

# **Fats:** Dietary Guidelines for Americans

# **FAT CALORIES**

FOR EVERY GRAM OF FAT  
YOU EAT = **9** CALORIES

↑ **Animals**

↓ **Plants**

# 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**

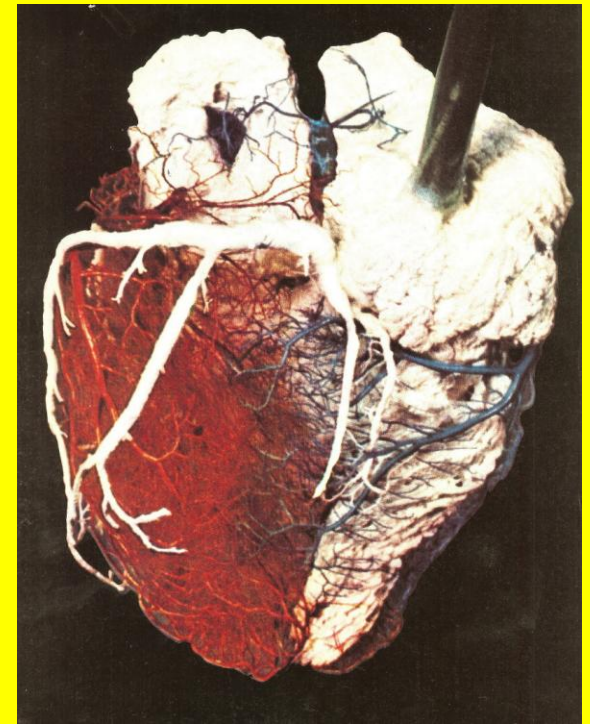
# Fat and Your arteries

↑ Fat: Heart Arteries = **Heart Attack**

↑ Fat: Brain Arteries = **Stroke**

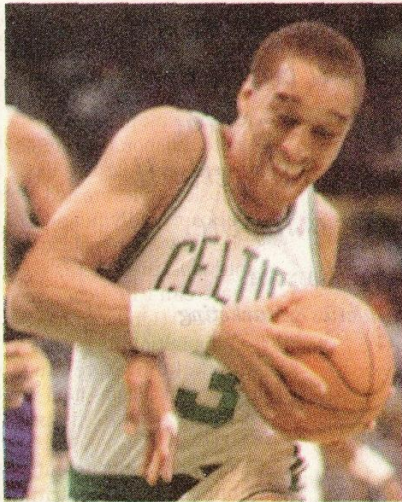
# Heart attack death: San Francisco 49ers offensive lineman- **Thomas Herrion (2005)**

- **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

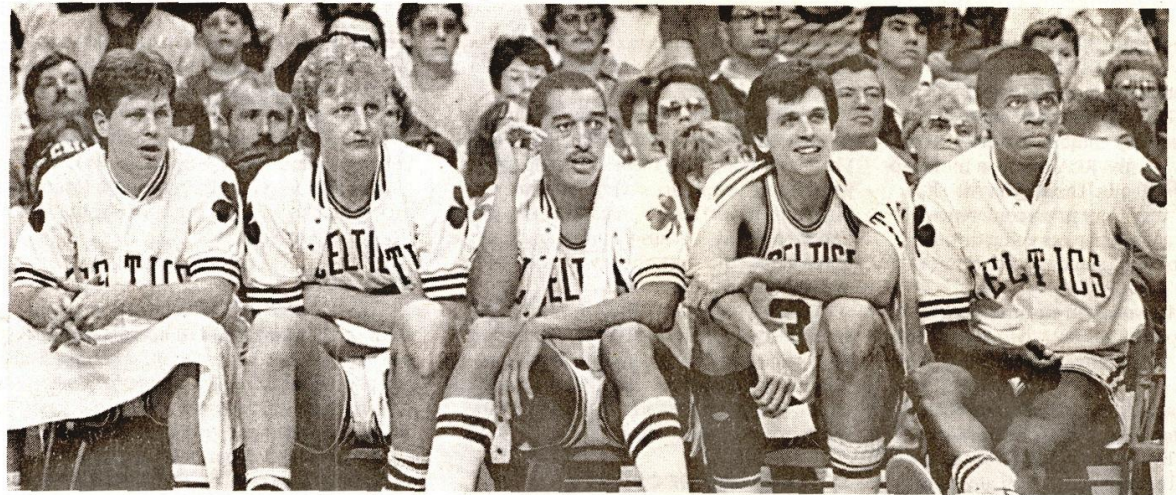


FILE/MARK LENNIHAN/ASSOCIATED PRESS

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”**



# Cholesterol

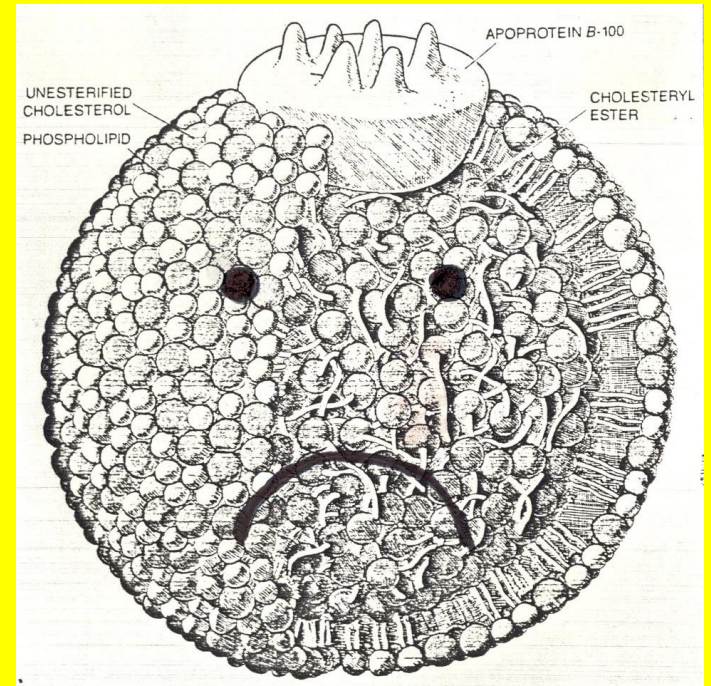
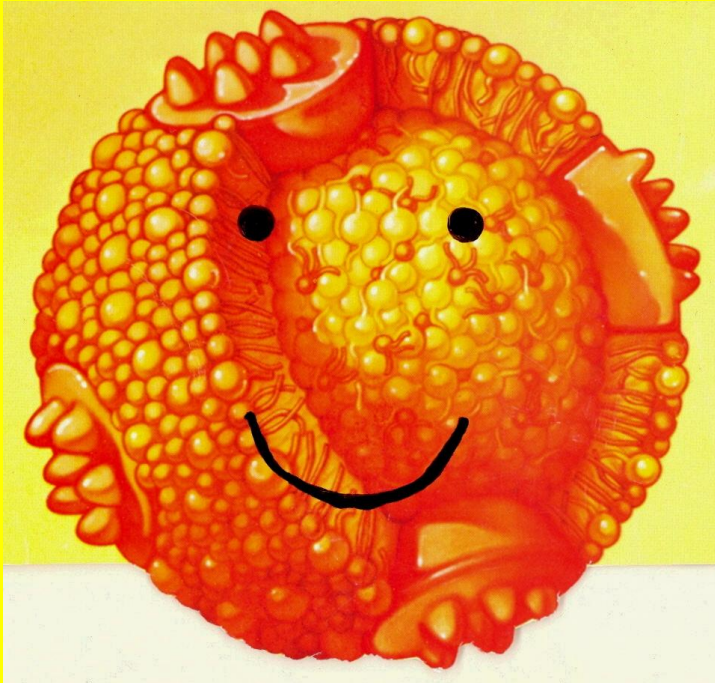
The Good

and

The Bad

**HDL**

**LDL**



# 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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WHY BE PLAIN? WHEN YOU CAN BE  
¿POR QUÉ SER SIMPLE? CUANDO PUEDES SER CRUJIENTE.

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# EXAMPLE

My Chocolate Bar = **11** grams of fat

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

# 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**

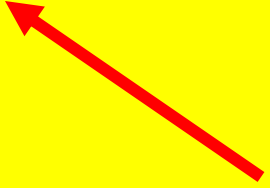
**Whole Milk**

**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)

Baking, Steaming

**Frying**

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

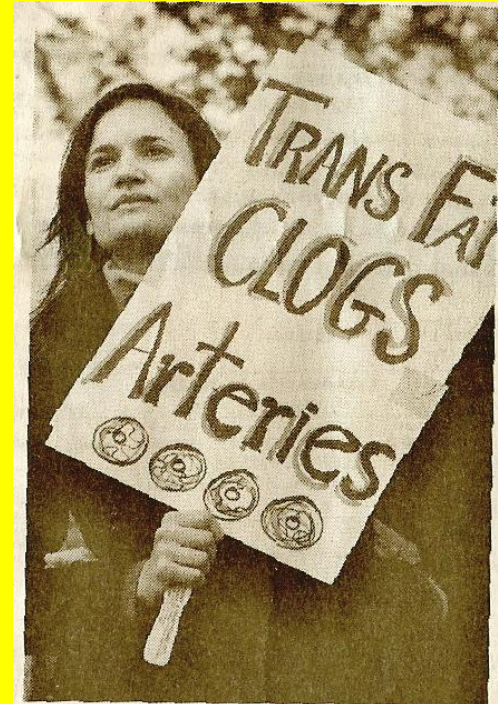
No Trimming



# 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.

# 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**

# Cholesterol: Bad Role

↑ Cholesterol in foods → LDL ↑

**In some people**

↑ Heart Attack ↑ Stroke

**2010 Dietary Guidelines: Most  
healthy people: 1 egg/day OK**

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)

# Polyunsaturated & Monounsaturated Fats

Good Fats

↓ Blood Cholesterol

↓ Heart Disease Risk

# FATS & OILS

## GOOD FATS

### Recommendation:

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

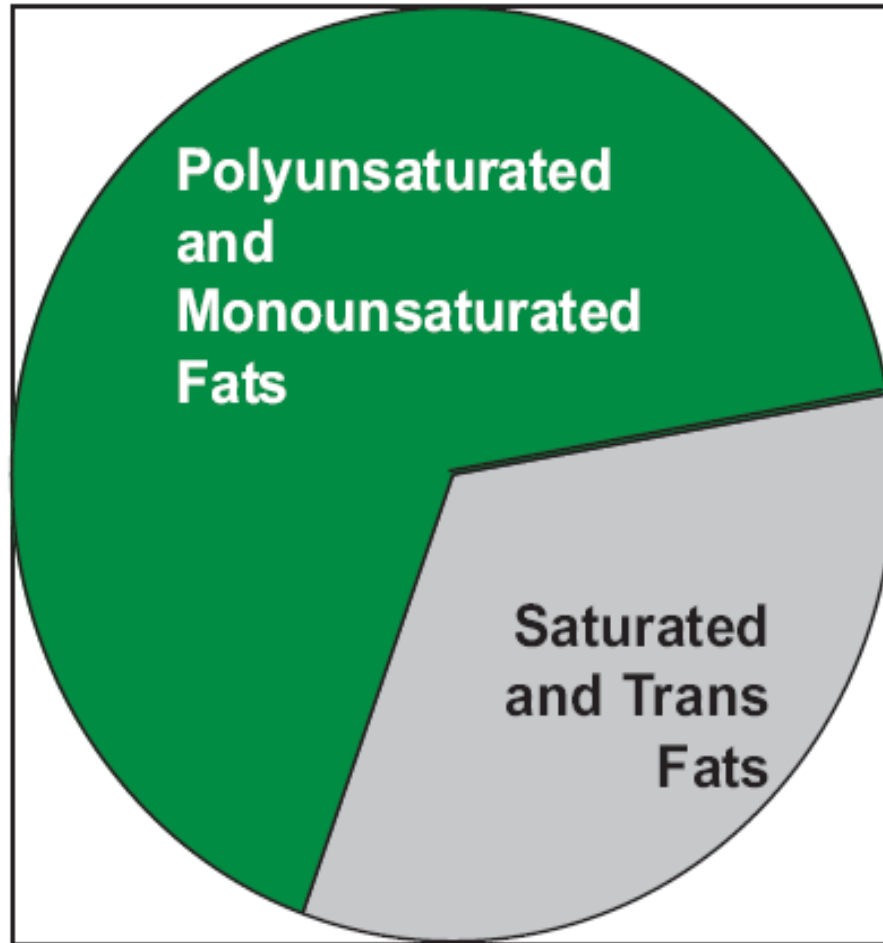
### Food label Key Words:

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	SATURATED FAT	LINOLEIC ACID	ALPHA-LINOLENIC ACID	MONOUNSATURATED FAT
<b>Canola oil</b> (New Puritan Oil)	0	6%	22%	10%	62%
<b>Safflower oil</b>	0	10%	77%	Trace	13%
<b>Sunflower oil</b>	0	11%	69%		20%
<b>Corn oil</b>	0	13%	61%	1%	25%
<b>Olive oil</b>	0	14%	8%	1%	77%
<b>Soybean oil</b>	0	15%	54%	7%	24%
<b>Margarine</b>	0	17%	32%	2%	49%
<b>Peanut oil</b>	0	18%	33%		49%
<b>Chicken fat</b>	11	31%	21%	1%	47%
<b>Lard</b>	12	41%	11%	1%	47%
<b>Beef fat</b>	14	52%	3%	1%	44%
<b>Butterfat</b>	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

# "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:  
**in blood**
-  **LDL cholesterol**

# 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 H<sub>2</sub>O)

## 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 <sub>2</sub> 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**

- Pregnant/Breast Feeding: limit 6 ounces/week: white (Albacore) tuna-higher in 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:**

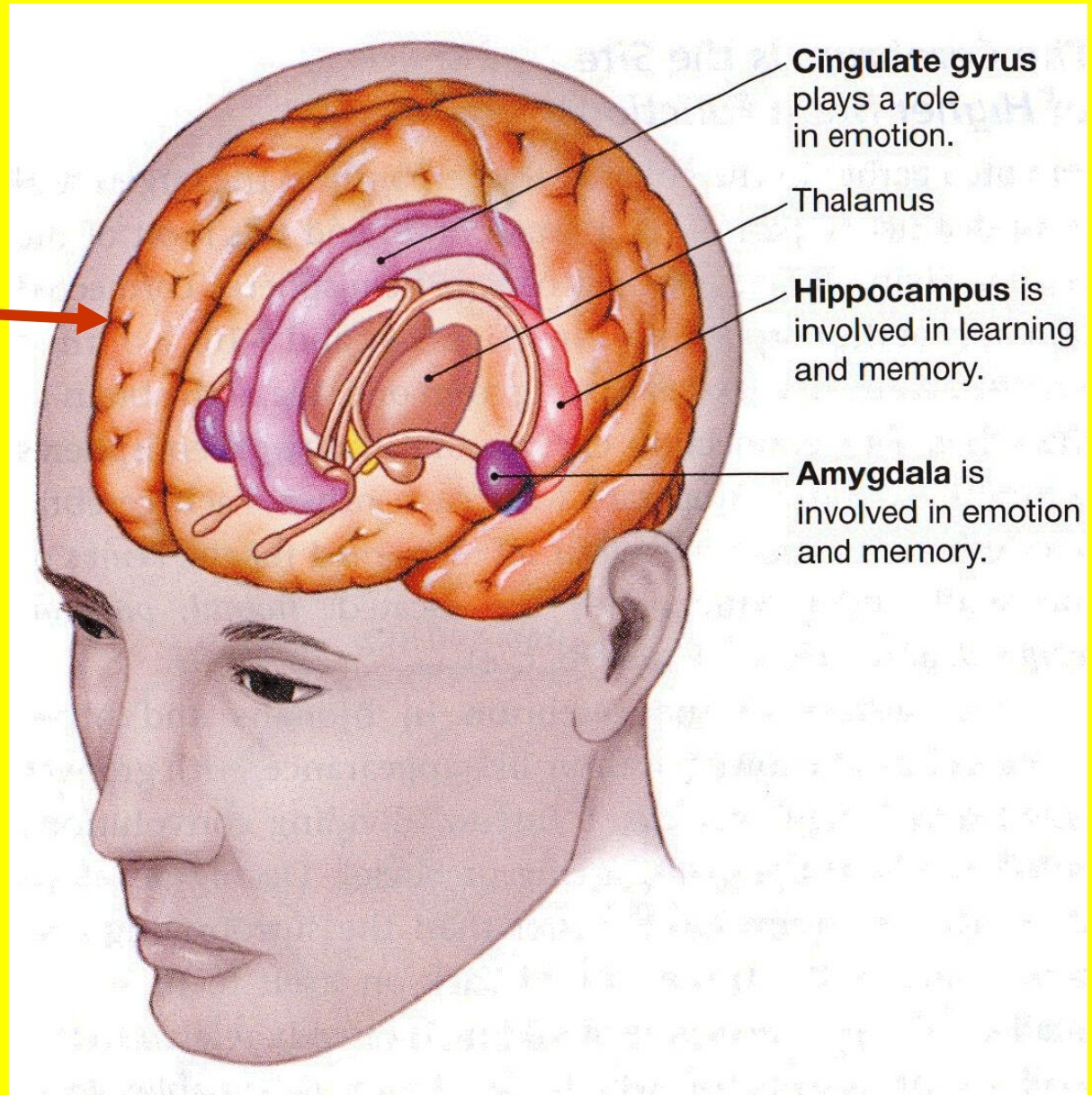
soybean oil, canola oil, walnuts, flaxseed

Omega 3 fats may protect against heart disease

# 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



**Cingulate gyrus**  
plays a role  
in emotion.

Thalamus

**Hippocampus** is  
involved in learning  
and memory.

**Amygdala** is  
involved in emotion  
and memory.

# 2010 Study: Inuit of Canada

↑ Omega 3's in red blood cells

↓ Serious Psychological Distress





# Fish and Prisoners



## **Does Eating Salmon Lower The Murder Rate?**

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

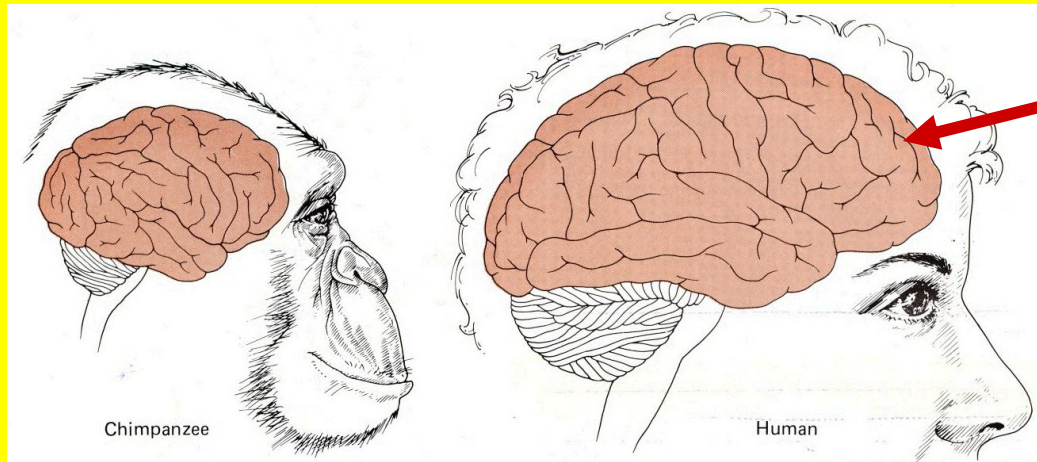


# Fish and Prisoners

- 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%**



# 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)**

# 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"**)

# 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



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# Omega 3's, Fish, & Your Heart

First discovered: 1970's

Greenland Inuit:

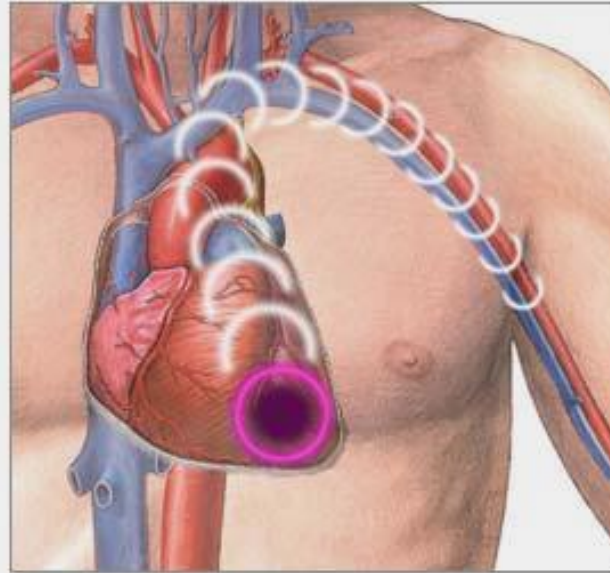
↑ Fatty Fish Diet

↓ Heart Disease





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

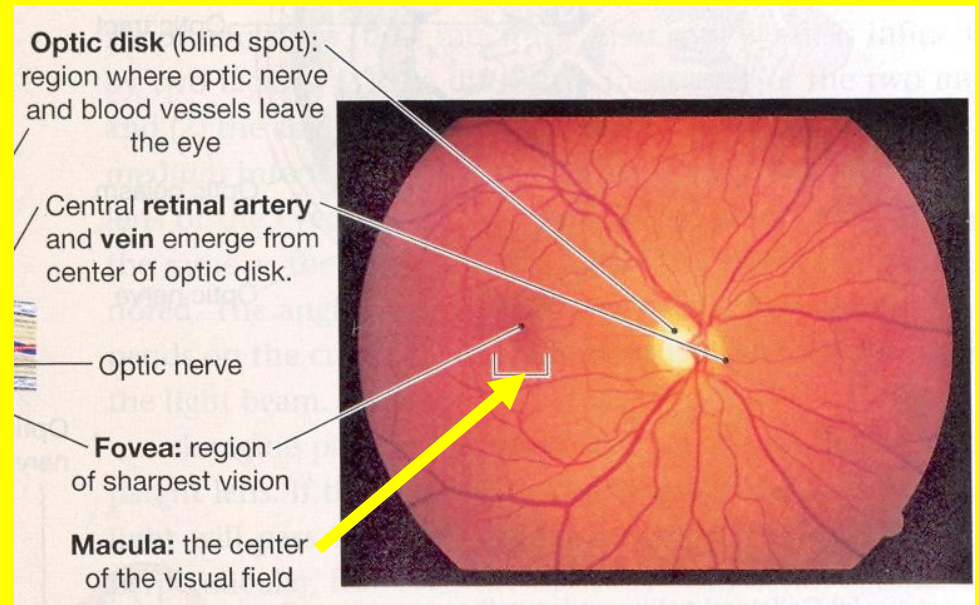
# Fish Oil Capsules

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



# 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: not low in fat**

## **Diet**

## **Fat Calories**

\*Traditional-Japan

**10%**

\*Crete (Mediterranean)

**35%**

\*Inuit (Greenland)

**60%**

North America

**33%**

\*Low heart disease

**What's important? Type of Fat**

# **Mediterranean Diet**



Saturated (animal) fat &  
cholesterol



**Monounsaturated fat**

**Plant proteins: legumes,  
nuts**



# 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**

# 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.”

