Nutrition and the Effects of Macronutrients

"From Fructose to Trans Fat"

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Northern Inyo Hospital, Bishop, California
December 27, 2006

Directly based on:
Nutritional Implications of Macronutrient Substitutes
Anals of the New York Academy of Sciences Vol 819 (1997)
G. Anderson, B. Rolls, D. Steffen, Eds.

What are Macronutrients (Major Food Groups that provide Energy)

_____WATER (REQUIRED)

_____PROTEIN (REQUIRED)

_____FAT (REQUIRED)

_____CARBOHYDRATE

>>>>> CARBOHYDRATE IS *NOT* A REQUIRED FOOD

Vitamins

- Vitamin D
- Vitamin B Complex
  - Thiamine (B1)
  - Riboflavin (B2)
  - Niacin (B3)
  - Pantothenic Acid (B5)
  - Biotin (B7)
  - Folate (B9)
  - Cobalamin (B12)
- Vitamin C (Yellow, tangy)
- Vitamin A (Beta Carotene, Orange)

Dietary changes over 12 years from 1977 to 1990

(+)120% increase in Low-Fat and Skim Milk, Fat modified products

(+) 40% increase in Dark Green Vegetables

(+) 20% increase in Grains and Carbonated Soft drinks,
Heavy Cream, Cheese, Frozen Deserts, Full-Fat Yogurts

(-) 34% *decrease* in Fat Consumption, Total Fat and Saturated Fat

(-) 40% *decrease* in Milk, Pork and Beef (Red Meat, Butter, Whole Milk, Eggs)

(-) 05% *decrease* in Total Calories (we consume *fewer* Calories today than in 1900)

US Obesity rate has ***doubled*** or more

Vitamin Deficiency

Maize (Corn) consumed alone, without its culturally protective mix of legumes (beans), led to Pellagra in Europe (Nicain/Vitamin B3 deficiency).

There is no evidence that
Pellagra (Niacin Deficiency) existed before 1492.

Energy Intake

Men Consume an average of **2600** calories/ day

Women Consume an average of **1800** calories/ day

Resting Fat metabolism is *lower* in women than in Men, leading to Fat Storage in Women

Relative contribution to Energy Use

Resting Metabolic Rate	**(60-70%)**
Physical Activity	(15-30%)
Thermogenesis	(5-10%)

Formal Recommendations

- Formal Recommendations

A. + **1988** Surgeon's General Report on Nutrition and Health [138]
   1. − *Decrease* Hi-Fat, Saturated Fat and Cholesterol Foods
   2. = Increase Vegetables, Fruits, Whole Grain Foods

B. + **1989** Diet and Health Report of the National Academy of Sciences [138]
   1. − Increase Carbohydrates to 55% of Total Calories
   2. − Double the Intake of Vegetables and Fruits
   3. = Neutral with respect to Sugars

C. + **1995** USDA and HHS Dietary Recommendations [138]
   1. − Eat a variety of Foods
   2. − Balance the Food you eat with Physical Activity
   3. − Choose a diet low in Fat, Saturated Fat, and Cholesterol
   4. − Choose a diet with plenty of Grain products, Vegetables, and Fruits
   5. − Choose a diet moderate in Sugar
   6. − Choose a diet moderate in Sodium
   7. = Drink Alcoholic Beverages only in moderation

D. + **1990** American Heart Asociation/ American Diabetes Association [142]
   1. = Reduce Fat to 30% of Calories

Glycemic Index of Foods

Food	Glycemic Index	Food	Glycemic Index
Rice, instant	128	Green peas	68
Potato (instant/baked)	120	Oat bran bread	68
Cornflakes	119	Pumpernickel bread	66
Rice Krispies	117	Grapes	62
Carrot	101	Orange	62
White bread	100	Spagehtti	59
Whole White Bread	99	Corn	55
Shredded Wheat	99	Apple	52
Cream of Wheat	94	Pear	51
Raisins	93	Lima Beans	46
Rice	81	Apricot, dried	44
Potato, new boiled	80	Kidney beans, dried	42
Popcorn	79	Peach	42
Oatmeal	78	Barley	36
Banana	76	Grapefruit	36
Kidney Beans, canned	74	Red Lentils, dried	36
Rice, white	69	Peanuts	21

Carbs Inhibit Fat Oxidation

DIETARY CARBOHYDRATE INFLUENCES FAT OXIDATION DURING EXERCISE

Eating Carbohydrate During the Hours Before Exercise

Fat oxidation during exercise is very sensitive to the interval between eating carbohydrate and the onset of exercise and to the duration of the exercise. This is due in part to the elevation in plasma insulin in response to the carbohydrate meal and the resultant inhibition of lipolysis in adipose tissues, thus reducing the mobilization of FFA into the plasma. This effect is evident for at least 4 h after eating 140 g of carbohydrate that has a high glycemic index (Montain et al., 1991). Under these conditions, the carbohydrate meal reduces both total fat oxidation and plasma FFA concentration during the first 50 min of moderate-intensity exercise. However, this suppression of fat oxidation is reversed as the duration of exercise is increased; after 100 min of exercise, the rate of fat oxidation is similar, whether or not carbohydrate was eaten before exercise. It appears that the body relies heavily on carbohydrate and less on fat when people have eaten carbohydrate during the previous few hours, and therefore carbohydrate is preferred when it is available. It is likely that insulin plays a role in regulating the mixture of carbohydrate and fat oxidized during exercise.

FLING DIET


FRUCTOSE


CORN
SYRUP


Hydrogenated
Fat


TRANS FAT

News Clippings

n River to Bayonne, N.J.,
n motion; it had been
| The Associated Press

n – sort of

– sometimes by brib-
nd political chicanery of
rt dramatized in the 1974
"Chinatown."
this day, Mulholland, an
eer and the first superin-
nt of the city's water util-
ard, is seen as the bad guy
drama.
redirection of the water
s as a result of more than
ars of legal battles waged
yo County officials, resi-

New York is first U.S. city to ban artificial trans fats

By David Ho
COX NEWS SERVICE

NEW YORK • Health officials approved a ban on artificial trans fats in the Big Apple's restaurants Tuesday, making New York the nation's first city to outlaw the ingredient linked to heart disease and other illnesses.

The ban is likely to send ripples nationwide as cities such as Chicago consider restrictions and large fast-food chains move away from the man-made fats, which are found in everything from french fries to doughnuts.

"It is very significant," said Dr. Walter Willett, chairman of the Department of Nutrition at the Harvard University School of Public Health. "New York is not just the Big Apple, it's a big domino as well," he said. "Lots of other cities will be following."

The National Restaurant Association, while supporting an overall shift away from these fats, criticized the ban and its deadlines for potentially harming public health.

The ban might pressure some restaurants to resort to using unhealthy saturated fats instead, association spokeswoman Sue Hensley said.

"There is also a legal concern about a city municipal health agency banning an ingredient that the Food and Drug Administration has already approved," she said.

New York's measure, unanimously approved by the city Board of Health, requires restaurants to stop using most frying oils containing artificial trans fat within about 6 months and to keep it out of all foods by July 2008.

The ban does not apply to grocery stores or the foods restaurants serve in sealed original packaging. It also does not include naturally occurring trans fats found in small amounts in some meat and dairy products.

Most artificial trans fat is in partially hydrogenated vegetable oil, which is used for baking and frying and is found in many processed foods. Those trans fats also are in margarine and some shortenings.

Doctors and scientists widely agree that artificial trans fats, invented to be a healthier and longer-lasting alternative to natural animal fats such as butter, are dangerous in almost any amount. They are viewed as more unhealthy than saturated fats because they raise bad cholesterol while lowering good cholesterol.

"They are far and away the biggest toxic chemical in the food supply," Willett said.

Trouncing trans fat

New York City's board of health approved the nation's first ban on trans fats – harmful artificial oils that can be replaced with other ingredients.

Major food sources of trans fat for American adults

TYPES OF FAT	HEALTH EFFECTS
Trans	
From hydrogenated (hardened) oil found in fried foods, commercial baked goods*, processed foods, margarine	Can raise harmful cholesterol and lower beneficial cholesterol
Saturated	
Whole milk, butter, cheese, fatty meats	Main dietary

NYC proposes ban on trans fats in restaurant food

Supporters say other cities, states could follow

By Nanci Hellmich and Bruce Horovitz
USA TODAY

New York City restaurants and street vendors may be facing this edict: Change your cooking oil — or pay a stiff fine.

The city's public health officials proposed a regulation Tuesday that would require all restaurants to virtually eliminate artery-clogging trans fats in their cooking oils and margarines over six months. If the rule is enacted, it would mean posh eateries, small outdoor vendors and chain restaurants, including McDonald's, that are using trans fats would have to switch to healthier oils or risk being fined $200 to $2,000.

Health

The second proposal would require some major chains such as Starbucks, Subway and McDonald's to list calories for items on their menus or menu boards.

This would apply only to restaurants that have made calorie information for menu items available either online or in brochures by March 1, 2007.

The move comes at a time when consumer concerns over trans fats are finally resulting in major industry change. This month, Wendy's eliminated trans fats from its french fries. The New York City proposal, which is viewed as a bellwether, is being applauded by consumer groups and obesity experts but is expected to face fierce resistance from the $511-billion-a-year restaurant industry, which has 925,000 restaurants nationally.

Trans fats, which are used in many fried and processed foods, increase bad (LDL) cholesterol and decrease good (HDL) cholesterol. New York City health commissioner Thomas Frieden calls trans fat "a dangerous artificial chemical that increases heart attacks and strokes, and no one will miss it when it's gone. We're confident that what we proposed will sustain legal challenge."

Says Margo Wootan of the Center for Science in the Public Interest, a consumer group: "This move sets an important precedent and has far-reaching health implications. We expect other cities and states will follow."

Psychologist Kelly Brownell of the Rudd Center for Food Policy and Obesity at Yale University says, "This represents bold, courageous action by a forward-thinking health commissioner."

But opponents are outspoken.

"This is a solution in search of a problem," says Rick Berman, executive dire of the Center for Consumer Freedom group financed by restaurants and fo makers. Many restaurants, he says, are ducing trans fats. As for listing calories menus, "people know a Diet Coke has f er calories than a milkshake," he says.

Forcing restaurants to provide me labeling and eliminate trans fats "is an reasonable, one-size-fits-all approac says Chrissy Shott, a spokeswoman for National Restaurant Association.

Starbucks officials say they're mak progress without mandates. Last mon Starbucks eliminated trans fats from baked goods it sells nationally, and i pushing bakers to eliminate them in bal goods it sells regionally. Because Starbu lists nutritional information on its webs and in brochures, "we're confident our c tomers make informed choices," says Sa Gould, a spokeswoman.

McDonald's says it's working on be questions. It now puts nutrition inform tion on food packaging, says Walt Rike spokesman. And, he says, the company working "in earnest" to reduce trans levels.

"Restaurant inspectors have long a dressed food safety concerns, and n they are taking actions to help people av heart disease, diabetes and obesity," Wo tan says. "A lot of food manufacturers taking trans fat out of their products. T will nudge restaurants to do the same."

By Mario Tama, Getty Images

A healthier Big Apple? A proposed change in regulations would ban trans fat from meals in New York, such as this Burger King sandwich and french fries.

The bigger the burger . . .

Here's how McDonald's menu board might look if the calories were listed on it. Prices may vary.

Hamburger	260 cal.	$.89
Cheeseburger	310 cal.	$.99
Filet-O-Fish	400 cal.	$2.59
Quarter Pounder	420 cal.	$2.99
Big Mac	560 cal.	$2.76
McChicken	370 cal.	$1.00
Double Quarter Pounder with cheese	730 cal.	$3.79
Large french fries	570 cal	$1.79

Sources: Center for Science in the Public Interest, USA TODAY research

Piece of History 22 years ago

Dr. Twohey.

2/6/85 - CV

arteriosclerosis - hardening of arteries

atherosclerosis - (atheroma) genetic

HTN is treatable!

↑cholesterol
DM
HTN
Cigarette Smoking. CO_2 ←, vasoconstriction
Sedentary
Obesity
Urban Residence
sthenic body build. (mesomorph - stocky)
personality type
toxic trace elements

premature CAD

Intermittant claudication - $\downarrow O_2$ supply.
Pain on movement / spasm

[100 + Systolic pressure = "normal" pressure c age]

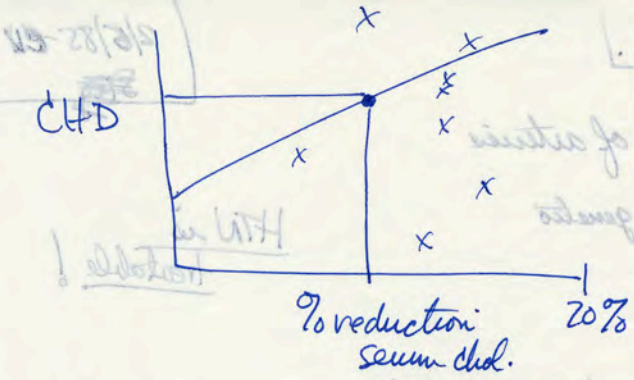
systolic goes up
diastolic should stay ≤95 (at least)

migraines - no take oral contraceptive

Dr. Shoemaker

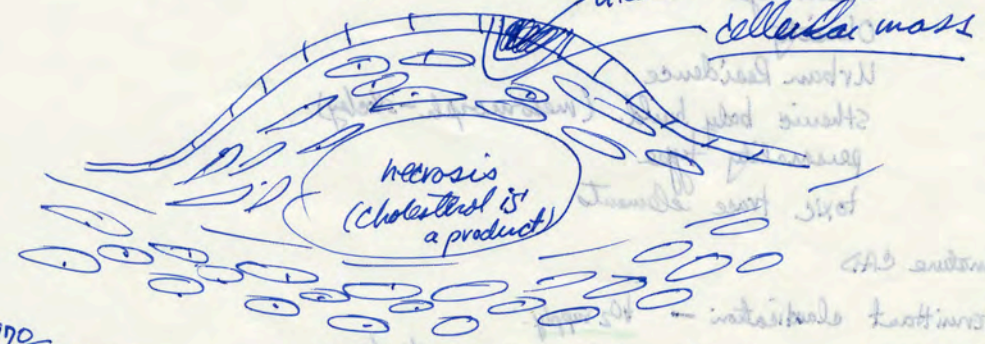
DIET

Framingham study 8.7% vs 7% control group
↑Cholestyramine ↑



calico cat
↓ ♀

atheroma - proliferation of cells of coronary media.



1970 BENDITT → Atha = benign tumor. (not tumor) thought. but wrong

G6PDH: A vs B (black females mosaic)

↳ atheromata primarily A or B.

1979 - combined injury / benign tumor hypoth.

old vs. young repair areas.

normal repair process of intima + media is monoclonal only.

(normal scars have characteristics of benign tumors).

$\Omega 3$ inhibit lipoxygenase effectively.

$\uparrow \Omega 3 \rightarrow \downarrow$ PG activity products.

	$\Omega 6$	$\Omega 3$	$\Omega 6/\Omega 3$
Safflower oil	75		150
Corn oil	50		150
Soft margarine	21		10
Chicken	13.5		9
Beef			1.5

Spoon of fish oil ($\uparrow \Omega 3$) → doubled his clotting time: platelets do not stick.

Salmon oil 20% $\Omega 3$ → decrease in platelet ct, etc.
Corn oil 0% $\Omega 3$ →

DON'T eat margarine + vegetable oil products (polyunsaturated)
(except for olive oil) → 1 double bond only.

to try lower cholesterol, found ↑ CA

macp have cholesterol receptors

platelet —PUFA ($\Omega 6$)→ injury → clonal repair
$\Omega 3$ prevents

2/6/85
(5) cont

Cholesterol may affect hardness of patches.

insulin resistance

Intro to Radiology.
Angiography et al.

2/6/85
Dr. Kammer.

X Ray:

(5) metal - closest to plate → least magnified.
(4) calcium -
(3) water -
(2) fat
(1) Air

AP (portable) - heart looks enlarged
PA (normal)

$$\frac{\text{largest cardiac silohette}}{\text{inside of largest part of aerated lung}} = \frac{1}{2} \text{ normal}$$

(.65 in infant child)

PA:
- right border - RA
- no border - RV
- usually no LA border.
- left border - LV.

1. aortic nob
2. PA artery outflow tract.
3. atrial
4. ventricle

upright - lower lung vessels more prominent

Diagnosing Inborn Errors of Metabolism

The Metabolic Screening Lab is devoted to the diagnosis of inborn errors of metabolism and nutritional defects by gas chromatography mass spectrometry. Our method of sample preparation (J. Chrom. Biomed. Appl. 562 (1991) 125-138) permits quantitation of carbohydrates, amino and organic acids all in the same sample.

This is a CLIA-certified and inspected facility, (26D0652021), with California Medi-Cal Provider Number XLAB01210.

Dr. Shoemaker holds State of New York Certificate of Qualification Code SHOEJ1 for Biochemical Genetics and Clinical Laboratory Permit PFI #5451, Code 826040A4.

Sample requirements:
1-2 ml urine or 0.4-1.0 ml serum, CSF or vitreous fluid shipped overnight on dry ice.

Fees:
We are happy to bill patients or third parties if billing information is supplied.
Institutions willing to pay directly on monthly invoice may do so on the following terms:
1-499 samples/year: $200/sample;
500 or more samples/year: $100/sample.

Shipping:
Dr. James Shoemaker, M.D., Ph.D.
3555 Vista Rear Door
St. Louis, MO 63104

Fructose Sugar - Garbage

A. + Fructose Sugar

1. – When Table Sugar (Sucrose) is digested, it breaks down into equal amounts of Fructose and Glucose (Dextrose).
2. – Fructose is a little sweeter than table Sugar (Sucrose).
3. – Modest amounts of Fructose occur naturally in fruits and vegetables, with other Sugars.
4. – Modest amounts of Fructose are safe and do not boost blood Glucose levels, making the sweetener attractive for diabetics.
5. – Large amounts of Fructose increase Triglyceride (Fat) levels in blood, thereby increasing the risk of heart disease.
6. – Fructose affects Thyroid, Liver and Paraventricular Nuclear function, conversion of T4 to T3
7. – Fructose is metabolized only in the **Liver**
8. = Fructose mimics a magnesium deficiency, and may worsen Copper deficiency (www.ithyroid.com/boron.htm)

Fructose, Glucose, Liver, PVN

Over consumption of fructose:

Fructose is an odd carbohydrate. It is really only usable by your liver as it requires GLUT5 for transport into cells. Fructose is essentially the opposite of refined starches as described above. Because of the special way in which fructose is metabolized it skips the rate-limiting step of PFK-1. Because of this it oxidizes in the liver incredibly quickly and tricks your liver in to thinking you have plenty of glucose even if you don't. This affects the hepatic glucose sensor described previously. It causes increased GABA delivery to the PVN, thus slowing metabolism. It can induce hyperglycemia (our arch nemesis) by interactions with several systems. As stated, it reduces PVN firing so that means less thyroid, cortisol, and NE release.

More importantly, fructose is non-insuligenic. Because of this it does not stimulate leptin or alpha-MSH production. So the LH in your brain never deciphers that the body is being fed. The third problem with fructose is that it fails to activate the portal vein glucose sensor, and thus it does not activate this essential glucose disposal mechanism. So in summation, fructose: slows metabolism, lowers leptin, fails to decrease hunger, and causes hyperglycemia. All in all too much fructose is just plain bad. Keep in mind a little fructose can be good, especially if you are an athlete. However for someone that is almost never glycogen depleted, fructose is detrimental and only does harm (36).

www.fitnessprat.no/showthread.php?p=294404

Hi Fructose Corn Syrup Garbage

B. + High Fructose Corn Syrup (HFCS)

1. = Corn Syrup is treated with enzymes to convert some of its Glucose (Dextrose) to Fructose, which results in High Fructose Corn Syrup (HFCS).
2. - Hi-Fructose Corn Syrup (HFCS) is a major source of Fructose in the typical diet.
3. - HFCS typically contains about half Fructose and half Glucose.
4. - HFCS has largely replaced ordinary Sugar used in soft drinks and many other foods, because it is cheaper.
5. - Americans consume about 59 pounds per year of HFCS (a total of 150 pounds per year of all refined sugars).
6. - http://www.cspinet.org/reports/chemcuisine.htmz
7. = **High Fuctose Corn Sugar (HFCS) was introduced in 1906, escaping safety evaluation by the FDA**

PolyUnsaturates - Garbage

D. + Polyunsaturated/Monunsaturated Natural **Oils**

1. − Vegetable (Natural) Oils are Polyunsaturated (Safflower, Sesame, Sunflower, Corn, Soybean) and Monounsaturated (Canola, Olive, Peanut, Avocados)
2. − Vegetable (Liquid) Oils are meant to be consumed in dilute forms (nuts, grains)
3. − Polyunsaturated Oils may inhibit Thyroid Function
4. + Un-saturated Fats/Oils oxidize easily, which may produce Free Radicals in vivo, a health risk increasing cell damage
   a. − Polyunsaturated Fats especially may increase Damage from Free Radicals
   b. − Saturated Fat does not produce Free Radicals
5. = But Liquid Oils are better than Solid Fats (best if mono- or un- saturated)

ScienceDaily

Source: University of California - San Francisco
Date: 2005-08-02

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Email to friend

Omega-6 Fatty Acids Cause Prostate Tumor Cell Growth In Culture

A study conducted at the San Francisco VA Medical Center (SFVAMC) has demonstrated that omega-6 fatty acids such as the fat found in corn oil promote the growth of prostate tumor cells in the laboratory. The study also identifies a potential new molecular target for anti-tumor drugs: an enzyme known as cPLA2, which plays a key role in the chain leading from omega-6 fatty acids to prostate tumor cell growth.

The study was led by Millie Hughes-Fulford, PhD, director of the Laboratory of Cell Growth at SFVAMC and scientific advisor to the U.S. Undersecretary of Health for the Department of Veterans Affairs. It is being published in the September 2005 issue of Carcinogenesis, and is currently available online.

Related News Stories

Eating Oily Fish May Reduce Inflammation (March 14, 2005) -- A new study explains how a diet high in oily fish like salmon and mackerel improves inflammatory conditions, particularly in combination with

Nutr Cancer. 2003;46(1):59-65. Related Articles, Links

Olive oil consumption during pregnancy and lactation in rats influences mammary cancer development in female offspring.

Stark AH, Kossoy G, Zusman I, Yarden G, Madar Z.

The Hebrew University of Jerusalem, Faculty of Agricultural, Food and Environmental Quality Sciences, Rehovot, Israel.

This study examined the effects of variety and quantity of dietary fat consumed by rats during pregnancy and lactation on female offspring's response to chemically induced mammary cancer. Groups of six female rats were fed diets containing 7% corn oil (7-CO), 15% CO (15-CO), 7% olive oil (7-OO), or 15% OO (15-OO) for 5 wk prior to, and during, pregnancy and lactation. Female offspring (n = 15 per group) were fed a 7-CO diet, and mammary cancer was induced with 7,12-dimethylbenz[a]anthracene (DMBA). Three months following cancer induction tumor incidence and size were recorded, and markers of apoptosis, serum estrogen concentrations, and hepatic phase II enzymes were measured. Tumor incidence was 47% in offspring born to mothers fed the 7-OO diet, rose to 67% in 7-CO and 15-OO offspring, and reached 86% in 15-CO. A trend toward smaller tumors was observed in the 7-OO group, and offspring of mothers fed high-fat diets had significantly more tumors. Estradiol levels at the end of lactation were significantly lower in mothers fed 7-OO but were similar in all groups of offspring. In tumor tissue, Bcl-2 expression was highest in the 15-CO offspring, and Bak expression was significantly higher in rats exposed to OO. A distinct trend toward increased caspase-3 expression (20 kDa) was observed in the 7-OO offspring, and both low-fat diets significantly elevated caspase activity. In healthy mammary tissue, rats exposed to low-fat diets had significantly higher caspase-3 (32-kDa) levels, and caspase-3 activity was significantly higher in the healthy tissue from both OO groups. Hepatic quinone reductase activity was significantly lower in offspring of mothers fed the low-fat diets. These results indicate that perinatal exposure to OO may have a protective effect against future development of mammary cancer in female offspring, whereas high-fat diets fed to pregnant and lactating rats, in particular CO, may be deleterious.

PMID: 12925305 [PubMed - indexed for MEDLINE]

Corn Fed Beef

Corn-fed Beef looks better than Grass-Fed, because of the added Fat marbling, but the marbling is a result of indigestible Saturated Fats. We're better off without them.

a. + Statements from Advocates of Grass-Fed over Corn Fed Beef (Milk?)

(1) – It is leaner (about 1/3 the Fat)

(2) – It is higher in Conjugated Linoleic acid (3-5 times as much)

(3) – It is higher in Omega-3 Fatty acids (2-6 times as much)

(4) – It is higher in Vitamin E (2-4 times as much)

(5) – It is higher in Beta-Carotene

(6) – When cattle are "finished" on Corn or Grain, the meat changes dramatically. The ratio of omega-6 fatty acids to omega-3 Fatty Acids goes from about 1:1 to greater than 10:1, and levels of the other beneficial nutrients drop dramatically. This change occurs very quickly, being complete within 30 days on grain. This is why when purchasing grass-fed beef you need to ask for 100% grass-fed.

(7) – http://www.paicinesranch.com/grass-fed%20beef.htm

Hydrogenated Fat

E. Industrial Waste By-products (**Plastic Fat** and **Artifical Sugars**)

1. Hydrogenated **Fat and Oils** (***Artificial Partially Saturated Fats are NOT OK***)

   a. Vegetable Oil (Natural, Polyunsaturated, usually liquid), is processed into semi-solid shortening by reacting it with Hydrogen. Partial Hydrogenation reduces the levels of Polyunsaturated (Natural) Oils, and also creates Trans (artificial) Fats, which promotes heart disease. Hyrogenated Fats are at least Partially Saturated.

   b. Crisco, introduced in **1906**, is Partially Hydrogenated Vegetable Fat used for baking and frying in place of Lard. **Crisco escaped safety evaluation by the FDA and Contains Trans Fat.**

   c. Fully Hydrogenated Vegetable Fat (Saturated) does not have any Trans Fat or Polyunsaturated (Natural) Oils. It is sometimes mixed (physically or chemically) with Liquid Oils to create Trans-free Shortening. When it is chemically combined with Liquid Oil, the ingredient is called Inter-Esterified Vegetable Oil.

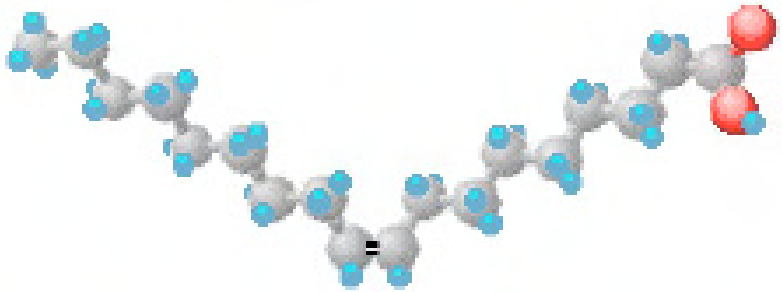
Trans vs Cis Fats

- **Trans Fat** (Not OK) vs **Cis Fat** (OK)

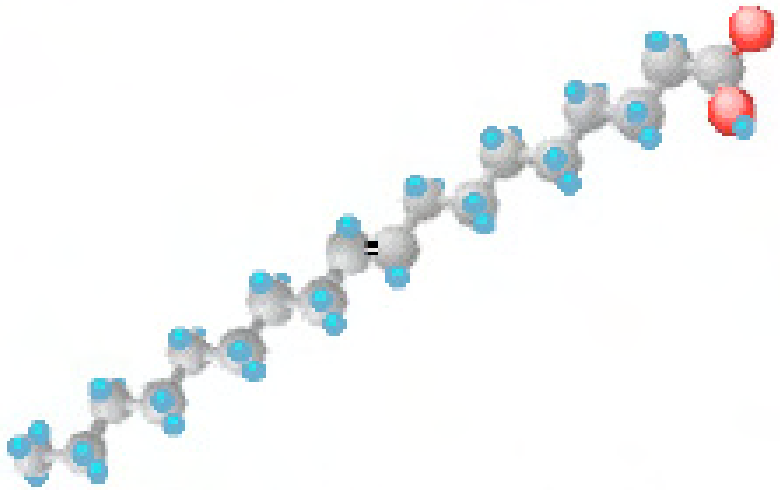
a. – Trans Fats are so named because the carbon atoms adjacent to their double bonds are on opposite sides, resulting in a straight configuration and solid at room temperature. In contrast, naturally occuring unsaturated Fatty Acids contain Cis configuration with adjacent carbon atoms on the same side, resulting in a bent shape and a liquid. http://www.recoverymedicine.com/hydrogenated_oils.htm

CisTrans Configuration

Double bonds bind carbon atoms tightly and prevent rotation of the carbon atoms along the bond axis. This gives rise to configurational isomers which are arrangements of atoms that can only be changed by breaking the bonds. (www.scientificpsychic.com/fitness/fattyacids.html



Cis-9-octadecenoic acid
(Oleic acid)



Trans-9-octadecenoic acid
(Elaidic acid)

www.scientificpsychic.com/fitness/fattyacids.html

Government and Industry

IX. **Goverment and Food Industry has fed us Garbage for over 75 years:**

A. **Plastic Fat (*Hydrogenated Oils*) and Cardboard (*Corn/Soy Solids*) that is sweetened with Artificial Sugar (*High Fructose Corn Syrup*)**

B. **Warning: What the the animals eat, you eat**

1. Artificial Fats
2. Corn, Soybean feed
3. Estrogens to fatten animals
4. Growth Hormones
5. Antibiotics

C. **Nutrition Challenge:**

1. Find a Loaf of Bread that does not contain Corn Sugar
2. Find a package of Hot Dogs that does not contain Corn Sugar
3. Find a Can of Soup that does not contain Corn Sugar
4. Find Maple Syrup that contains Maple Syrup instead of Corn Sugar
5. Find Butter at KFC or McDonald's Restaurants

Predictors of Weight Gain

- Three metabolic Predictors of Weight Gain [32]

A. + **Low Resting Energy Expenditure (REE)**
   1. − Family members tend to be similar
   2. = **How much Food burned at rest**

B. + **Elevated Respiratory Quotient (RQ)** (Hi RQ = Hi Carb Oxidation)
   1. + Individuals with higher RQ were more likely to gain weight over a five year period [32]
      a. − Hi RQ = Hi Carb Oxidation, Lo Fat Oxidation
      b. − Hi RQ = less Oxygen used
   2. + Hi RQ will preferentially oxidize Carbohydrate, depositing Fat
      a. − Carbohydrate deposited as Glycogen signals satiety, inhibits further intake
      b. − Fat deposited easily, directly into Fat cells, which creates no signals of satiety
   3. = **How much Oxygen is used to burn that Food**

C. + **Insulin Sensitivity**
   1. − Insulin shifts to preferentially use Carbohydrate for fuel in Muscle (Burn Carbs)
   2. − Insulin shifts to promote Fatty Acid Entry into Fat cells (Store Fat)
   3. − Insulin augments Lipoprotein Lipase (LPL) actions in Adipose (Store Fat)
   4. − Insulin *inhibits* Lipolysis, Fat Release (No Release)
   5. + Adipose in Obese very sensitive to Insulin
      a. − Hi Carbs induce Hi Insulin Induces above (Hi Carb Diet)?
      b. − Insulin Resistance limits further Fat gain ? [39] [ ]
   6. = **How much Fat is burned by Muscles** (versus Stored in Adipose)

Hi-Fat Diet

+ Hi-Fat Diet
  1. – **Lean subjects tended to increase Lipid Oxidation on a Hi-Fat Diet**
  2. + Obese and Previously Obese subjects did not increase Lipid Oxidation on a Hi-Fat Diet
     a. – Post-Obese subjects also increased Storage of Fat on a Hi-Fat Diet after weight loss
  3. – ***Subjects informed of the Fat content of Premeal Snack ate more when labeled as "Lo-Fat" than when labeled "Hi-Fat".*** [185]
  4. – Subjects ***not informed of the Fat content of Premeal Snacks ate more after a Hi-Fat/Hi-Calorie load than after a Lo-Fat/Hi-Calorie Load.***
  5. + Hi-Fat Soup at meals increased Total Calorie Intake over no soup, Fat-Free and Oleastra Soups [185]
     a. = ***Consider Low-Fat Soup at meals***

Diet vs Exercise

XVII. + Diet versus Exercise for Weight Loss

A. + **Diet only** (-500kcal/day)

1. – body weight *decreased*
2. – ***loss* of Lean mass**
3. – less *loss* in Fat mass

B. + **Activity only** (-500 kcal/day)

1. – body weight *decreased*
2. – **gain in lean mass**
3. – more *loss* in fat mass

C. + **Diet plus Activity** (-250 kcal/day, -250 kcal/day)

1. – body weight *decreased*
2. – **gain in lean mass**
3. – more *loss* in fat mass with combined approach

D. = Zuti, W.B., & Gelding, L.A. (1976). Comparing diet and exercise as weight reduction tools. *Physician and Sportsmedicine, 4,* 49–53.

E. = www.eaca.be/_upload/documents/research/obesity.pdf

Lifestyle 1

XIII. ✥Lifestyle Issues

A. + Alcohol and Drugs
   1. − Poor Nutrition
   2. ▬ Liver, Brain damage

B. + Smoking
   1. − Nicotine (oxygen poison)
   2. ▬ Carbon monoxide (oxygen blocker)

C. + Exercise
   1. − Aerobic excercise burns more Sugar than Fat (sweating, huffing and puffing)
   2. ▬ Most likely mechanism for the reduction in Fat oxidation during high-intensity exercise is a downregulation of carnitine palmitoyltransferase I, either by a marked decline in free carnitine availability, or by a decrease in intracellular pH. jp.physoc.org/cgi/content/abstract/536/1/295
   3. − At high exercise intensities (usually sustainable only by highly trained athletes), muscle Glycogen can be depleted within 2 hours, and this can represent 300-400 grams of total carbohydrate or so.
   4. − Increasing Calories burned to 10-25% of daily calories causes Weight Loss in Obese patients [33]
   5. − The majority of research shows that Women derive a greater proportion of their Energy Expenditure from Fats during low to moderate intensity excercise relative to Men.
   6. − Low intensity exercise uses majority of Energy from Fat as a percentage. Low intensity Cardio workout for longer duration is recommended (Slow-twitch). However, a higher Total Energy Expenditure does come from more intense excercise levels (absolute Calories), so shorter durations of higher intensity can be added.
   7. ▬ Total Activity Level and Toning is important

Lifestyle 2

D. + Diabetes
   1. − Insulin inhibits Lipolysis, so Fat is stored instead of being used.
   2. = Metabolic Androgen Syndrome

E. + Coffee, Tea (Caffeine, Theophylline) blocks Phosphodiestersae, increasing cAMP and productions of Fatty Acids from Adipose
   1. + Green Tea increases Fat Oxidation
      a. − Inhibits CPMT, increasing NE, prolonging effect of NE (without increase)
      b. = 36 to 41%

F. + Hunger
   1. − Well fed rats had no preference for 30% Corn Oil Emulsion (nutritive) versus 30% Mineral Oil Emulsion (nonnutritive) [158, 160]
   2. + Hungry rats select Food that has more Calories
      a. − Food-deprived rats had an 85% preference for the nutritive Corn Oil Emulsion over nonnutritive Mineral Oil emulsion
   3. + Energy Intake did not change with reduction in Fat percentage [160]
      a. − Fat-modified foods did not change Preference for Hi-Fat Foods in human subjects, even if Fat intake was significantly reduced
      b. − 51% vs 30% Fat Diets and (Plateuas at 21% Calories as Fat)
      c. = 63% Calories as Fat increased Energy Intake, however

Lo Salt Diet Bad

Low-Salt Diet May Not Help Heart

Study: More Deaths Seen With Sodium Restriction

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Feb. 22, 2006 (Page 1 of 2)

(CBS/AP)

QUOTE

"It is increasingly evident that one size doesn't fit all when it comes to diet."

Hillel W. Cohen, researcher

(WebMD) If you're still reeling from the news that low-fat diets don't seem to protect against heart disease, you may want to sit down.

New research suggests that low-salt diets may actually increase your risk of dying from heart attack or stroke.

Over a 13-year period, people in the study who reported eating little salt were 37% more likely to die from cardiovascular causes (such as stroke and coronary heart disease) as people who ate more salt than is recommended by U.S. government guidelines.

Researchers were quick to point out that the findings fall far short of proving that restricting sodium is bad for your health.

But they say the proof that salt-restricted diets protect against death from heart and artery disease has also not emerged in the years since salt was targeted as public enemy No. 1 by heart experts.

www.usatoday.com

USA TODAY

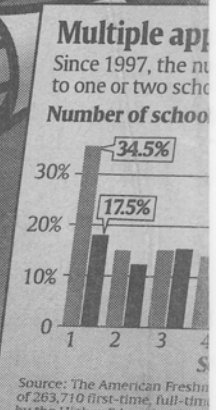
A better Life

Low-carb diet isn't more risky for heart

Eating a diet low in carbohydrates and high in fat over several years doesn't raise the risk of heart disease, a study finds, easing fears that the popular Atkins diet and similar regimens might set people up for heart attacks. But that finding doesn't mean an all-clear sign to low carb/high-fat diets, say researchers at the Harvard School of Public Health, who analyzed data collected over 20 years from more than 83,000 women. The study also found that women who ate a low-carb diet but got more of their protein and fat from vegetable sources cut heart disease risk by 30% on average, compared with those who ate more animal fats. Women who ate a high-carb/low-fat diet but got most of their carbs from refined sugars and highly processed foods nearly doubled their risk of heart disease. All of those findings together suggest the quality of fat and carbohydrate in the diet is more important than the quantity, say researchers. The study is in today's *New England Journal of Medicine*.

Nobel laureate launches tree campaign

Nobel Peace Prize winner and Kenyan environmentalist Wangari Maathai called on individuals, schools, businesses and governments around the world Wednesday to plant and care



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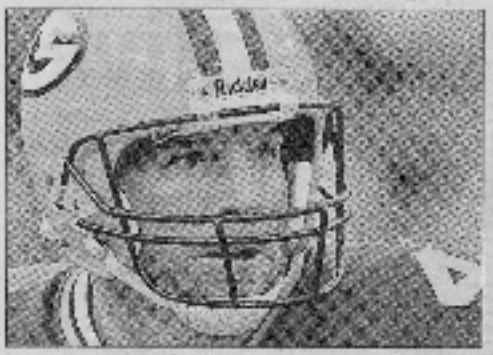

Favre: Renewed retirement speculation.

Final call for Brett?

■ Green Bay abuzz whether tonight will be QB Brett Favre's last home game for Packers, 1C

places hit hardest by Katrina. The U.S. government has spent

Please see COVER STORY page 10A ▶

Intestinal microbes pack on your pounds

Bacterial colony good at extracting calories

By Elizabeth Weise
USA TODAY

You are what your microbes eat.

Two new studies show that there are different colonies of bacteria in the intestines of the obese than there are in the innards of the slim. The research, published in today's edition of the journal *Nature*, finds that the microbes in an overweight body are more efficient at extracting calories from food.

"Not everyone sitting down to a bowl of cereal will necessarily absorb the same number of calories from it," says Jeffrey Gordon, lead author of the papers and a professor of medicine at Washington University in St. Louis.

About two-thirds of adults, about 136 million Americans, are overweight or obese, the government says. These findings open up a new area of research, says Sam Klein, a study co-author and professor of gastroenterology at the university.

"It's not just your brain and your body fat and your body organs involved in your energy balance equation," he says. "It may also be the bugs that are in your body as well."

One study focused on mice, the other on humans. They found that in both man and rodent, a family of bacteria known as firmicutes were more plentiful in the obese than in the lean. Conversely, bacteria called bacteroidetes were less abundant than in normal-weight subjects.

The research showed that obese mice were more efficient than lean mice at harvesting calories from complex sugars found in fruits, vegetables and grains, and depositing those calories in fat — most likely because of the bacterial colonies.

And when they transplanted the microbes from obese and thin mice into mice raised in a sterile environment, those that got microbes from the obese mice gained twice as much fat.

When obese people lost weight, virtually all the bacteroideres increased, while the firmicute group shrank, Gordon says.

The bacteria inside us are a huge and mysterious part of life. "There are trillions of them, they outnumber the human cells in our bodies," Klein says. Meaning, Gordon quips, "you never eat alone."

Reforestation lags amid record wildfires

in the same boat, you've go
it in stride," said O'Dwyer, 2

The Air Transport Ass
the airlines' trade group, p
record number of passeng
ing the holiday travel
through Jan. 3. It forecasts
age of 2 million a day, a
crease from last year.
138,000 were supposed
through Denver on Wedne

"It's going to disrupt the
for thousands of people," s
tion consultant Michael Bo
could have as many as 3
United airplanes stuck ho
would ripple through the sy

By Wednesday evening,
hotels were fully booked.
port road was closed, an
people were in the Denver
corridors, Cannon said.

Denver is the No. 2 hub
ed Airlines, the USA's seco
est carrier, after American
canceled more than 600 f
and out of Denver Wednes
100 more this morning. The
was felt around the regio
United's other hubs at
O'Hare, Washington Dull

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Test your knowledge about smart food choices.

Question: 1 2 3 4 5 6 SCORE: 0 OUT OF 6

Question 1:
What is the maximum amount of sodium you should consume daily?

- A 1,200 mg
- B 2,300 mg

SUBMIT HINT?

Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6 SCORE: 1 OUT OF 6

Correct.
You should consume less than 2,300 mg (approximately one teaspoon of salt) daily.

B 2,300 mg

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Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6 SCORE: 1 OUT OF 6

Question 2:
What is the recommended intake limit of canned tuna for women of childbearing years?

- A 12 ounces
- B 16 ounces

SUBMIT HINT?

Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6

SCORE: 2 OUT OF 6

Correct.

Women of childbearing years should limit their intake of canned tuna to 12 ounces, or two regular cans, a week.

A 12 ounces

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Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6

SCORE: 2 OUT OF 6

Question 3:
How much fattier are restaurant meals than home-cooked meals, on average?

- A 5 percent
- B 20 percent

SUBMIT HINT?

Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6 SCORE: 3 OUT OF 6

Correct.
When eating out, make healthy choices by studying the menu, limiting portions and speaking up about what you want.

B 20 percent

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Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6

SCORE: 3 OUT OF 6

Question 4:
How much fat must manufacturers cut from regular foods to qualify for "reduced-fat" labels?

- A 25% of the fat.
- B 50% of the fat.

SUBMIT HINT?

Source: USDA; FDA; US Department of Health and Human Services

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Question: 1 2 3 4 5 6 SCORE: 4 OUT OF 6

Correct.

Food items labeled "reduced-fat" need to have only 25% less fat than the comparable regular food items.

- A 25% of the fat.

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Source: USDA; FDA; US Department of Health and Human Services

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Test your knowledge about smart food choices.

Question: 1 2 3 4 5 6 SCORE: 4 OUT OF 6

Question 5:
How many pieces of medium-sized fruit meets the two cups-daily dietary guidelines?

- A Two
- B Four

SUBMIT HINT?

Source: USDA; FDA; US Department of Health and Human Services

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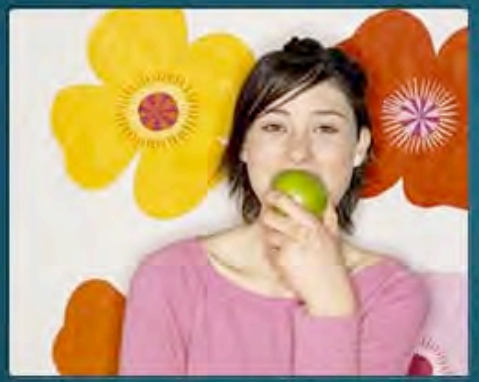
Question: 1 2 3 4 5 6

SCORE: 5 OUT OF 6



Correct.
Four medium-sized pieces of fruit are equivalent to a two-cup serving.

B Four

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Source: USDA; FDA; US Department of Health and Human Services

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Workshop Quiz

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Question: 1 2 3 4 5 6

SCORE: 5 OUT OF 6

Question 6:
For women, drinking alcohol in "moderation" is defined as

- A Up to one drink per day
- B Up to two drinks per day

SUBMIT HINT?

Source: USDA; FDA; US Department of Health and Human Services

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STEP 5
Workshop Quiz

Test your knowledge about smart food choices.

Question: 1 2 3 4 5 6

SCORE: 6 OUT OF 6

Correct.
It is recommended that women do not drink more than one alcoholic drink per day, while men can drink up to two.

A Up to one drink per day

GO TO STEP 6

Source: USDA; FDA; US Department of Health and Human Services

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Olive Oil Cancer (12/2006)

News + Trends

Updated:2006-12-20 08:32:09
Olive oil may hinder cancer process
By AMY NORTON, Reuters
NEW YORK - People who use plenty of olive oil in their diets may be helping to prevent damage to body cells that can eventually lead to cancer, new research suggests.

In a study of 182 European men, researchers found evidence that olive oil can reduce oxidative damage to cells' genetic material, a process that can initiate cancer development.

They say the findings may help explain why rates of several cancers are higher in Northern Europe than in Southern Europe, where olive oil is a dietary staple.