

Fats: Dietary Guidelines for Americans

FAT CALORIES

FOR EVERY GRAM OF FAT
YOU EAT = 9 CALORIES



Animals



Plants

Assignment for everyone: Pick your favorite ice cream

- Visit a supermarket's frozen food section
- Find your favorite ice cream

Record the following information

- **Serving size**
- **Calories**
- **Total fat** (grams)
- **Saturated fat** (grams)
- **Trans fat** (grams)
- **Cholesterol** (milligrams)
- **Sodium** (milligrams)

Bring information to class

Assignment for one volunteer

- Find **sorbet** in the supermarket
- Collect the same information

GOOD ROLE OF FATS

- **Energy**
- **Cell membranes**
- **Absorb vitamins (A, D, E, K) and antioxidants in food**
- **Need “essential” fats**
- **Growth: children**
- **Development: brain/
nervous system-
children**

BAD ROLE of FATS

↑ Obesity

↑ Some Cancers

↑ Heart Disease

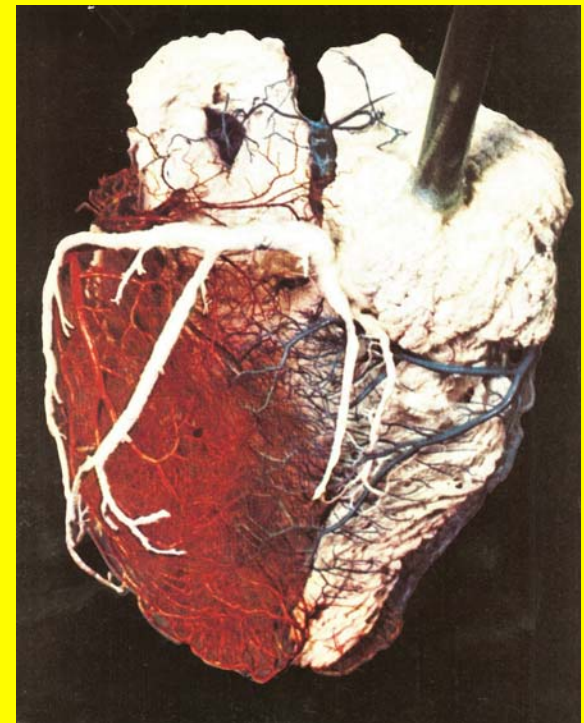
↑ Blood Clots

Fat and Your arteries

- ↑ Fat: Heart Arteries = **Heart Attack**
- ↑ Fat: Brain Arteries = **Stroke**

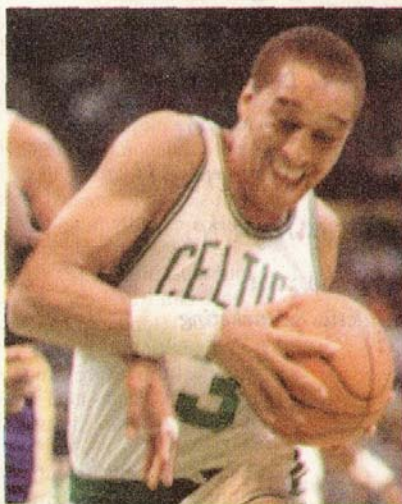
Heart attack death: San Francisco
49ers offensive lineman-
Thomas Herrion (2005)

- **23** years old; 6 feet 3 inches, 315 pounds
- After exhibition game
- Not drug related
- **Significant blockage: right coronary artery**
- Enlarged heart



DENNIS JOHNSON HEART ATTACK

DENNIS JOHNSON
1954-2007

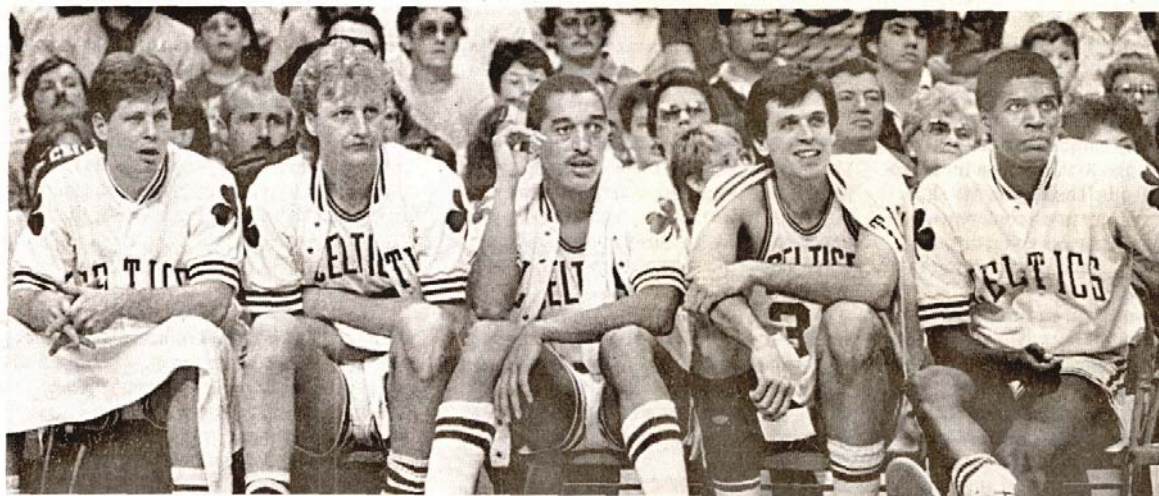


FILE/MARK LENNIHAN/ASSOCIATED PRESS

Point guard Dennis Johnson was a driving force in the Celtics' NBA championships of 1984 and '86.

Ex-Celtic star dead at age 52

DENNIS JOHNSON 1954-2007



Dennis Johnson was a student of the game with the Celtics' title teams of the mid-'80s (left), and a teacher of the game

Ex-Celtic Johnson dead at 52

45 DA

Lipids + Fats = Lipoproteins

- Low Density Lipoprotein (LDL)

“Bad Cholesterol”

- High Density Lipoprotein (HDL)

“Good Cholesterol”

Total Fat in Your Diet

- Adult: Reach Healthy Body Weight

- **Stay in Energy Balance**

Calories In = Calories Out

- **Adjust Fat Calories** (Energy Rich)

" Follow the Grams"

- Total Fat Limit each day =
65 grams
- Based on **2000** calorie reference diet



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CHOCOLATE CON LECHE Y ARROZ TOSTADO

NET WT/PESO NETO 1.55 OZ (43.9 g)

WHY BE PLAIN? WHEN YOU CAN BE

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EXAMPLE

My Chocolate Bar = 11 grams of fat

65 grams – 11 grams = 54 grams
of fat- limit
rest of day

ASSIGNMENT

Next Class:

Bring in your favorite chocolate bar

or

Wrapper from your favorite
chocolate bar

Be ready to read: Nutrition Facts: Fat

Fats: Grams vs. Calories

- What if you:
 - A) Are in **energy balance** &
 - B) Eat much **less** or much **more** than **2000** calories/day

How do you figure out your **grams**
of fat/day?

SIMPLE MATH

1. Divide your total calories/day by **2000**;
2. Multiply this number by **65**;
3. Gives your **specific daily fat limit** in grams

- What is your total fat limit/day if you eat **1500** calories /day?

Answer

$$\frac{1500}{2000} = .75 \times 65 = 48 \text{ grams}$$

- What is your total fat limit/day if you eat **2500** calories /day?

Answer

$$\frac{2500}{2000} = 1.25 \times 65 = \mathbf{81}$$

grams

SATURATED FAT = BAD FAT

- **Higher amounts in:**

Meats

Whole Milk

Cheese

Ice Cream

Many Prepared Foods

SATURATED FAT = BAD FAT

- **Most Plants: Low Amounts of Saturated Fat**
 - **Exceptions:** Palm & Coconut oil
 - **Ingredients: look for these words**
- 

FATS & OILS

SATURATED FAT - BAD FAT

Recommendation:

Less than **20** grams per day

Limit:

(examples - contain 6 or more grams per serving*)

beef (chuck), bologna, burritos, cheeses (cheddar, cream) enchiladas, frozen dinners (some), gravies (some), hamburger, ham loaf, hot dog (beef), ice cream, lamb chops, meat loaf, cheese omlet, pastas with cheese, parmigiana (chicken, veal, eggplant), pies (some), pizza, sauces (some), sausage, spareribs, steaks, tacos

*Sources: The T-Factor Fat Gram Counter, 1999. Pope, J. and M. Katalin. W.W. Norton & Company, Inc. New York, NY.

↑ Saturated Fat ↑ LDL

↑ Risk Heart Disease

Women ↑ Risk Breast
Cancer

If you already have high **LDL**
levels.....

Eat less than **15.5** grams/day
of saturated fat

***Saturated Fat: One of
the most dangerous fats
you can eat**

Smart ways to reduce Saturated fat in your diet:

- Lean, low-fat, fat-free foods
- Choose low fat/extra lean meats
- Remove skin
- Roast or bake instead of frying
- Choose low fat dessert

Smart Way to cut back- Saturated Fat
Same amount of food shown

Saturated Fat

Higher

Regular Cheese
(6.0 grams)

Regular Ground
Beef

(6.1)

Lower

Low Fat Cheese
(1.2 grams)

Extra Lean

(2.6)

Saturated Fat

Higher

Whole Milk
(4.6 grams)

Croissant
(6.6)

Lower

Low Fat Milk
(1.5 grams)

Bagel (oat bran)
(0.2)

Saturated Fat

Higher

Regular Ice Cream

(4.9 grams)

Butter

(2.4)

Lower

Frozen,

Low Fat

Yogurt (2.0)

Soft Margarine

(0.7)

Saturated Fat

Higher

Chicken leg fried/
with skin

(3.3 grams)

Fried Fish

(2.8)

Lower

Roasted
Chicken

Breast,
Skinless

(0.9 grams)

Baked Fish

(1.5)

Smart Ways to Cook



Saturated
Fat

Smart Way

Better Than

Broiling/Roasting/
Grilling on rack (fat
drips away)

Frying

Baking, Steaming

Smart Ways to Cook



Saturated
Fat

Smart Way

Better Than

Liquid Vegetable
Oil (Canola, corn
olive, etc.)

Butter,
Lard

Smart Ways to Cook ↓ Saturated Fat

Smart Way

Better Than

Non-stick pans,
Vegetable sprays

Butter, Lard,
Stick Margarine

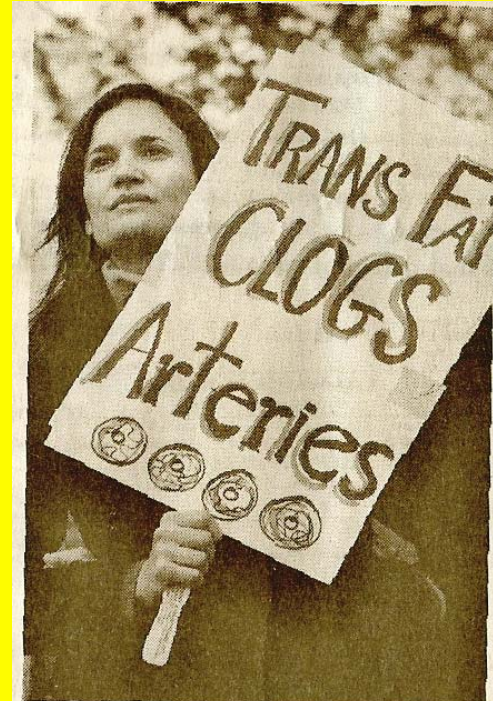
Trim Fat from
Meat

No Trimming

Trans Fat : Bad Fat

↑ LDL ↓ HDL

↑ Heart Disease
Risk



MARIO TAMA/GETTY IMAGES

A protester in New York where the health department is holding public hearings on trans fats.

Cape Cod Times 6/14 06

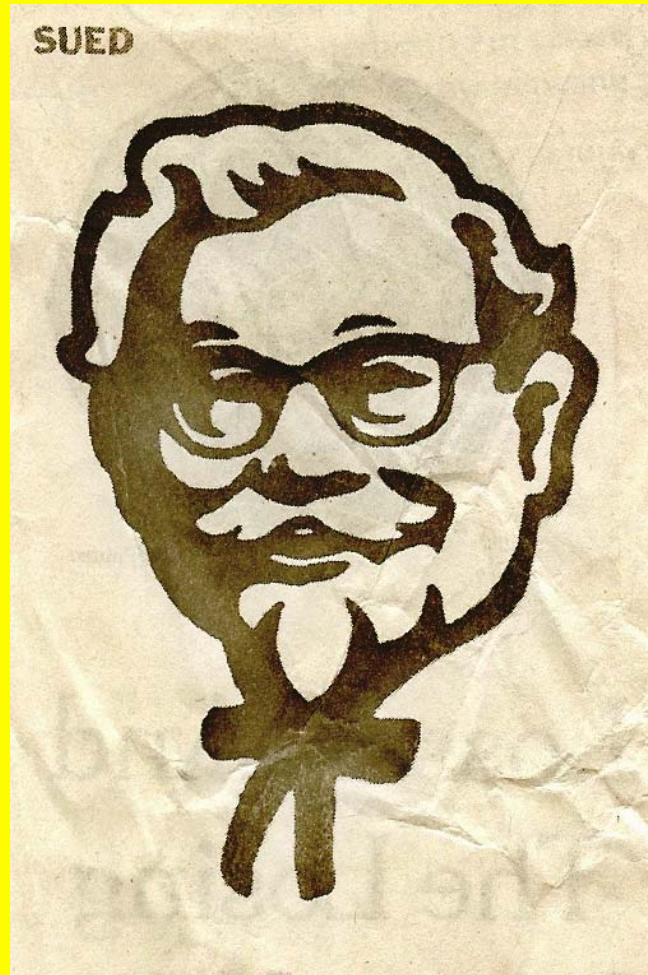


ASSOCIATED PRESS

A customer leaves a KFC eatery yesterday in Montgomery, Ala., the same day the chain was hit by a lawsuit by a health-advocacy group that wants KFC to stop frying chicken in partially hydrogenated oil.

KENTUCKY FRIED CORONARY?

The Colonel is sued
NY Times 6/18/06



TRANS FAT

BAD FATS

Recommendation:

Eat as little as possible.

Food Label Key Words: “hydrogenated”,
“partially hydrogenated”, “trans fat”

Limit These: cakes, cookies, crackers,
pies, bread, some margarines, French fries,
potato chips, corn chips, buttered popcorn,
shortenings.

Trans Fat: What to Do

- Look for “partially hydrogenated”
- Eat less processed foods
- **Use liquid, tub, spray or “trans free” margarine**
- Avoid **butter, stick margarine**
- **Read ingredients: food labels**

Headlines

- NY Times 1/3/07 “Starbucks cuts use of trans fats”



- Globe 1/30/07 “McDonald's will roll out trans-fat-free oil in fries”
- UMass Lowell Aramark: March 2007: will cut trans fats from fryers

Beyond Trans Fats: Calories

- Great Indiana State Fair: bans trans fats from fryers
- Switch to **soybean oil**
- But everything is **deep fried**



Beyond Trans Fats: **Calories**

Combo platter: battered/deep fried:

1 Snickers bar

2 Oreos

1 Reese's

Peanut

butter cup



> **700 calories**

Cholesterol: Bad Role

↑ Cholesterol in foods → LDL ↑

↑ Heart Attack ↑ Stroke

Foods high in cholesterol: eggs (yolk),
Liver, kidney, many prepared foods

FATS & OILS

CHOLESTEROL - BAD FAT

Recommendation:

less than **300** milligrams per day

Limit:

[examples - contain 100 or more milligrams per serving*]

beef (chuck), cheese souffle, chicken leg with skin, desserts (eclair, mousse, some pies), eggs, frozen dinners (some), ham loaf, kidney, lamb (leg), liver, lobster newburg, meatloaf, parmigiana (chicken, veal), pastas with cheese (some), quiche, shrimp creole, spareribs, steak (chicken fried, salisbury), sub sandwich (salami & cheese)

*Source: The T-Factor Fat Gram Counter. 1999. Pope, J. and M. Katahn. W.W. Norton & Company, Inc. New York, NY.

Polyunsaturated & Monounsaturated Fats

Good Fats

↓ Blood Cholesterol

↓ Heart Disease Risk

FATS & OILS

GOOD FATS

Recommendation:

Polyunsaturated
+
Monounsaturated less than **45** grams per day

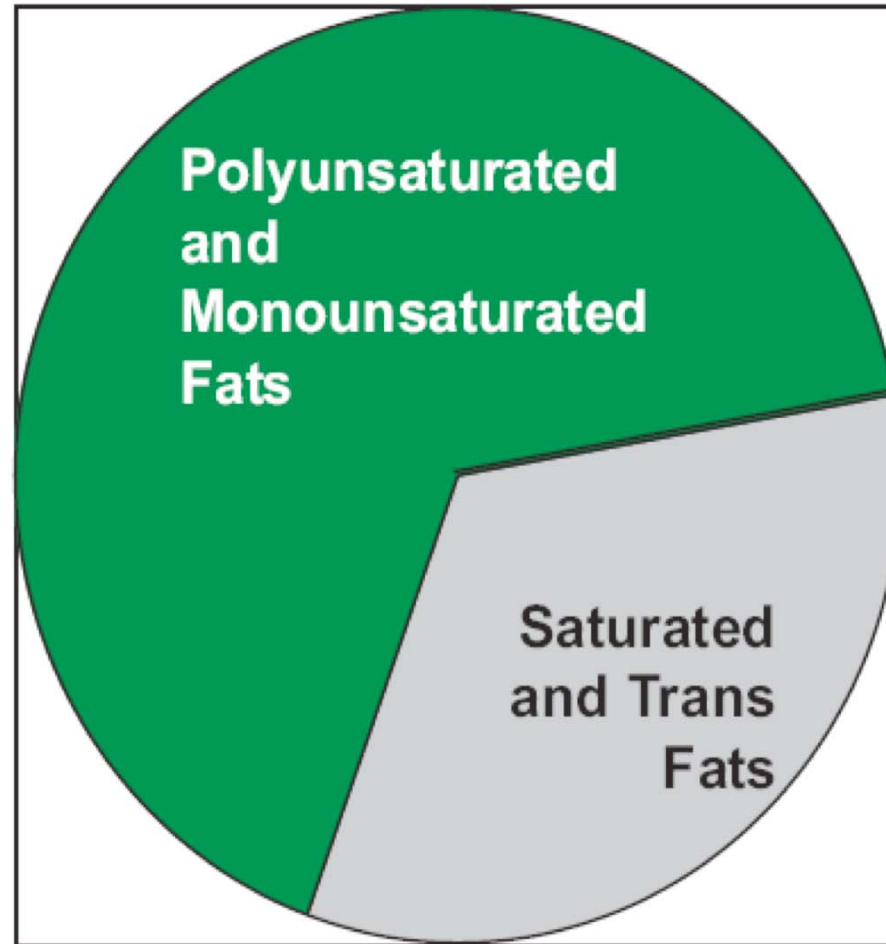
Food label Key Words:

polyunsaturated, monounsaturated

Consider These:

flaxseed, nuts (unsalted),
seeds (sesame, sunflower)
liquid vegetable oils: canola, corn, olive,
safflower, soybean, margarine (trans-free
tub, liquid, spray)

Get most of your FAT calories
from poly's & mono's - *Limit saturated fat*



COMPARISON OF DIETARY FATS

■ SATURATED FAT

POLYUNSATURATED FAT
 ■ Linoleic Acid
 ■ Alpha-Linolenic Acid
 (An Omega-3 Fatty Acid)

■ MONOUNSATURATED FAT

DIETARY FAT

CHOLESTEROL
mg/Tbsp

Fatty acid content normalized to 100 percent

DIETARY FAT	CHOLESTEROL mg/Tbsp	Fatty acid content normalized to 100 percent			
Canola oil (New Puritan Oil)	0	6%	22%	10%	62%
Safflower oil	0	10%	77%	Trace	13%
Sunflower oil	0	11%	69%		20%
Corn oil	0	13%	61%	1%	25%
Olive oil	0	14%	8%	1%	77%
Soybean oil	0	15%	54%	7%	24%
Margarine	0	17%	32%	2%	49%
Peanut oil	0	18%	33%		49%
Chicken fat	11	31%	21%	1%	47%
Lard	12	41%	11%	1%	47%
Beef fat	14	52%	3%	1%	44%
Butterfat	33	66%	2%	2%	30%

Easy numbers to remember: food shopping & eating out

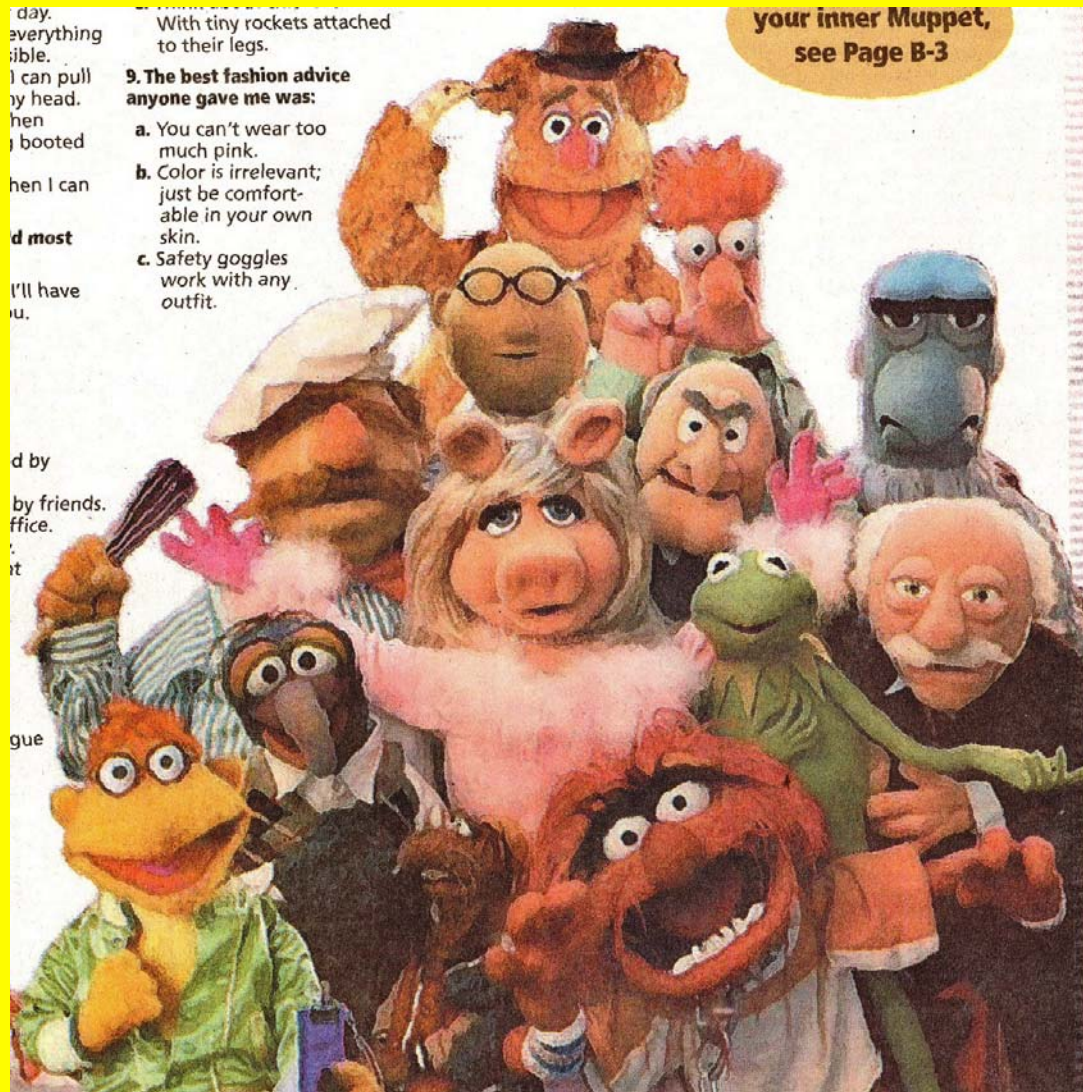
Total fat limit: 65 grams

Saturated fat limit: 20 grams

Poly + Mono-
Unsaturated fat: } 45 grams

Cholesterol: 300 milligrams

A Polyunsaturated Pig?



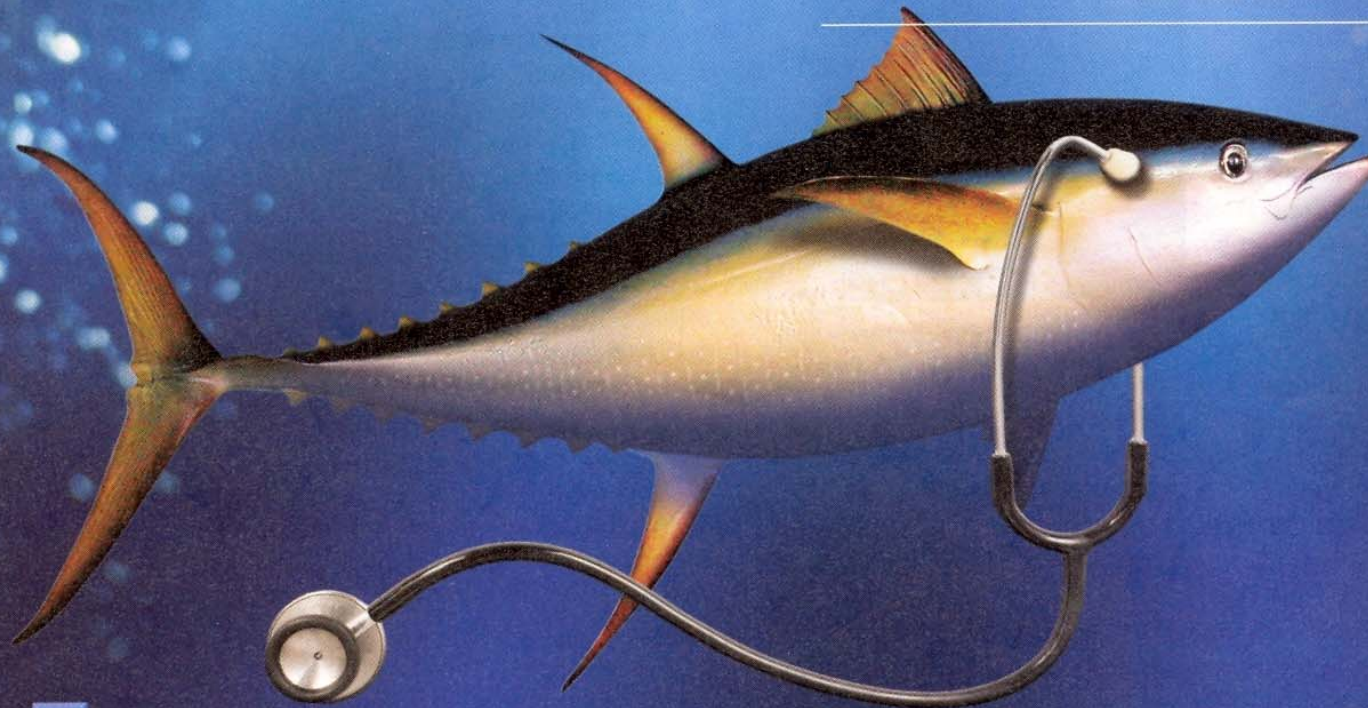
"You are what you eat"

- Iowa State University: feed pigs high soybean oil diet
- ↑ Polyunsaturated fat in pork; no change in pork cholesterol
- Feed lard, pork chops to women (19-24 years)
- ↓ Polyunsaturated Fats
Saturated/monounsaturated:
↓ blood
- **LDL cholesterol**

OMEGA MEDICINE?

Is fish oil good for what ails you?

BY BONNIE LIEBMAN

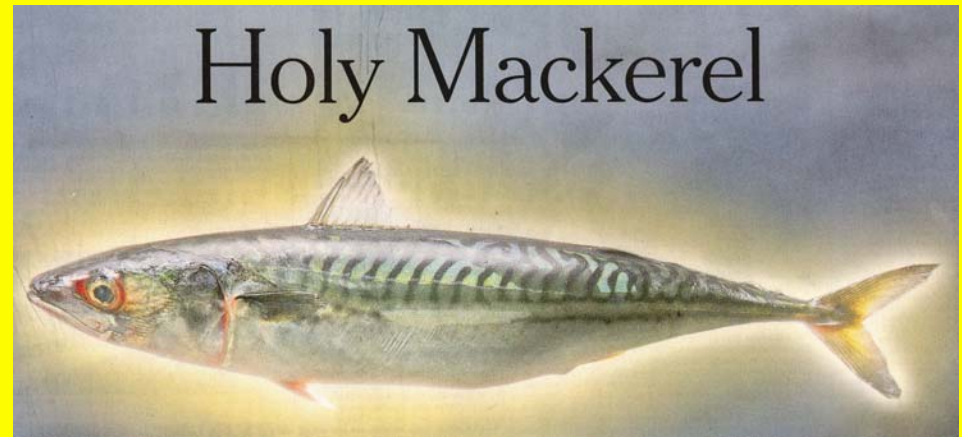


ire (stethoscope), Photo Illustration: Jorge Bach.

Omega 3: Good Fats- Special Type of Polyunsaturated fat

Protect against:

- Heart attack
- Stroke
- Sudden death
- Lower blood triglycerides
- Help maintain normal heart rhythms



People with arthritis: **fish oil capsules** + medications: ↓ swollen & tender joints: anti-inflammation



FISH

PROTECT YOUR HEART - OMEGA 3 = GOOD FATS

Recommendation:

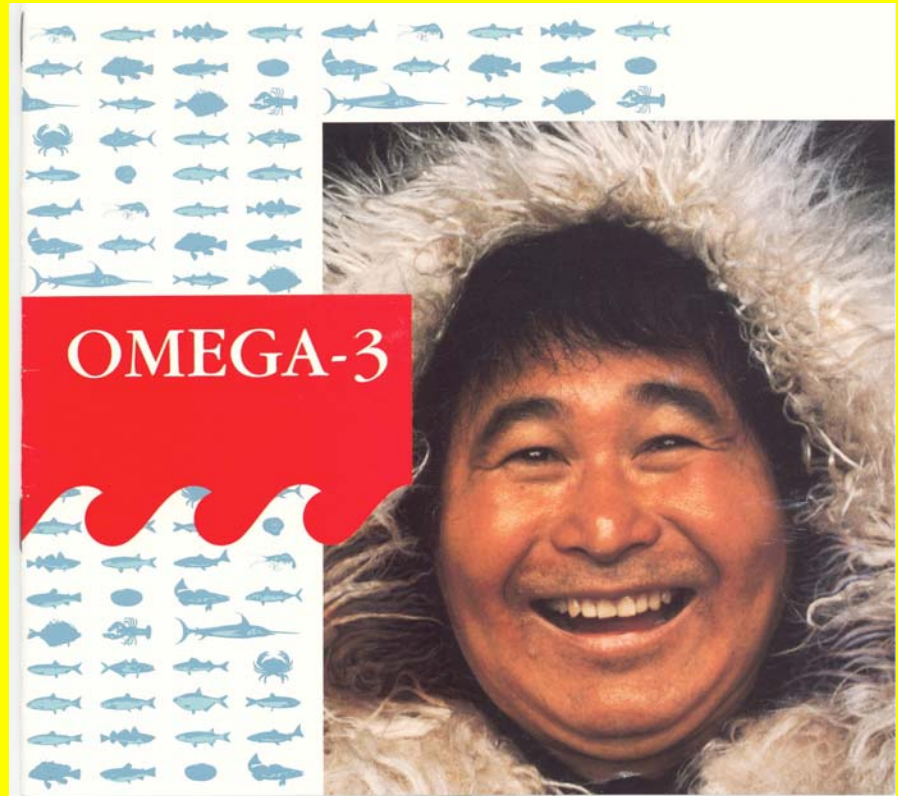
2 Servings per Week*

one serving = 4 ounces

Omega 3 fats may
protect against heart disease

Consider These:

Salmon, Mackerel, Tuna, Trout, Pollack, Flounder, Alaska
King Crab, Snapper, Shrimp, Haddock, Cod



Fish

Omega 3
(grams/four ounces)

Salmon

2.4

Mackerel

2.1

Tuna- fresh

1.7

Trout

1.1

Tuna- white

1.0

(canned in H₂O)

Fish

Omega 3 (grams/four ounces)

Pollack	0.6
Flounder	0.6
Alaska King Crab	0.5
Snapper	0.4
Shrimp	0.4
Tuna-light (in H ₂ O)	0.3
Haddock	0.3
Cod	0.2

Word of caution: Mercury (poison)
found in fish

↑ Mercury in some fish
and shellfish

Harm unborn babies or
young children

FDA 2004 Advisory

- Pregnant/nursing women
- Women who might become pregnant
- Young children

Avoid:

**Shark, Swordfish, King
Mackerel, Tilefish: high
mercury**

Fish vs. Red Meat

Fish:

1. Low in calories & saturated fat
2. Good source: protein, B vitamins, minerals

OMEGA 3

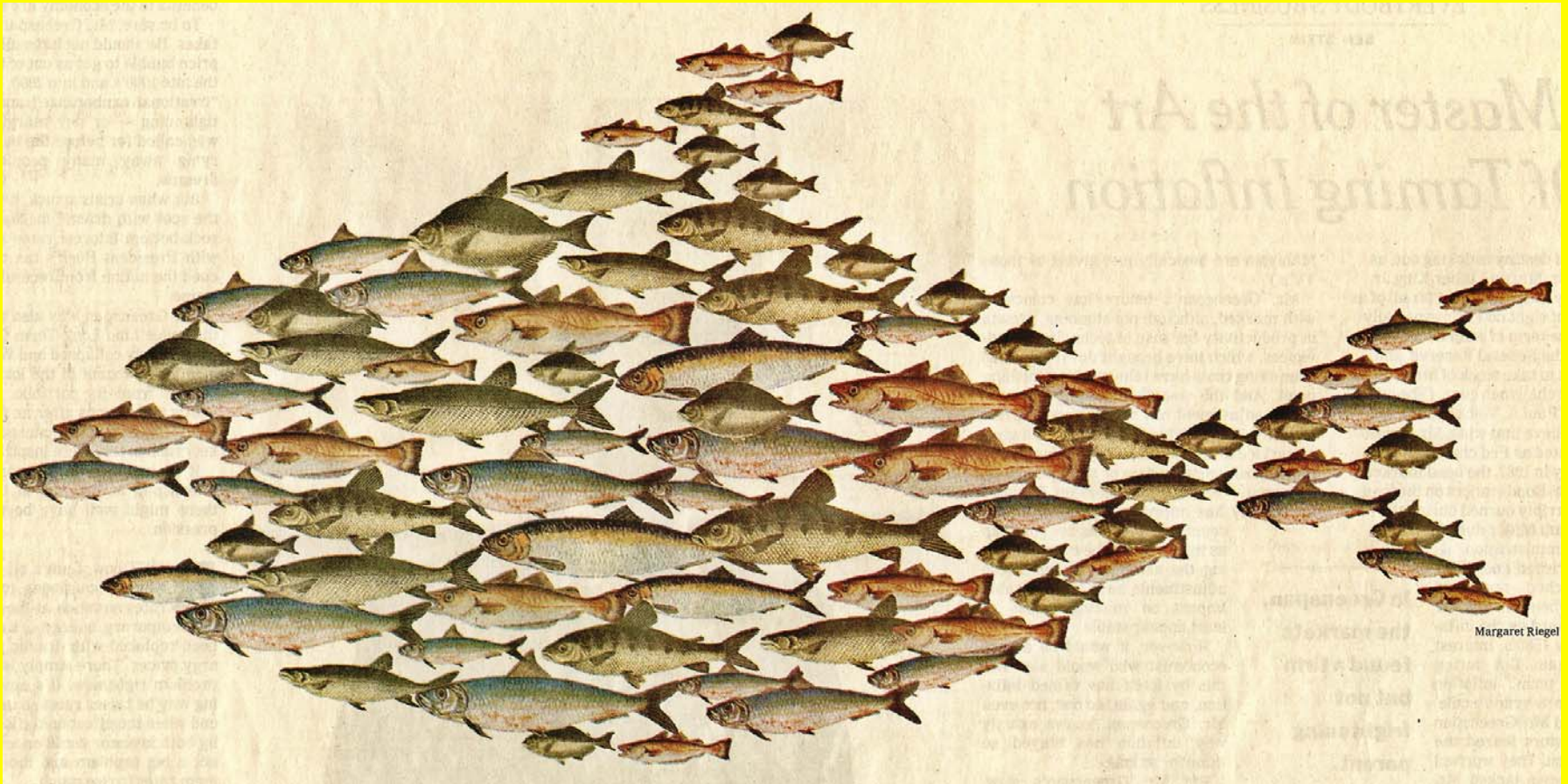
GOOD FATS - PROTECT YOUR HEART

Plant Sources:

soybean oil, canola oil, walnuts, flaxseed

Omega 3 fats may protect against heart disease

Other interesting things about Omega 3's



Fish and Prisoners



Does Eating Salmon Lower The Murder Rate?

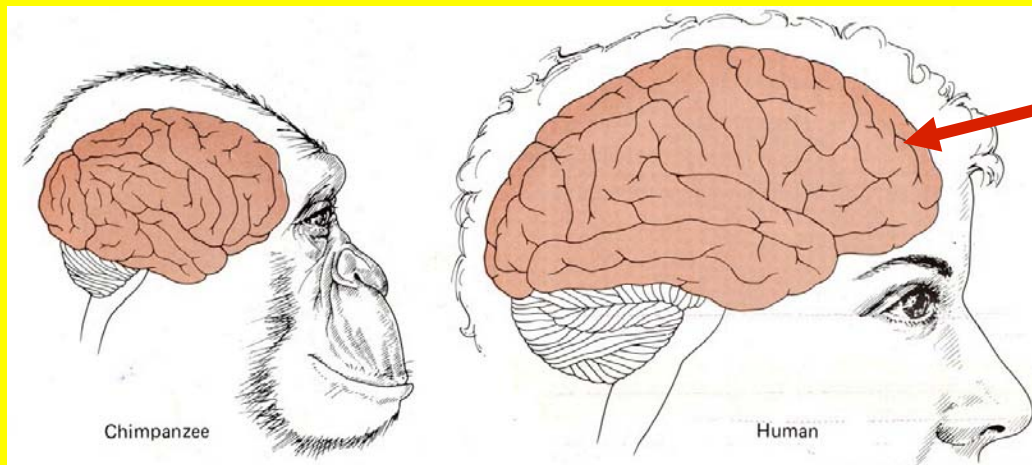
What omega-3 fatty acids might do for
violent behavior. By Stephen Mihm

Fish and Prisoners

- U.S. : highest per capita jail rate
- Within 2 weeks release: ex-prisoners
12.7 X more likely: dead
- 71% deaths: drug overdose
- NIH study: correlation
↑ omega 3 fats ↓ murder rate
- Finland study: prisoners: violent
crime: ↓ omega 3's in **blood**

? Cause → Effect ?

- Omega 3's important part of brain's frontal cerebral cortex: controls **impulsive behavior**
- Give **omega 3's**: people- substance abuse: "**anger**" symptoms ↓ **50%**



Fish Oil and Coma

Little leaguer (N.J.) -baseball/metal

bat

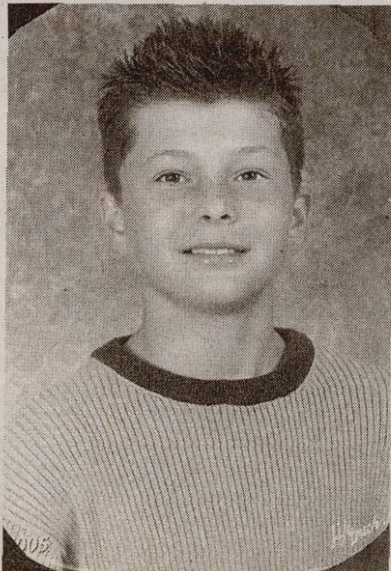
disrupt heart electrical

chest

signals

heart stopped

coma



Domalewski family, via Associated Press
Steven Domalewski, 12, was hit by
a line drive in a Police Athletic
League game in Wayne, N.J.

1) Treated: B12 vitamins
+ **fish omega 3's**

2) Dr. Bales: W. Virginia
University Medical Center

3) Out of coma,
doing well

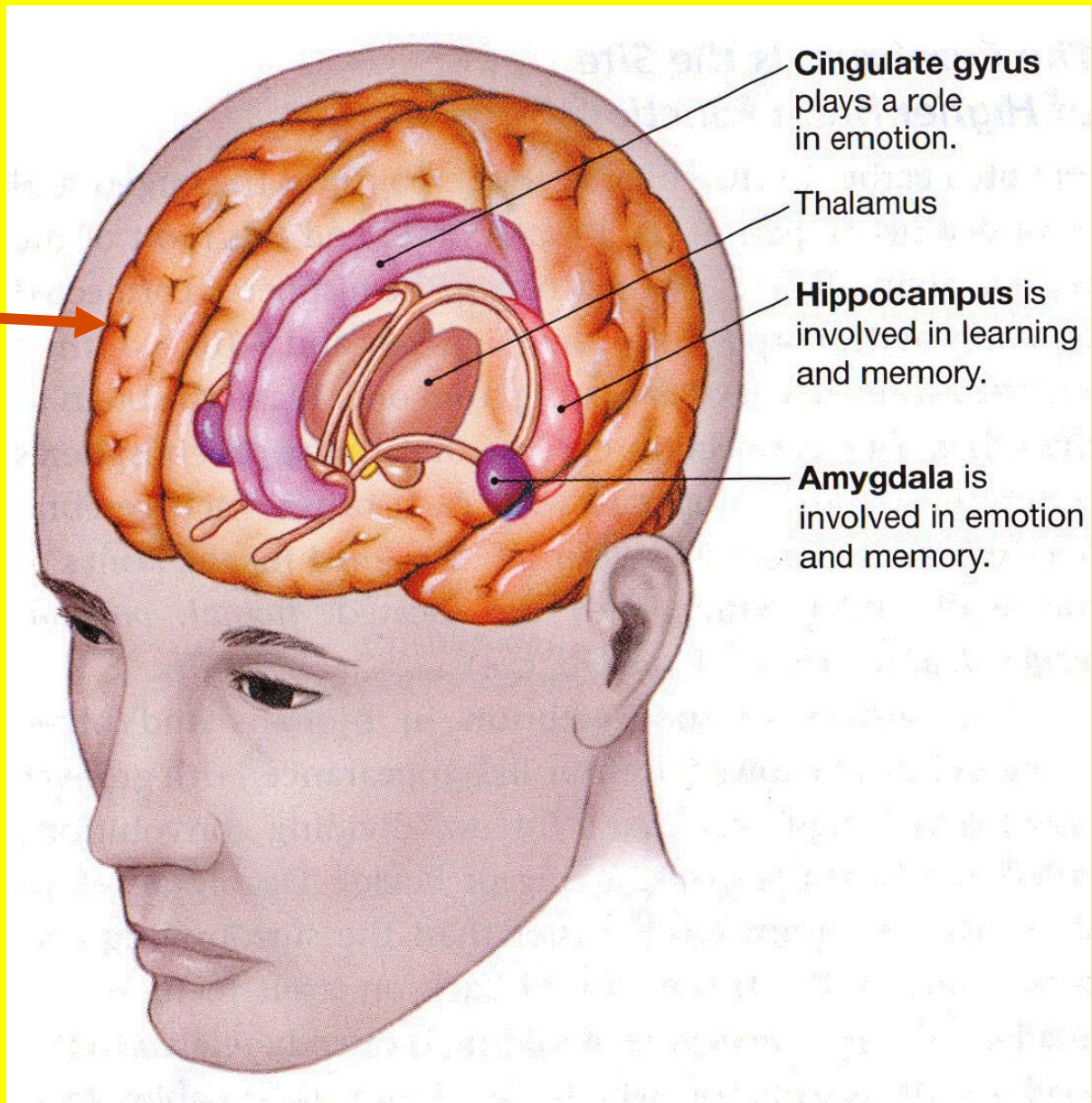


4) Same treatment: Randal McCloy-
survivor Sago Coal Mine disaster 2006

Omega 3's, Fish, & Your Brain

- Omega 3 fats- abundant in brain's gray matter (cerebral cortex covering- intelligence)
- Omega 3's: breast milk: important babies' **brain development**
- ↓ brain omega 3's with age

Gray
matter



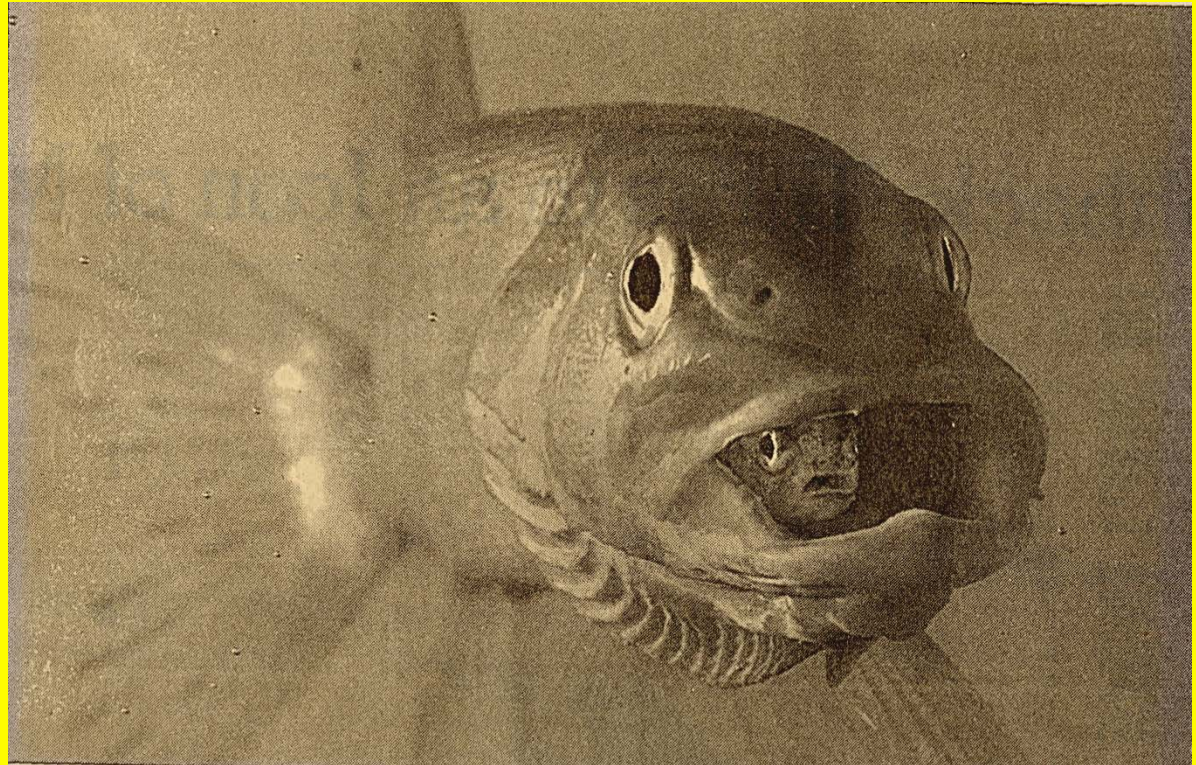
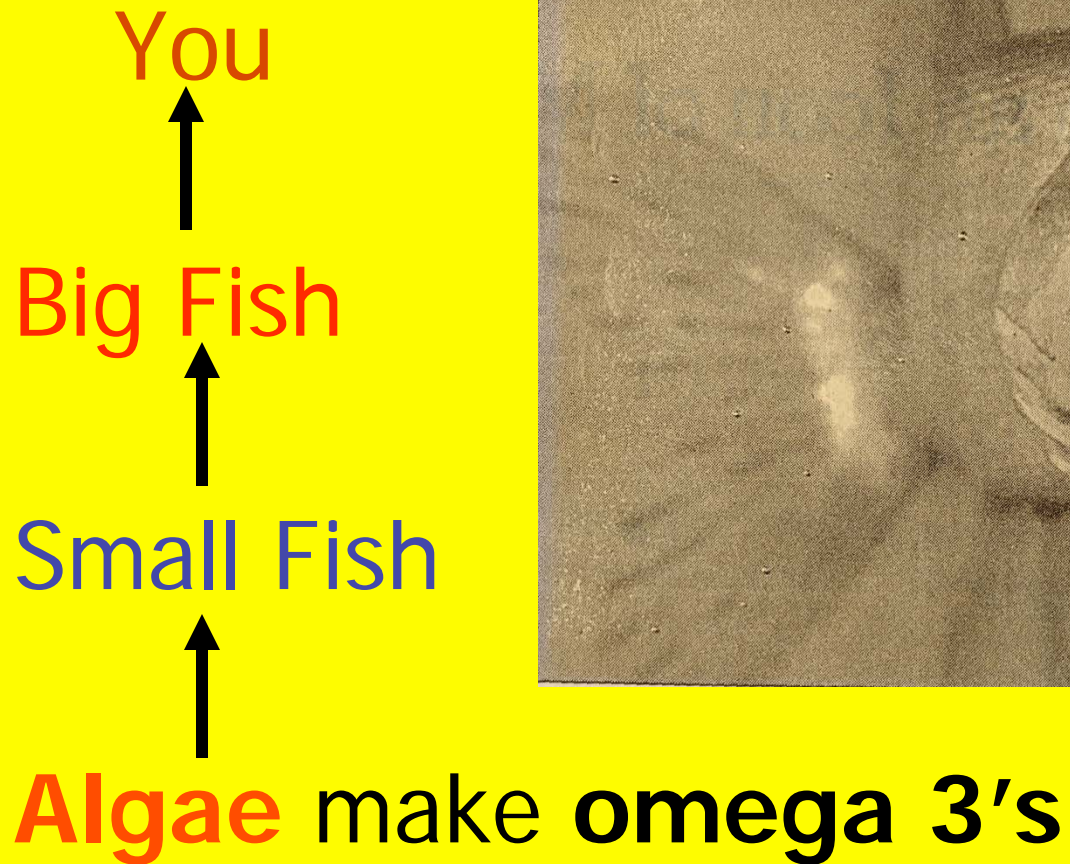
Fetus/Placenta need omega 3's from pregnant woman

- Pregnant women: fish oil supplements (DHA, EPA): Babies- better hand/eye coordination & mental development
- Pregnant women: fish > 3 times/week
 - 1) Babies better IQ scores ("brain food")

Omega 3's & Aging Brain

- Chicago study: people **65+**
1-2 fish meals/week
10-13% slower **mental decline**
- Framingham study: people age **76**:
2.7 fish meals/week
↓ **47%** risk dementia
(Alzheimer's disease)

Food Chain and Omega 3's



Martek Biosciences- Maryland

- Isolated/purified omega 3's from algae
- “Vegetarian Omega 3”
- 2001: FDA allowed use omega 3's in baby formula (90% formulas in U.S.)
- Nutrition bars- pregnant/nursing women, Soy milk, yogurt, OJ



Omega 3 Enriched Eggs



The Country Hen

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The Country Hen is Unique

- They live in sunlit spacious bams*
- They eat a certified organic feed*
- This feed is very high in Omega-3's*
- Producing simply healthy and delicious eggs!*


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Omega 3's, Fish, & Your Heart

First discovered: 1970's

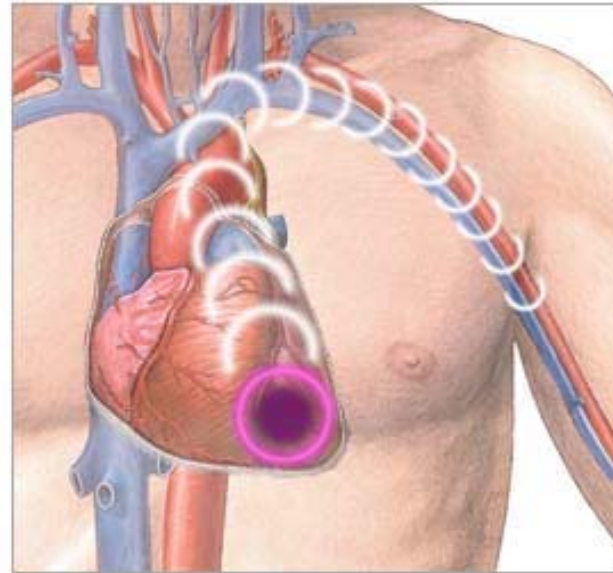
Greenland Inuit:

↑ Fatty Fish Diet

↓ Heart



NY Times 10/3/06 "In Europe It's Fish Oil
After Heart Attacks"



Pain radiating
down arm
might signal
heart attack

ADAM.

- People survive 1 heart attack
Eat Fish ↓ Risk 2d attack

Fish Oil Capsules

- **Italy**: leader fish oil treatment heart disease
- Mediterranean Diet ↑ baked/broiled fish

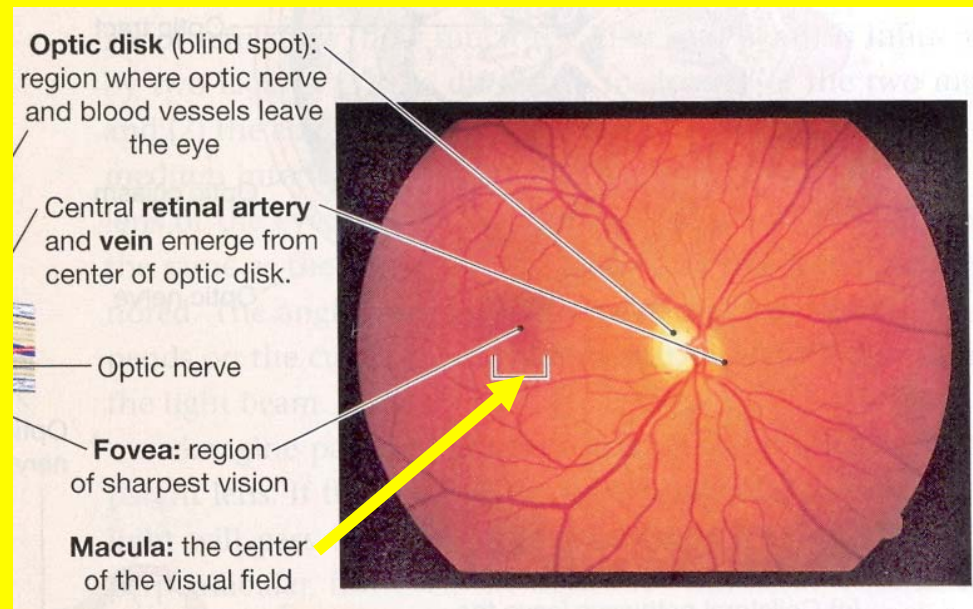


- **Rome hospital:** all heart attack **survivors:** prescription- purified omega 3 capsules



Omega 3's, Fish and Your Eyes

- Omega 3's- concentrated: retina
- Needed- visual acuity
- Macula: small, center of retina- where images focused



↑ Age ↑ Macular Degeneration

- ↓ Visual sharpness
- Black spots in visual field
- Eating fish **once**/week ↓ **40%** risk
- Fish **three** times/week ↓ **75%** risk

of age-related macular
degeneration

Problems: Omega 3's



Heart-healthy fish Salmon is a rich source of omega-3 fatty acids. Here it is steamed with strips of carrot and scallions and served with noodles.

Good sources

Most fish contain less than five percent fat, and this fat is mainly polyunsaturated. "Oily" fish contain five to 15 percent fat—a few have more. This list ranks fish by their relative fat content (oily to lean):

- Herring
- Mackerel
- Sardines
- Anchovies
- Salmon
- Tuna
- Halibut
- Cod
- Crab
- Scallops
- Shrimp
- Lobster



- Frying fish breaks down Omega 3's
- Fish oil capsules: FDA: up to **3 grams/day**- generally safe
- High intake fish oil: excessive bleeding

Mediterranean Diet

Portugal, Spain, Italy, France, Greece,
Turkey, Israel



Mediterranean Diet

↓ Cholesterol levels

↑ Longer Life

↓ Breast Cancer

Mediterranean vs.

U.S. Women

↓ Heart Disease

↓ Cancer

Mouth

Esophagus

Stomach

Lungs

Intestine

Overall pattern of eating: more important than individual foods. "Food interactions."

↑ Fruits, vegetables, breads, cereals, beans, nuts, seeds, legumes (fiber, vitamins, minerals)

↓ Processed foods

↑ Seasonal, fresh foods

Daily dessert: fresh fruit

Olive oil = Major fat (? What kind)

Cheese & yogurt= low to moderate

< 4 eggs/week

↓ Red meat

Fish

Wine (red) with meals

+ Daily physical activity

Overall:

Mediterranean Diet: not low in fat but
differs in type of fat vs. U.S. Diet

Mediterranean Diet



Saturated (animal) fat &
cholesterol



Monounsaturated fat

Plant proteins: legumes,
nuts

Diet

Fat Calories

*Traditional- Japan	10%
*Crete (Mediterranean)	35%
*Inuit (Greenland)	60%
North American	33%

*Low Heart Disease

Conclusion?

Harvard "Siesta Study" 2007



Mediterranean Sleep

- Greek men: regular 30 minute nap
↓ 37% risk heart disease death
- Reasons?: Biological clock- 2
drowsiness dips: midway through waking hours & before bed time
- ↓ Stress ↓ BP ↓ Heart Rate & helps Immune system- restored
- HEART HEALTH: **Diet/Exercise/Sleep**

NAPS- WILL THEY CATCH ON?



1. Yarde Metals, Inc. Southington, CT

- Midday nap for employees
- Nap room- full-body **massage** chair
- Aromatherapy/motion: sights & sound of beach/brook

2. Indiana University **"Nap Club"**

- 15 beds for students
- Mon-Thursday 11AM- 3 PM
- "Moderator"- wakes people up
- Basis: Most people need 9.5- 10 hours sleep: perform optimally

French Paradox

- French Diet: ↑ Moderately high-saturated fat but ↓ heart disease
- WHY?
 1. Wine (red) at meals: ↑ HDL
↓ Blood clots, antioxidants
 2. Portion sizes: Paris vs. Philadelphia
Paris restaurants ↓ portions
Supermarkets ↓ candy bars, hot dogs, yogurt

French Paradox

3. French eating **fewer calories**
4. ↓ **Obesity** in France vs. ↑ U.S.
Longevity: French women (**84** years) life expectancy second only to Japanese (**85.6**)

Jeanne Cuisiner (87)

“ I eat a lot of vegetables & not much meat.”



Foie Gras (fatty liver)

- Ducks/Geese: force fed with tube-cooked **corn**
- Delicacy- enlarged liver
- Banned Chicago restaurants & 12 other countries- inhumane treatment animals



Assignment for volunteers: Frozen dinner experts

- Visit a supermarket's frozen food section.
- Find the following frozen dinners (chicken, any kind): Healthy Choice, Boston Market, South Beach, Hungry Man, Swanson, Stouffer's Lean Cuisine.

Record the following information

- Serving size and grams
- Calories/gram
- Total fat (grams)
- Saturated fat (grams)
- Trans fat (grams)
- Cholesterol (grams)
- Sodium (grams)

Bring information to class.