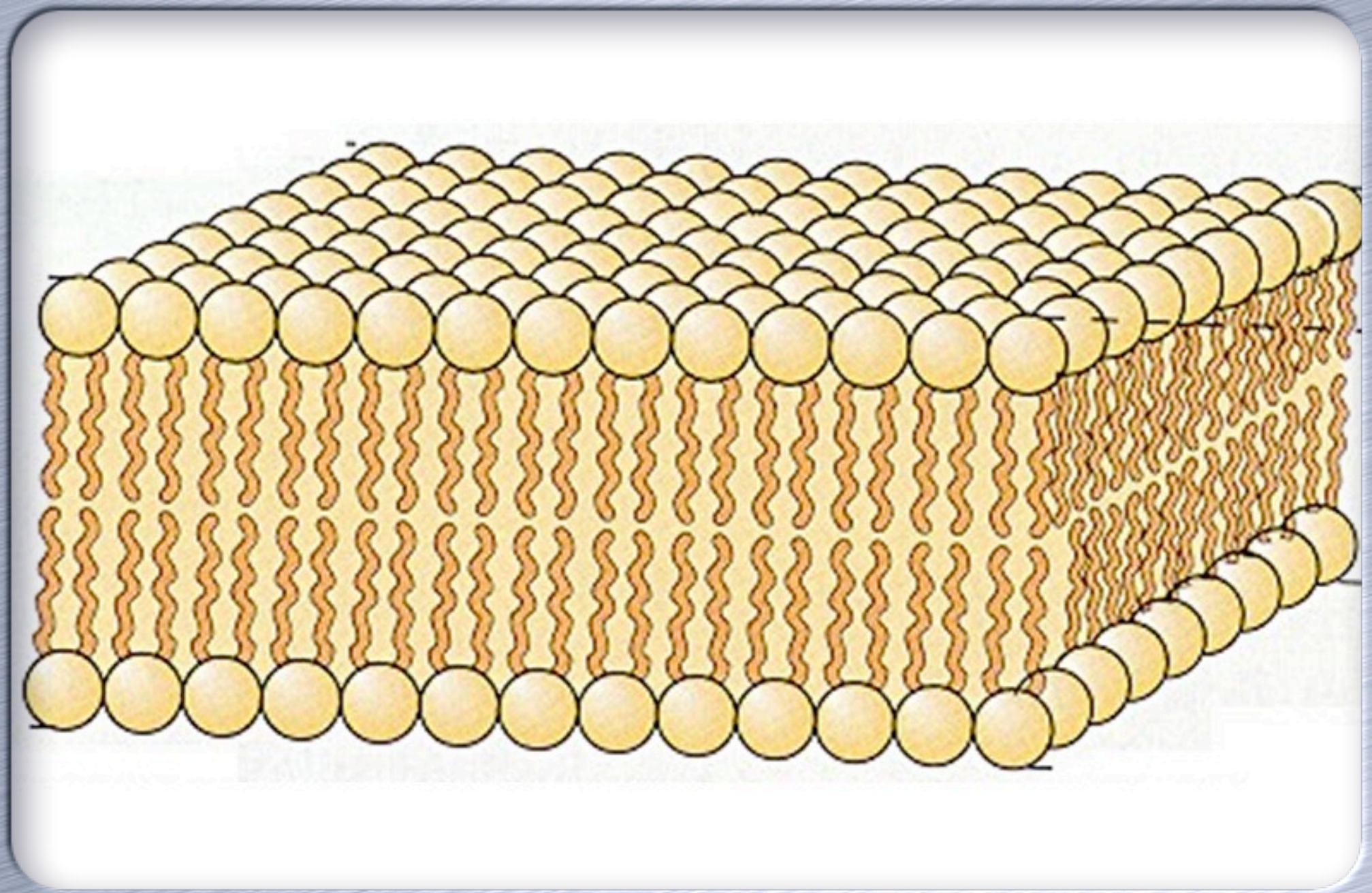


Lipids in the bilayer

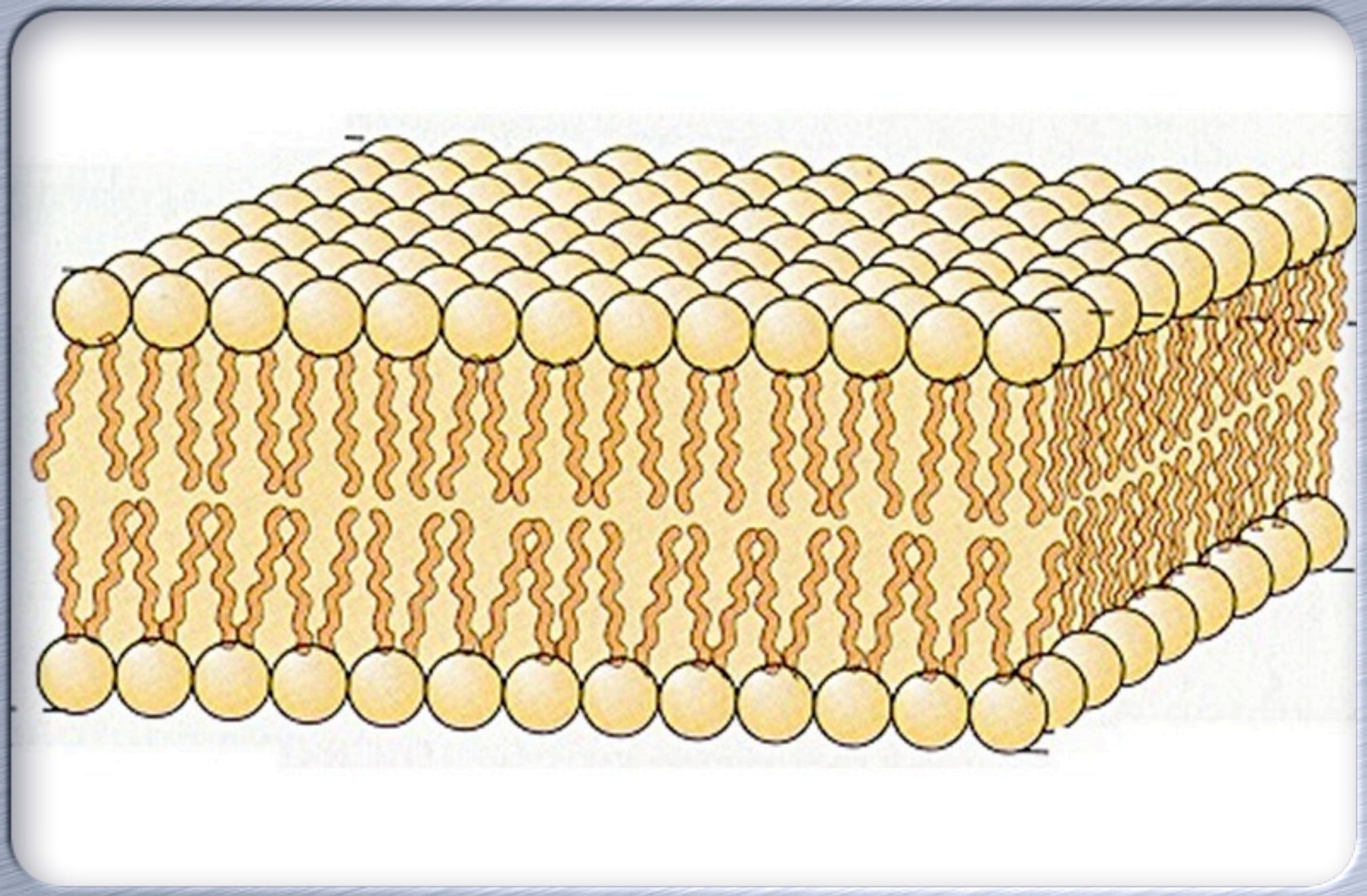
- Left "leg" shows saturated fat
  - A straight, rigid chain
- Right "leg" shows unsaturated fat
  - A bent, flexible chain



SatFat = Tight Cell Walls



Unsat = Fluid Cell Walls



One more difference

- **Nonessential** =
  Either not required for human survival
  or are produced by the human body.
  Not necessary to obtain from the diet.

- **Essential (EFAs)** =
  Required for human survival *and*
  not produced by the human body.
  Must be obtained from the diet.

A New Fat Paradigm

- Not a matter of high-fat or low-fat
- More important is *which* fat you eat
- Mono & poly *both* fight cholesterol

- All unsat's (-3, -6, -9) are important
- Omega-3s are vital to our health
  - Severely deficient in modern diets
  - The ideal omega-6:omega-3 ratio is 1:1
  - Western diets are typically 10:1 to 20:1

The Yin and Yang of Fats

Omega-6 **Arachidonic Acid (AA)**		**Omega-3** **Eicosapentaenoic Acid (EPA)**
increased risk	**Cardiovascular implications:**	decreased risk
increased risk	sudden cardiac death	decreased risk
increased	coronary artery disease	decreased
more	platelet aggregation vasoconstriction	less
higher	blood pressure	lower
higher	triglycerides	lower
	Psychiatric implications:	
more	depression	less
worse	stress response	better
worse	concentration	better
worse	mood stabilization	better
	Inflammatory implications:	
worse	rheumatoid arthritis pain	improved
more	generalized inflammation	less

Fathead!

- 60% of the brain is composed of lipids
  - Greatest component after water
- More omega-3s than any other system
- Brain cannot use short-chain omega-3s
  - Flaxseed, canola oil, vegetables, walnuts
- It must have EPA and DHA to function
  - Derived primarily from certain fatty fish
  - Not found in U.S. farm-raised fish!

Brain Building 101

- A fetus requires high amounts of EPA & DHA for proper brain development
- Gets all omega-3s from mother
  - Preferentially transported to the fetus
- Omega-3 deficit during gestation
  - Can compromise future intelligence
  - Premature birth and low birthweight
- Requirement continues after birth

"In fact, this may be the only case in modern day biology where an alteration of the behavior of the whole organism can be reasonably ascribed to a change in the structure at the atomic level."

— Norman Salem, Jr., PhD
Lipid Biochemistry Dept.,
NIH and NIAAA

(referring to the importance of DHA in brain and retinal development)

But what about mom?

- An omega-3 deficit during pregnancy also threatens the mother
  - Eclampsia and pre-eclampsia
- Postpartum deficiency in the mother
  - Depletion continues while breast feeding
  - May be the main cause of postpartum depression
  - Can take up to one year to normalize levels

Mood Disorders

Unipolar Disorders

(Depression)

Dysthymia (mild depression, never manic or hypomanic)

Major depression (never manic or hypomanic)

Bipolar Disorders

(Manic-Depressive)

Cyclothymia (hypomania with mild depression)

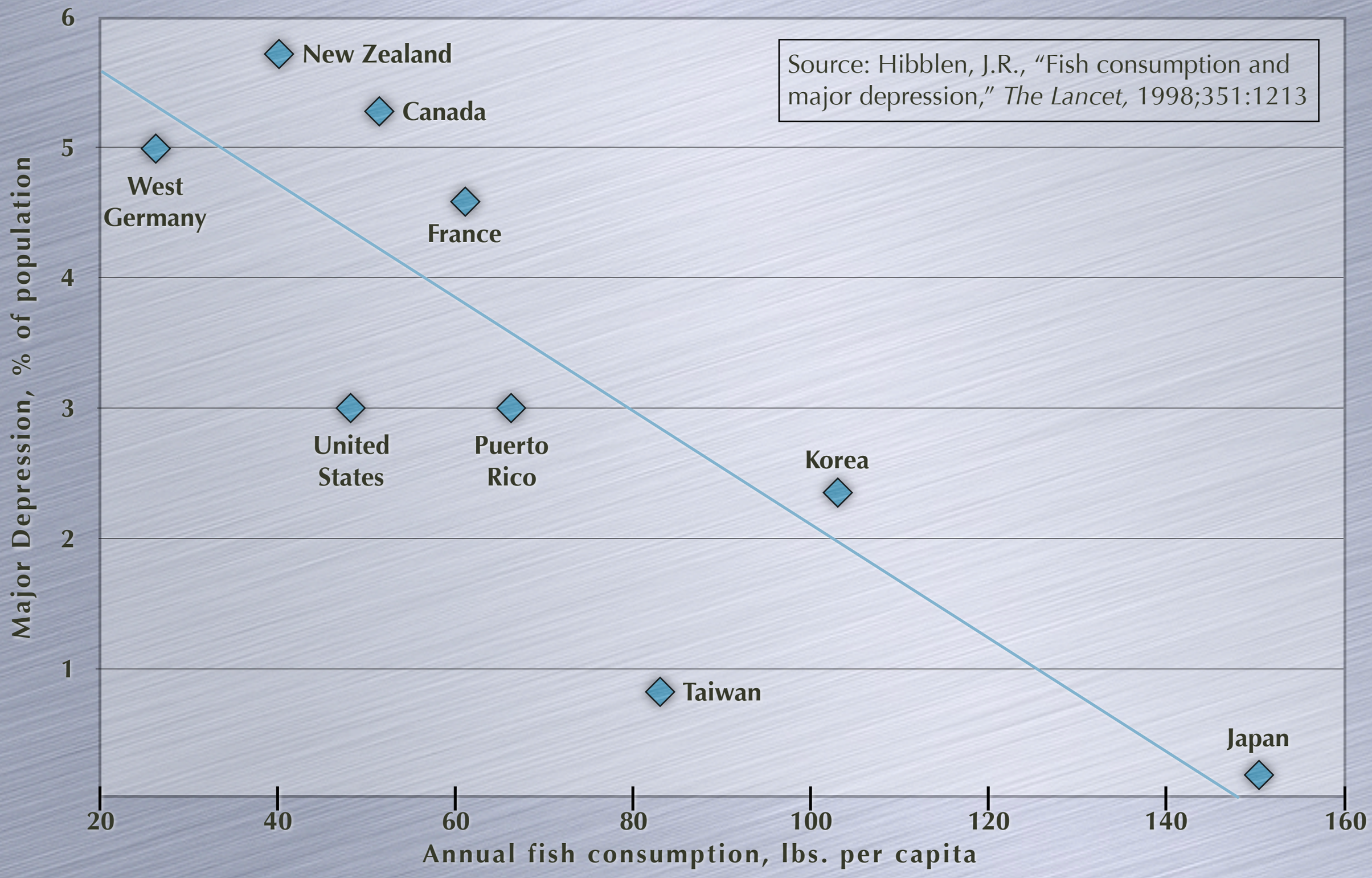
Bipolar disorder, type 2 (hypomania with major depression)

Bipolar disorder, type 1 (mania with or without major depression)

Omega-3s vs. Depression

- Evidence of efficacy
  - Epidemiological studies
  - Biochemical studies
  - Neurochemical studies
  - Clinical trials

Epidemiological Evidence



Biochemical Evidence

- Many studies link major depression to lower serum levels of omega-3s
  - "AA:EPA ratio in blood correlated positively with clinical symptoms of depression" (Australia, 1996)
  - "Lowered omega-3 PUFAs in serum phospho-lipids and cholesterol esters of depressed patients" (Belgium, 1999)
  - "Long-chain PUFAs in depression and related conditions" (England, 1999)
  - "Depletion of omega-3 fatty acid levels in RBC membranes of depressive patients" (England, 1998)

Neurochemical Evidence

- EPA, DHA, & ALA affect cellular fluidity
- EPA converts to eicosanoids
- EPA competes with AA to modulate hormones
- EPA, DHA, & ALA decrease inflammation
- EPA & DHA alter signal transduction
- EPA inhibits secondary messenger molecules
- EPA, DHA, & eicosanoids activate PPARs
- EPA, DHA, & ALA affect cellular ion channels

Clinical trials

- Open-label
  - The source of discovery
  - Ongoing in the U.S. and U.K.
- Double-blind, placebo-controlled
  - The proof of efficacy
  - Expensive and technically difficult
  - Ethically questionable for major depression
  - Not cost-effective for minor depression

Omega-3s vs. Bipolar

- Current treatment: mood stabilizers
  - Lithium, valproate, carbamazepine, verapamil, electroconvulsive therapy (ECT)
- Search for a better mood stabilizer
- Clinical trial of omega-3s for bipolar
  - Double-blind, placebo-controlled design
  - A 30-subject, 9-month study
  - Ended early for compassionate reasons

Omega-3s vs. ADHD

- Dx in 5%–20% of schoolchildren
- Estimated in 5%–10% of adults
- Among the most treatable disorders
  - CNS stimulants lead, despite problems
  - Bogus "therapies" come and go
- Animal studies link distractibility with a deficit of EFAs, especially omega-3s
- Clinical trials are encouraging

Omega-3s vs. Senility

- Beyond correcting a deficiency
- A surplus of EPA & DHA boosts memory and cognition
  - Animal studies in Japan
  - Animal and human studies in Wales
  - Human studies in the Netherlands
  - Exact ratio for learning found in Israel
- Ideal ratio of omega-6:omega-3 is 1:1

Other Psych. Disorders

- Stress Response
  - Anger, aggression, hostility
- Habitual violence
  - Incarcerated criminals
  - Violent youth & lack of impulse control
- Schizophrenia
  - Hallucinations, delusions, agitation, rituals
  - Social withdrawal, cognitive decline, apathy

Nutraceuticals

("Better health from the health food store")

- Alternative/complementary medicine
  - Has taken the West by storm
  - Limited data on safety, efficacy, and purity
    - The baby and the bathwater
- Integrative medicine
  - Trained in traditional medicine
  - Added only after rigorous scientific proof
  - Slowly becoming more mainstream

Psychonutraceuticals

("Better <u>mental</u> health from the health food store")

- For minor depression only!
  - St. John's wort (*Hypericum perforatum*)

    Standard usage: Use 300 mg capsules of St. John's wort extract, standardized to 0.3% hypericin. Start at 300 mg b.i.d.; may increase to 900–1200 mg/day after 2 weeks, if necessary.
  - SAMe (*S*-adenosyl methionine)

    Standard usage: Use 200 mg or 400 mg coated tablets. Start at 200 mg b.i.d., increase to 400 mg b.i.d. over 1 week. **Caution:** Can induce mania in bipolar people, including the 10% of depressed individuals in the general population without a bipolar diagnosis.
  - Omega-3 essential fatty acids

    Standard usage: 1–2 g/day of EPA+DHA (<u>not</u> total oil content).

"The Omega Cure"

- The importance of diet
- Choosing a high-quality supplement
  - High omega-3 content
  - High EPA concentration & ratio (min 1.5:1)
  - Pharmaceutical grade, "winterized"
  - Molecular distillation, nitrogen packaging
  - No fish liver oils, low cholesterol content
  - No rancidity, vitamin E in each capsule

“The Omega Cure”

- Major depression or bipolar disorder
  - Only under a doctor’s supervision!
  - 2–5 g/day of EPA+DHA (not total oil content)
  - increase p.r.n to 10 g/day or more
  - increases sensitivity to traditional meds
- Schizophrenia
  - Only as directed by a physician!
  - Do not attempt to self-medicate!

“The Omega Cure”

- Postpartum depression
  - Work with your doctor if severe!
  - 2–4 g/day of EPA+DHA (not total oil content) to restore your levels & increase breast milk content for your baby’s development
- ADD / ADHD
  - 1–2 g/day of EPA+DHA (not total oil content)
  - increase p.r.n to 5 g/day or more
  - may increase sensitivity to traditional meds

"The Omega Cure"

- Boosting memory and cognition
  - 1–2 g/day of EPA+DHA (not total oil content)
  - increase p.r.n to 3–4 g/day
- Modulating stress response
  - Same as above
- General health, cardioprotection, lowering inflammation, etc.
  - Same as above

"The Omega Cure"

- Potential side effects
  - Hypervitaminosis A (only from fish liver oils)
  - Gastrointestinal side effects
  - Impaired platelet function
  - Drug interactions
  - Rancidity (peroxidation)
    - in the product: look for vitamin E content
    - in the body: take vitamins C and E

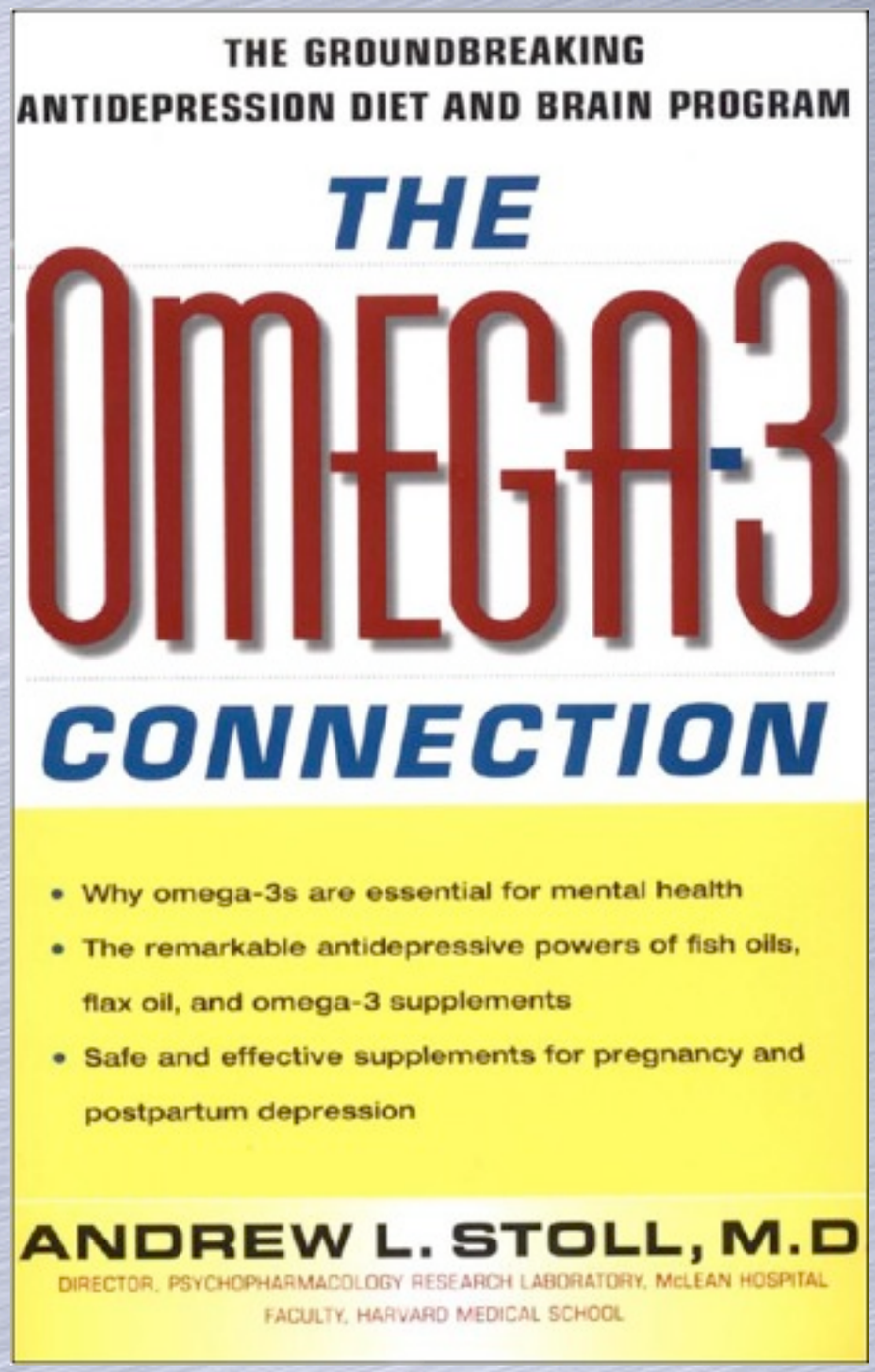
For more information

The Omega-3 Connection

by Andrew L. Stoll, MD

- Director, Psychopharmacology Research Laboratory, McLean Hospital, Boston
- Assistant Professor of Psychiatry, Harvard Medical School

Simon & Schuster, ©2002; ISBN 978-0-684-87139-4



Thank you!

"Fathead!"

Using Essential Fatty Acids to Improve Mental Health and Enhance Brain Function

These slides are available for
download at spwb.com/articles/