

# Re-examining the AHA Diet and Lifestyle Recommendations

A 40 year track record unblemished by  
success

# AHA 2006 Diet and Lifestyle Guidelines

- **TABLE 1. AHA 2006 Diet and Lifestyle Goals for Cardiovascular Disease Risk Reduction**
- • Consume an overall healthy diet.
- • Aim for a healthy body weight.
- • Aim for recommended levels of low-density lipoprotein (LDL) cholesterol
- high-density lipoprotein (HDL) cholesterol, and triglycerides

# AHA 2006 Diet and Lifestyle Guidelines

## ■ TABLE 2. AHA 2006 Diet and Lifestyle Recommendations for Cardiovascular Disease Risk Reduction

- • Balance calorie intake and physical activity to achieve or maintain a healthy body weight.
- • Consume a diet rich in vegetables and fruits.
- • Choose whole-grain, high-fiber foods.
- • Consume fish, especially oily fish, at least twice a week.
- • Limit your intake of saturated fat to 7% of energy, *trans* fat to 1% of energy, and cholesterol to 300 mg per day by
  - — choosing lean meats and vegetable alternatives;
  - — selecting fat-free (skim), 1%-fat, and low-fat dairy products; and
  - — minimizing intake of partially hydrogenated fats.
- • Minimize your intake of beverages and foods with added sugars.

# AHA 2006 Diet and Lifestyle Guidelines

## ■ Lifestyle

- ● Know your caloric needs to achieve and maintain a healthy weight.
- ● Know the calorie content of the foods and beverages you consume.
- ● Track your weight, physical activity, and calorie intake.
- ● Prepare and eat smaller portions.

# AHA 2006 Diet and Lifestyle Guidelines

- A range of 25% to 35% for total fat is an appropriate level of intake in a healthy dietary pattern.
- As a set of goals, the AHA recommends intakes of 7% of energy as saturated fat, 1% of energy as *trans* fat, and 300 mg cholesterol per day.
- In other words – eat a low fat diet and count your calories
- Everybody “knows” that
  - Eating fat makes you fat
  - Eating cholesterol makes your cholesterol worse

Seems similar to previous advice on “Step 1” and “Step 2” diets  
lower and lower in fat

# Why

- Fat is calorically dense – 9 calories/ gram versus carbohydrates 4 calories/ gram

### Comparison of Low-Carbohydrate and Reduced-Fat Diets.

Variable	Low-Carbohydrate Diet*	Reduced-Fat Diet†
Caloric restriction	Not necessary; ketosis may help to reduce intake	Necessary
Food choices	Highly restricted	Moderately restricted
Initial rate of weight loss	Rapid, with increased diuresis	Gradual, with some diuresis
Weight loss	Dependent on duration	Dependent on duration
Weight maintenance	Unproven over the long term	Unproven over the long term
Cholesterol‡		
LDL	No change	Decrease
HDL	Greater increase	Increase
Triglycerides	Greater decrease	Decrease
Potential long-term concerns	<p>Calciuria (renal stones and decreased bone mass)</p> <p>Relatively high protein content (patients with renal or hepatic disease)</p> <p>Atherogenicity (high saturated fat, trans fat, and cholesterol levels and relative absence of fruits, vegetables, and whole grains)</p>	None

\* A low-carbohydrate diet is defined as one that provides less than 35 g of carbohydrate per day. The Atkins diet begins with a stricter limitation (20 g per day) for at least the first two weeks, with a gradual increase of 5 g per week to achieve a rate of weight loss of approximately 2 lb (0.9 kg) per week until a weight within 5 to 10 lb (2.3 to 4.5 kg) of the goal is achieved. Carbohydrate intake is then further increased by 10 g per week until weight loss ceases.

† A reduced-fat diet is defined as one in which fat constitutes less than 30 percent of the total caloric intake; under certain circumstances (e.g., in some patients with the metabolic syndrome), fat intake of up to 35 percent of the total caloric intake is recommended.

‡ LDL denotes low-density lipoprotein and HDL high-density lipoprotein.

# AHA 2006 Diet and Lifestyle Guidelines

- How Are we doing?
- Dietary fat decreased from 42% of calories to 34% of calories from the 1970's to 2000 yet obesity rates, metabolic syndrome rates, diabetes rate are skyrocketing
- AHA has come out strongly against such fad diets as the Atkins, and the Zone diet



# Canadian Health Measures Survey

- From 1981 to 2009, results released Jan 13, 2010, Dr. Mark Tremblay
- Done by statistics Canada
- 5000 Canadians age 6-70 at 15 survey sites from 2007 to 2009

# Canadian Health Measures Survey

- Average weight of 45 year old man ballooned by 20 pounds and waist size by 3 inches
- Average weight of 45 year old woman increased by 12 pounds and 3 inches to the waist

# Canadian Health Measures Survey

- Average 12 year old boy a 'whopping' 14 pounds heavier
- 61% of adults considered to be overweight or obese
- Being overweight (25% or more body fat) is now the norm by age 36
- Proportion of Canadians with dangerously large waists quadrupled from 5% to 21%

# DIRECT Study

- *The New England Journal of Medicine*
- July 17, 2008 vol. 359 no. 3
- Weight Loss with a Low-Carbohydrate, Mediterranean, or Low-Fat Diet
- Iris Shai, R.D., et al for the Dietary Intervention Randomized Controlled Trial (DIRECT) Group

# DIRECT Study

- 322 obese patients randomized to 3 study diets (recruited from workplace in research centre)
- low-fat, restricted-calorie;
- Mediterranean, restricted-calorie;
- or low-carbohydrate, non–restricted-calorie
- Cafeteria at work sole source of lunch was labeled for specific diets (main meal is lunch)

# Direct Study

- The rate of adherence to a study diet was 95.4% at 1 year and 84.6% at 2 years
- Each diet group was assigned a registered dietitian

# Low Fat

- The low-fat, restricted-calorie diet was based on American Heart Association guidelines. We aimed at an energy intake of 1500 kcal per day for women and 1800 kcal per day for men, with 30% of calories from fat, 10% of calories from saturated fat, and an intake of 300 mg of cholesterol per day.

# Mediterranean

- The moderate-fat, restricted-calorie, Mediterranean diet was rich in vegetables and low in red meat, with poultry and fish replacing beef and lamb.
- We restricted energy intake to 1500 kcal per day for women and 1800 kcal per day for men, with a goal of no more than 35% of calories from fat



# Low Carbohydrate

- The low-carbohydrate, non–restricted-calorie diet aimed to provide 20 g of carbohydrates per day for the 2-month induction phase and immediately after religious holidays, with a gradual increase to a maximum of 120 g per day to maintain the weight loss. The intakes of total calories, protein, and fat were not limited

# Results – Weight Loss

- Low Fat – 2.9 kg
- Med. – 4.4 kg
- Atkins – 4.7 kg
- $P < 0.0001$

# Results

- No differences in waist circumference, systolic or diastolic blood pressure
- HDL increase
  - Low Fat – 6.3mg
  - Atkins – 8.4 mg increase ( $p < 0.01$ )
- Decrease in TG
  - Low Fat – 2.7 mg/dL
  - Atkins – 23.7 mg/dL ( $p < 0.03$ )
- Dietary cholesterol intake on Atkins almost double that of low fat diet

# Results

- LDL – no difference
- TC/HDL
  - Atkins – improved by 20%
  - Low Fat improved by 12% (P=0.01)
- hsCRP
  - Improved in Med. (21%) and Atkins (29%) but not in low fat diet

# Results

- In 36 pts with diabetes
- Decrease in HgBA1C
  - Low Fat – 0.4%
  - Med. – 0.5%
  - Atkin -0.9% ( $p < 0.05$ )

# DIRECT study

- **Dietary Intake from 24-Hour Dietary Recall among Participants in the Dietary Intervention Randomized**

- **Controlled Trial (DIRECT).\***

Variable	Low-Fat Diet	Mediterranean Diet	Low-Carbohydrate Diet
Energy (kcal)	1347±239	1356±258	1281±380
Fat Total (g)	38.7±13.9	48.8±19.8	58.8±25.7†
% of energy	25.9±8.0	31.7±9.1†	40.5±10.0‡
Protein Total (g)	94.2±24.4	83.2±22.5	105.9±36.0
% of energy	28.3±6.	25.2±8.0	32.9±7.6†
Carb Total (g)	135.8±44.1	152.9±0.3	87.4±37.5‡
% of energy	48.2±0.7	45.0±11.7	28.3±11.7‡
Dietary chol (mg)	174±82	181±93	358±162‡

- \* Plus-minus values are means ±SD. During the first 6 months of the study, 24-hour dietary recalls were obtained from
- 27 participants on the low-fat diet, 22 on the Mediterranean diet, and 18 on the low-carbohydrate diet; the results were analyzed with the use of the Israeli nutritional database.<sup>1</sup>
- † P<0.05 for the comparison with the low-fat diet.
- ‡ P<0.001 for the comparison with the low-fat diet.

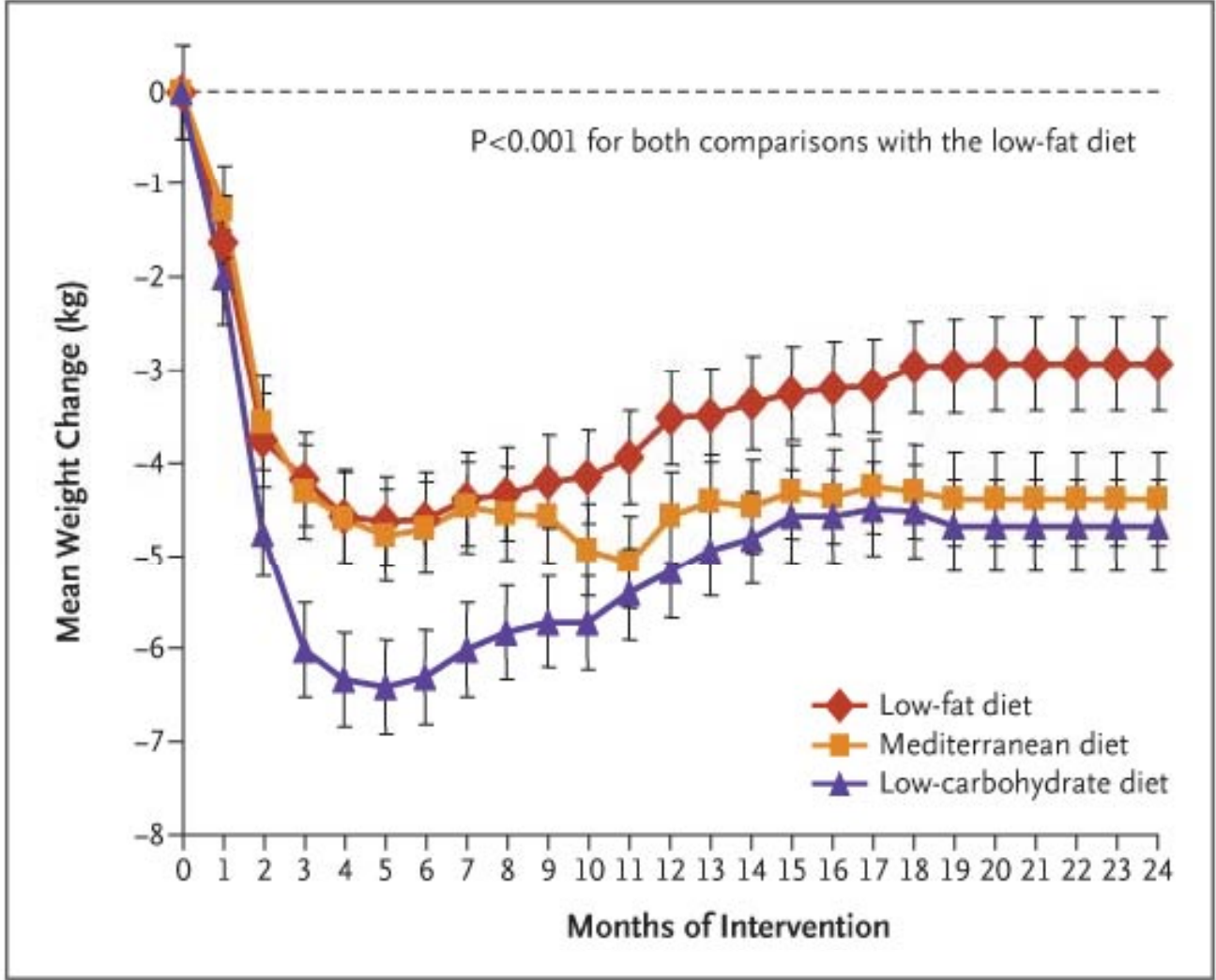
# DIRECT study

- Eating fat does NOT make you fat
- Eating cholesterol does NOT raise your cholesterol
- The Low fat diet is clearly the worst diet to follow
- The high fat diet makes you eat LESS calories by making you feel more full
- Low fat diet is raises triglycerides, lowers HDL and raises CRP

# Bottom Line

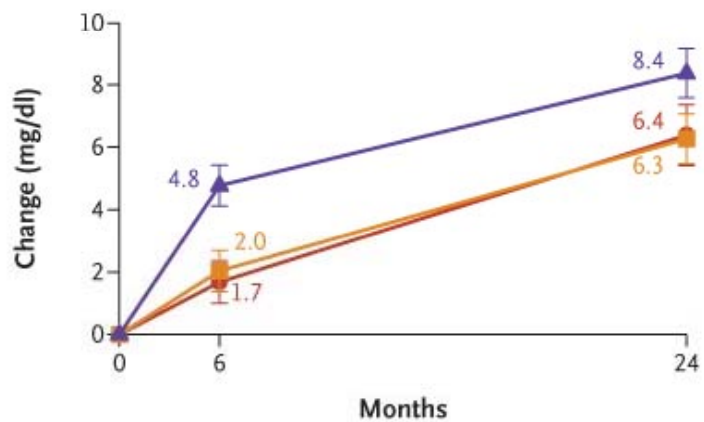
- The low fat diet compared to the other 2 has been clearly demonstrated to:
  - raise your TC/HDL (bad)
  - lower your HDL (bad)
  - increase your weight (bad)
  - increase your hsCRP (bad)
  - raise your HgB A1C (bad)
  - raise your TG (bad)



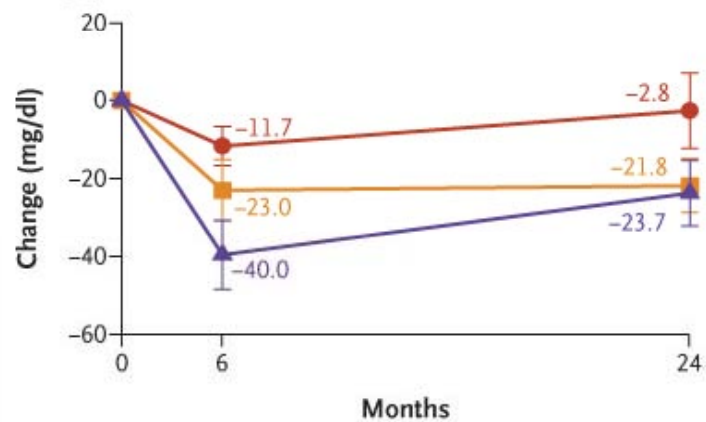


● Low-fat diet    ■ Mediterranean diet    ▲ Low-carbohydrate diet

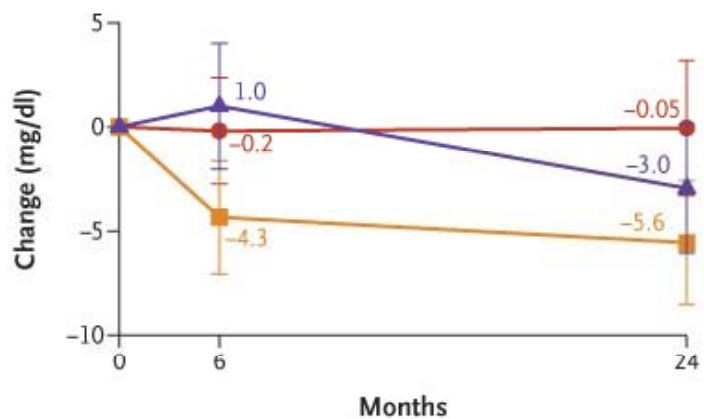
**A HDL Cholesterol**



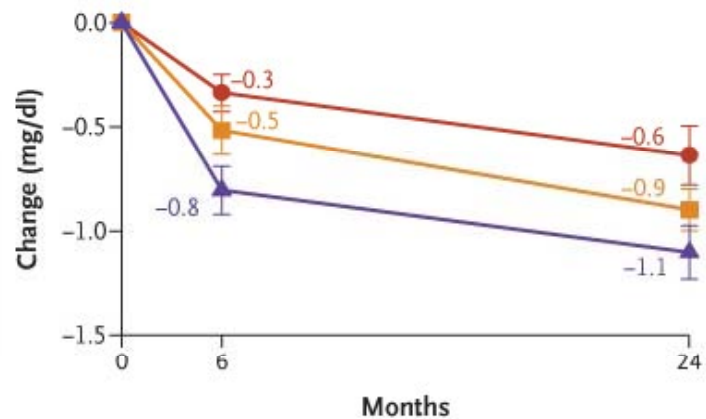
**B Triglycerides**



**C LDL Cholesterol**

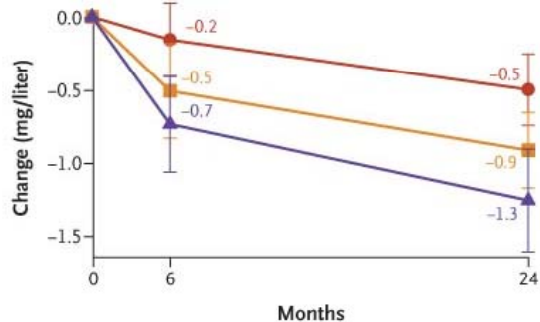


**D Ratio of Total Cholesterol to HDL Cholesterol**

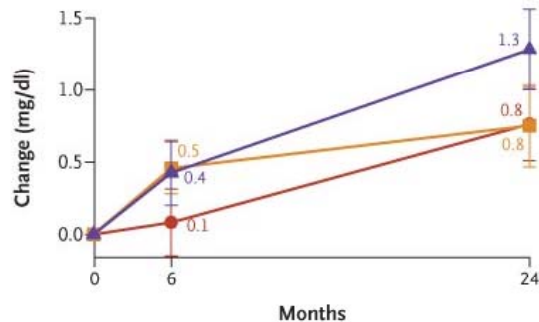


● Low-fat diet    ■ Mediterranean diet    ▲ Low-carbohydrate diet

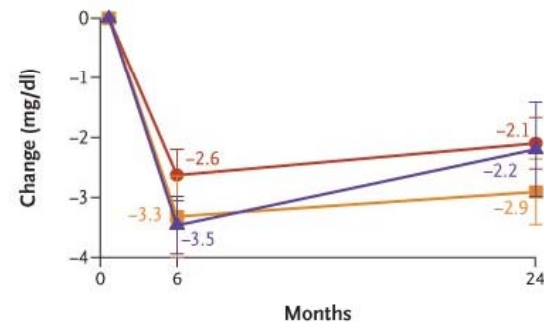
**A High-Sensitivity C-Reactive Protein**



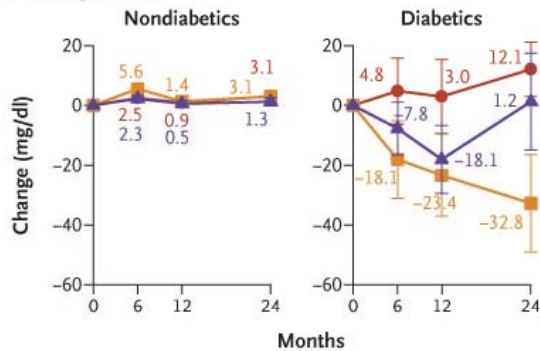
**B Adiponectin**



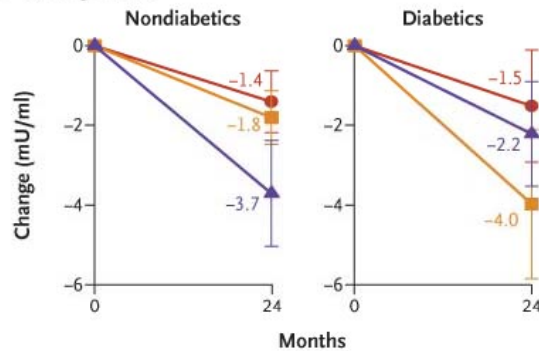
**C Leptin**



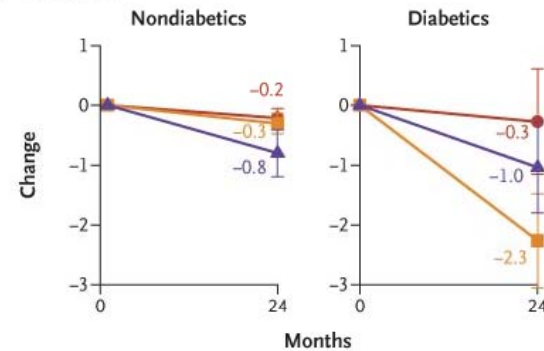
**D Fasting Glucose**



**E Fasting Insulin**



**F HOMA-IR**



# A Low-Carbohydrate as Compared with a Low-Fat Diet in Severe Obesity

- NEJM May 2003 – Samaha et al
- 132 obese subject, 39% with DM
- Randomized to low fat vs low carb diet
- By 6 months 47% (low fat) 33% (low carb) dropped out
- Diets 41% fat vs 33% fat
- Weight loss -5.8 kg vs -1.9 kg ( $p=0.002$ )

# Results

- Low carb vs Low fat diet
- Decrease in TG -20% vs -4% ( $p=0.001$ )
- LDL, HDL – no difference
- Fasting glucose -9% vs -2% ( $p=0.02$ )
- Insulin sensitivity (only of diabetics)
- Increase of 6% vs decrease of 3%
- HgBA1C – decrease of 0.6 vs no change ( $p=0.06$ )
- Insulin Level (non diabetic) -6 uU/mMol vs +1
- ( $p=0.008$ )

# Bottom Line

- Eating a high fat diet results in more weight loss
- Low fat diet increases TG
- Low fat diet worsens insulin sensitivity
- Lower compliance with a low fat diet than with a low carb diet

# A Randomized Trial of a Low-Carbohydrate Diet for Obesity

- NEJM May 2003 Foster et al
- 63 pt, 1 year randomized trial low fat vs low carb diet
- 43% and 39% dropout at 1 year
- Weight loss -4.4 kg vs -2.5 kg ( $p=0.26$ )

# Results

TG (mg/dL) -17 vs +0.7 (p=0.04)

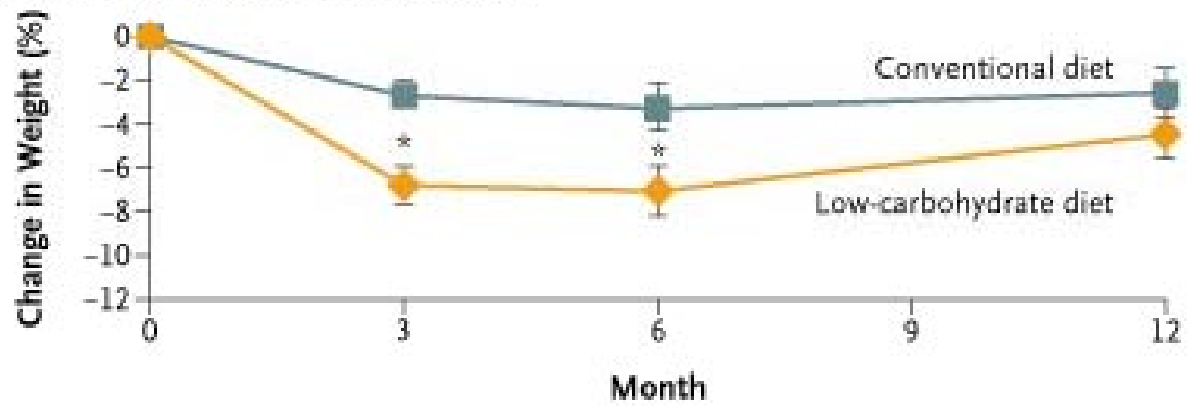
LDL no difference

HDL (mg/dL) +11 vs +1.6 (p=0.04)

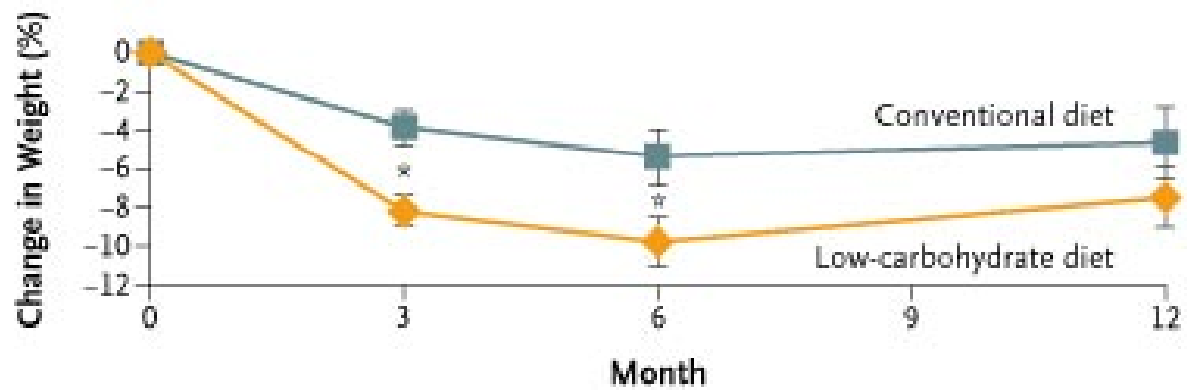
In favor of low carb diet

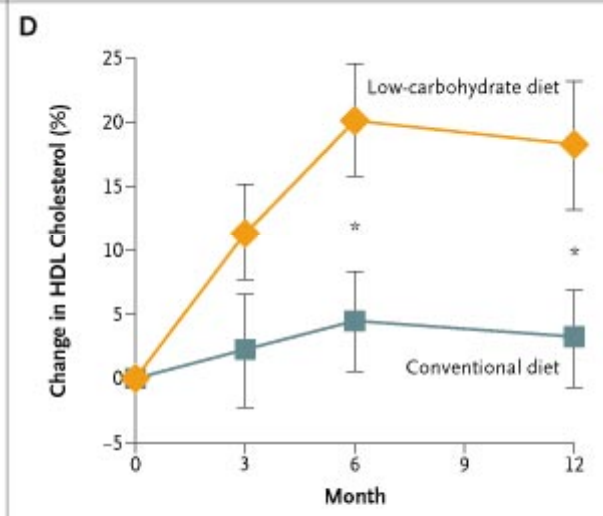
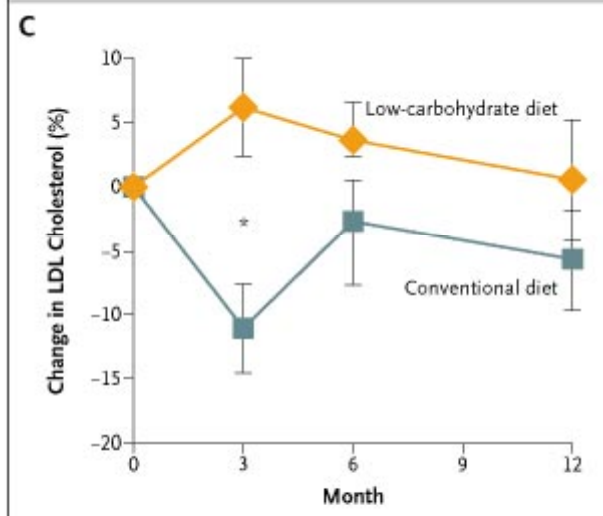
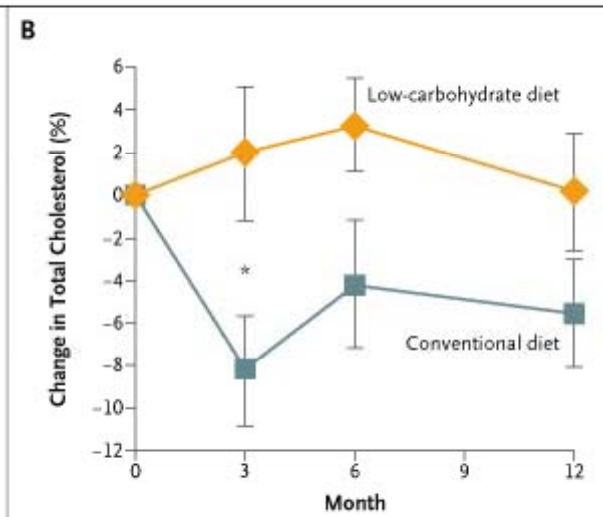
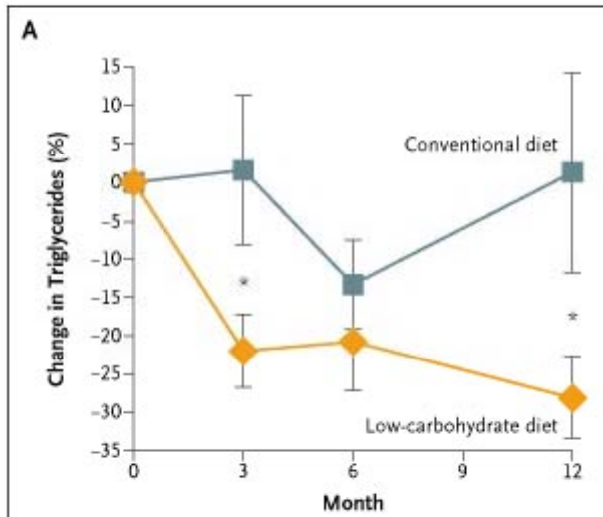


**A Base-Line Values Carried Forward**



**B Complete Data or Data from Last Visit**





# Bottom Line

- Improved compliance on a low carb diet
- More weight loss on a low carb diet
- Better TG, HDL on a low carb diet

# Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

- Sacks et al, NEJM Feb 26, 2009
- 811 patients randomized to 4 different groups followed over 2 years
- Groups carbs/ proteins/ fats are:
  - 65/15/20 (high carb, low fat)
  - 55/25/20
  - 45/15/40
  - 35/25/40 (low carb, high fat)

# Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

- Given intensive dietary advice
- At 2 years 645/811 followed up
- All had caloric restriction
- All advised to keep saturated fat <8% and 20grams fiber (American average 14 g/day)
- Conclusion “Reduced-calorie diets result in clinically meaningful weight loss regardless of which macronutrients they emphasize”

## Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

- Low fat group – 27.5% fat (target 20%)
- High fat group – 34.2% fat (target 40%)
- Difference in fat 6.7% (target 20%)
- High carb – 52% carbs
- Low carb – 46% carbs
- Difference in carbs 6% (target 30%)
- Bottom Line – all groups were eating more or less the same diet!

# Here's the problem....

- Imagine a patient randomized to 45% carbs (other groups were 35, 55, 65) 15% protein, and 40% fat

Dietician – Sir, you are eating 50% carbs. You should eat less carbs to get to 45% but not too little carbs otherwise you'll get to 35%

Patient – Huh?

Dietician – Eat less carbs but not too little

Patient – Huh?

Dietician – you should try to get 45% of your calories from carbohydrates 15% protein and 40% fat

Patient – Huh?

Dietician – Eat a little more fat, a little but not too little carbs and the rest protein

Patient – Huh?

# Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

- At 2 years
- Low fat reduced LDL more than high fat 5% vs 1%
- Low carb increased HDL more than High carb (9% vs 6%)
- Weight loss only correlated with number of counselling sessions



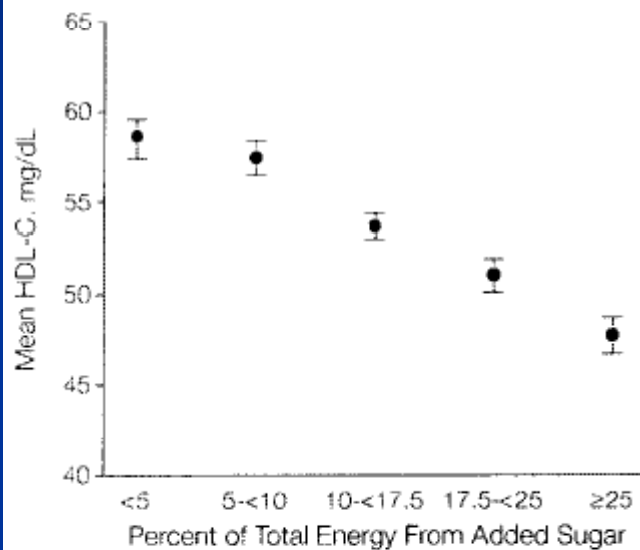
## Comparison of Weight-Loss Diets with Different Compositions of Fat, Protein, and Carbohydrates

- Conclusion “If you give 4 groups of people more or less the same diet, they will have more or less the same weight loss. However, because we spent all this time and money on this study, we will publish it with the conclusion that macronutrient makeup makes no difference”

# Caloric Sweetener Consumption and Dyslipidemia Among US Adults

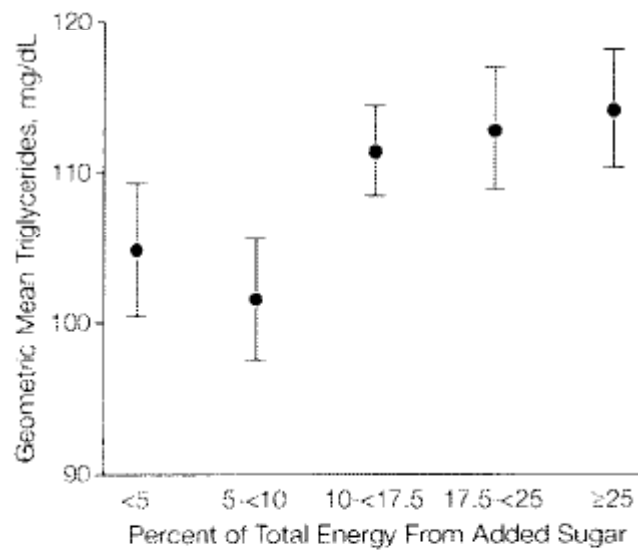
- JAMA April 21, 2010 – Vos et al
- 6,113 US Adults from the NHANES 1999-2006 study grouped by intake of added sugars
- Mean of 15.8% of consumed calories were added sugars
- Those with >25% calories consumed averaged 2.8 pound weight gain versus weight loss of 0.3 pounds for those taking <5% calories consumed as added sugars

**Figure 1.** Multivariable-Adjusted Mean HDL-C Levels by Level of Added Sugar Intake Among US Adults, NHANES 1999-2006



Participants grouped by percentage of total energy intake from added sugar; <5% comprises the reference group.  $P < .001$  for linear trend. Error bars indicate 95% confidence intervals. HDL-C indicates high-density lipoprotein cholesterol; NHANES, National Health and Nutrition Examination Survey. To convert values to mmol/L, multiply by 0.0259. The 3 highest categories (10-<17.5, 17.5-<25, and  $\geq 25$ ) were significantly lower than the referent group ( $P < .001$ ).

**Figure 2.** Multivariable-Adjusted Geometric Mean Triglyceride Levels by Level of Added Sugar Intake Among US Adults, NHANES 1999-2006



Participants grouped by percentage of total energy intake from added sugar; <5% comprises the reference group.  $P = .02$  for linear trend. Error bars indicate 95% confidence intervals. NHANES indicates National Health and Nutrition Examination Survey. To convert values to mmol/L, multiply by 0.0113. The categories 10-<17.5 and 17.5-<25 were significantly higher than the referent group at  $P < .05$ , and the category  $\geq 25$  was significantly higher at  $P < .01$ .

# Caloric Sweetener Consumption and Dyslipidemia Among US Adults

- There was no relationship with LDL cholesterol
- Conclusions “There was a statistically significant correlation between dietary added sugars and blood lipid levels”
- Despite 40 years of trying – there are still no convincing studies that correlate dietary fat or dietary cholesterol with poor blood lipid levels

# Results

- All randomized controlled trials demonstrating the exact same thing
- A low carb vs a low fat diet
  - Increased weight loss
  - Improved TG
  - Improved HDL
  - Improved insulin sensitivity
  - “Hey, you know what would be a good idea? To recommend a diet to give everybody the metabolic syndrome” American Heart Association

# Metabolic Syndrome

- Diets high in Sugars causes:

- Increased weight
- Increased TG
- Low HDL
- Increased plasma glucose and insulin resistance

- ATP III criteria for Metabolic Syndrome:

- Abdominal obesity
- Triglycerides  $> 1.7$
- HDL  $< 1.0$
- Hypertension
- Fasting plasma Glucose  $> 6.0$

## Effects of a Mediterranean-Style Diet on the Need for Antihyperglycemic Drug Therapy in Patients with Newly Diagnosed Type 2 Diabetes

- Giugliano et al, *Annals of Internal Medicine* , 1 Sep 2009, Vol 151, (5) 306-313
- Randomized trial
- 215 overweight patients with newly diagnosed DM
- Both diets calorie restricted
- Med. Diet (<50% carbs, >30% fats mostly olive oil)
- AHA diet <30% fat



## Effects of a Mediterranean-Style Diet on the Need for Antihyperglycemic Drug Therapy in Patients with Newly Diagnosed Type 2 Diabetes

- Patients given dietary advice monthly for 1 year then bimonthly for 2<sup>nd</sup> to 4<sup>th</sup> year
- Primary outcome is need for DM drugs if HgBA1C > 7%

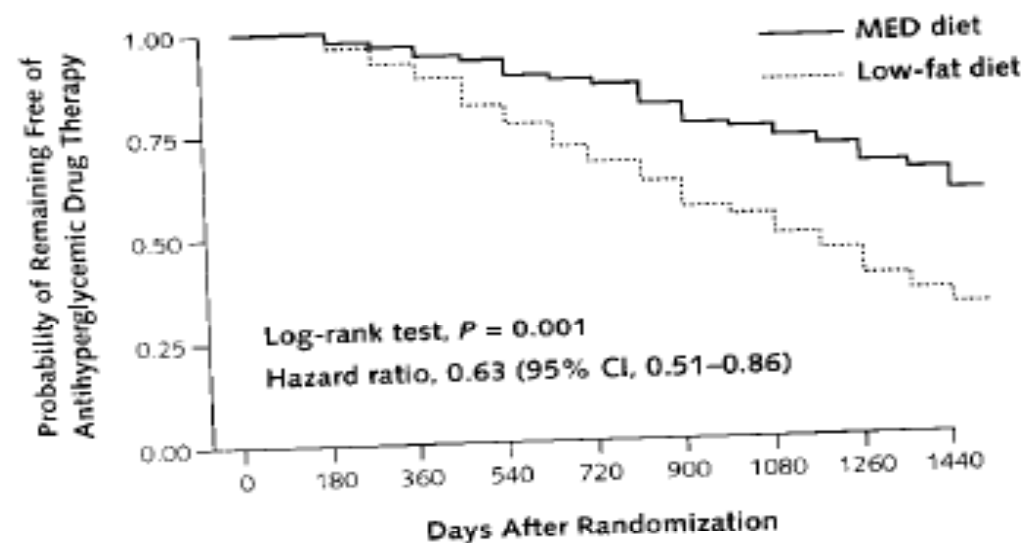
## Effects of a Mediterranean-Style Diet on the Need for Antihyperglycemic Drug Therapy in Patients with Newly Diagnosed Type 2 Diabetes

- At 4 years *44%* of med diet vs *70%* of low fat diet on diabetic meds
- Weight loss similar 3.8kg vs 3.2kg
- HgBA1C -0.9% vs -0.5% ( $p < 0.05$ )
- Plasma Glucose (mmol/L) -1.7 vs -0.8 ( $p < 0.05$ )
- HOMA -1.5 vs -0.9 ( $p < 0.05$ )
- Serum Insulin (pmol/L) -9.8 vs -5.6 ( $p < 0.05$ )

## Effects of a Mediterranean-Style Diet on the Need for Antihyperglycemic Drug Therapy in Patients with Newly Diagnosed Type 2 Diabetes

- HDL (mmol/L) 0.09 vs 0.02 ( $p < 0.05$ )
- TG (mmol/L) -0.28 vs -0.07 ( $p < 0.05$ )
- Total Chol -0.25 vs -0.1 ( $p < 0.05$ )

**Figure 2. Probability of remaining free of antihyperglycemic drug therapy.**



At risk, <i>n</i>	0	180	360	540	720	900	1080	1260	1440	
MED diet	108	108	105	101	89	80	77	66	52	49
Low-fat diet	107	107	98	87	72	64	54	45	35	29

MED = low-carbohydrate, Mediterranean-style.

## Effects of a Mediterranean-Style Diet on the Need for Antihyperglycemic Drug Therapy in Patients with Newly Diagnosed Type 2 Diabetes

- With similar weight loss in both groups, the mediterranean diet has far better cholesterol profile, but also significantly delayed the need for antihyperglycemic medications
- The AHA low fat diet is significantly more diabetogenic than the Mediterranean diet
- You would have to treat a whopping 59% more patients with drugs if patients were on the AHA low fat diet compared to the Mediterranean diet

# Nutrition Recommendations and Interventions for Diabetes

- A position statement of the American Diabetes Association
- Diabetes Care 1 Jan 2008 Vol 31 S61-81
- “dietary strategies including reduced calories and *reduced intake of dietary fat*, can reduce the risk for developing diabetes and are therefore recommended.”
- Despite all the evidence that low fat diets are diabetogenic they still recommend it??? WTF?

# Nutrition Recommendations and Interventions for Diabetes

- “There is not sufficient, consistent information to conclude that low-glycemic load diets reduce the risk for diabetes”
- WTF??
- “Intake of sucrose and sucrose-containing foods by people with diabetes does not need to be restricted because of concern about aggravating hyperglycemia” – it’s true – they really wrote this Page S65
- WTF??

# Nutrition Recommendations and Interventions for Diabetes

- What they should have written
- “It is both scientifically proven and instinctively obvious that eating less sugar produces lower blood sugars, but we have decided to portray fat as the enemy because, well, we’ve been doing it for the last 40 years. By writing these guidelines, we can ensure that the next generation of dieticians, nurses and physicians remains oblivious to the truth”



# Results

- Eating fats does NOT make you fat
- Eating Cholesterol does NOT increase your cholesterol
- Eating refined carbohydrates makes you fat and worsens your cholesterol
- Proven scientifically multiple times in multiple peer reviewed journals

# Fats are bad

- AHA implicitly states that fats are bad for you and you should limit yourself to 25-35% fats despite the fact that the higher fat diets cause greater weight loss, increased satiety, decreased drop out rates
- Can fats be good for you?

Effect of n-3 polyunsaturated fatty acids in patients with chronic heart failure (the GISSI-HF trial): a Randomised, double-blind, placebo-controlled trial

- The Lancet Oct 4, 2008
- Class 2-4 NYHA CHF
- N-3 PUFA vs placebo
- 6975 pt followed for 3.9 years
- 2% ARR in total mortality ( $P < 0.01$ )
- 9% RRR

# Side Effects

- d/c treatment 28.7% n-3 PUFA vs 29.6% placebo
- GI disorder 96 n-3 PUFA vs 92 placebo
- No mention of bleeding disorders
- Essentially no increased side effects versus placebo

# SOLVD trial (ACE)

- Mortality benefit 39.7% reduced to 35.2%
- 4.5% ARR
- 11% RRR
- SAVE Trial
- 25% mortality reduced to 20%
- 5% ARR
- 19% RRR

# Beta blockers in heart failure

- 33% mortality vs 30% mortality (bucindolol)
- 16.7% vs 11.2% (coreg) 5.5% ARR
- Statins in Heart failure – completely useless (CORONA)

# Bottom Line

- Addition of Omega 3 to conventional therapy of heart failure results in a highly statistically and clinically significant reduction in *mortality*, with essentially no side effects.

# GISSI-HF

- Randomised, double blind placebo controlled trial of 10mg crestor vs placebo in CHF
- No benefit in total mortality, worsening CHF, or anything
- Similar to CORONA study – no benefit to statins in CHF (NEJM 2007)



# Post MI

- GISSI-P (The Lancet Aug 7, 1999)
- Randomised, double-blind, placebo controlled
- N-3 PUFA (1 gram daily) vs placebo post MI
- 11,324 pt followed for 3.5 years
- Intention to treat analysis
- 2.3% ARR, 20% RRR in death, MI or stroke

# Post MI

- Adverse events – 3.8% discontinued N-3 PUFA due to side effects
- GI disturbances 4.9%
- Nausea 1.4%
- Bleeding – Not even mentioned

# CURE Trial

- Randomized patients to ASA or ASA plus Plavix
  - 2.1% Absolute Risk reduction
  - 20% Relative Risk Reduction
- Fish Oil
  - 2.3% ARR
  - 20% RRR

# Diet and Reinfarction Trial (DART)

- The Lancet, Sep 30 1999
- Randomised, controlled trial post MI
- 2033 men randomised to 3 diets: low fat diet, fish 2x/week diet, and high fiber
- Fish includes 2 weekly portions of mackerel, herring, kipper, pilchard, sardine, salmon, or trout
- Fish group who didn't take fish could take fish oil capsules instead 3/day
- 2 year follow up

# Diet and Reinfarction Trial (DART)

- Low Fat diet – no difference in mortality
- Fiber diet – no difference in mortality
- Fish diet – 3.5% ARR in total mortality – 29% RRR
- Effect appears early and persists throughout the 2 years
- No significant weight reductions in any group

# Diet and Reinfarction Trial (DART)

- Similar to an observation study from Norway that showed a sudden sharp decline in IHD mortality at the start of WWII and a sudden sharp increase at the end of WWII when there was sudden increase in fatty fish intake
- All previous dietary trials post MI showed no benefit (all using low fat diets)

# Diet and Reinfarction Trial (DART)

- Bottom line – low fat diets are NOT heart healthy and much more atherogenic than a high fat diet
- Diets high in fish oils appear cardio protective

## Mediterranean alpha-linolenic acid-rich diet in secondary prevention of coronary heart disease

- Lancet, 1994
- Randomised controlled trial – 5 year f/u
- 605 patients assigned to regular AHA advice or Mediterranean type diet – more bread, root and green vegetables and olive oil or canola based margarine as the only fat



## Mediterranean alpha-linolenic acid-rich diet in secondary prevention of coronary heart disease

- Levels of oleic, linoleic, linolenic eicosapentaenoic acids in blood significantly higher in treatment group
- Overall mortality – 70% RRR, 2% ARR
- Cardiovascular deaths 75% RRR, 2% ARR
- Total primary outcome 73% RRR, 4% ARR

## Mediterranean alpha-linolenic acid-rich diet in secondary prevention of coronary heart disease

- The 2 populations in the world with the lowest CHD mortality have a high intake of alpha-linolenic acid
  - Japanese in the form of canola and soybean oils
  - Cretans – through consumption of nuts

# Use by clever cardiologists

- Fish Oil for CHF – no risk, all benefit
  - Risk – none, cost \$20/year
  - Benefit – proven grade 1a evidence of benefit, all natural
  - Usage – 0%
  - Fish Oil post MI
  - Usage – 0%

# Use by clever cardiologists

- Statins in CHF – no benefit, all risk
  - Risk – hepatic, rhabdomyolysis etc., cost – over \$300/year
  - Benefit – proven grade 1a evidence of NO benefit
  - Usage – virtually 100%

# American Heart Association Guidelines for management of MI and CHF

- MI - Approx. 50 pages of detailed recommendations
- Number of Times n-3 PUFA (proven benefit, no risk, cheap) mentioned: 0
- CHF – Aprox 27 pages of detailed recommendations
- Number of times n-3 PUFA mentioned: 0

**Dr. Bibiana Cujec (cardiologist –  
Undergraduate Medical Education Director  
University of Alberta)**

- In Canadian Journal of Diagnosis May 2009 in response to question about Omega-3 and heart disease prevention
- “Omega-3 supplements are not otherwise routinely recommended for secondary prevention of coronary artery disease”
- WTF???! There are randomized placebo controlled trials of over 10,000 patients showing benefit!

# Dr. Bibiana Cujec (cardiologist)

- “high doses of omega-3 may cause GI upset, diarrhea and nausea” (simply not true – it doesn’t occur with any more frequency than in placebo)
- “Omega-3 is contraindicated in individuals with active bleeding and should be used with caution in individuals taking (anticoagulants)” – Trial evidence shows NO evidence of excessive bleeding risk

# Dr. Bibiana Cujec (cardiologist)

- “Omega-3 should be discontinued 14 days prior to dental or surgical procedures” WTF??? Should we also stop eating fish before dental work too, you idiot?
- “I would caution patients against omega-3 supplements if they are on.. (anticoagulants) because of the risk of excessive bleeding” – In the HF trial 47.9% of patients were on ASA and there was NO excessive bleeding



- Despite over a decade of evidence, cardiologists are advising against proven therapies that family doctors are asking about
- Why?

# Why?

- Number of Drug reps for PUFA: 0
- Number of Drug reps for Statins, ACEI, ARBs: a kajillion

“That fish oil rep never takes me anywhere nice so I’m not going to put it in my recommendations”

“They don’t need supplements - Let them eat pilchard!”

# Why are Omega 3 so vital?

- The evolution of man and the aquatic ape theorem vs the savannah theorem
- Characteristics of the evolution of man
  - Bipedalism
  - Hairless body
  - Subcutaneous fat

# A Prospective Study of Egg Consumption and Risk of Cardiovascular Disease in Men and Women

- JAMA April 21, 1999
- 2 prospective cohort studies – the Health Professionals Follow-up Study (1986-1994) and the Nurses Health Study (1980-1994)
- Relative risk of CHD events
  - <1 per week (1.0)
  - 1 per week (1.0)
  - 2-4/ week (1.04)
  - 5-6/ week (0.78)
  - >7/ week (0.93)

## A Prospective Study of Egg Consumption and Risk of Cardiovascular Disease in Men and Women

- Despite the fact that higher egg consumption was associated with smoking, lower physical activity and “unhealthier” eating patterns, there is no association of egg consumption and CHD events
- Eating more cholesterol does NOT increase risk of cardiac events but instead, seems to LOWER cardiac risk

## Effects of a Low-Glycemic Load Diet on Resting Energy Expenditure and Heart Disease Risk Factors During Weight Loss

- JAMA Nov 24, 2004 – from Brigham and Womens Hosp (Harvard)
- 46 pt randomly assigned to low fat vs low glycemic load diets
- When 10% of body weight lost – pt admitted to Hosp for metabolic testing

# Effects of a Low-Glycemic Load Diet on Resting Energy Expenditure and Heart Disease Risk Factors During Weight Loss

- Pt on low glycemic load diets
  - Less reported hunger
  - Resting energy expenditure decreased less
  - Insulin resistance decreased by more than twice as much ( $p=0.01$ )
  - 20% Lower triglycerides ( $p=0.01$ )
  - hsCRP declined 50% vs no change ( $p=0.03$ )

## Effects of a Low-Glycemic Load Diet on Resting Energy Expenditure and Heart Disease Risk Factors During Weight Loss

- For the SAME amount of weight lost, you get 50% better insulin resistance, and 50% better hsCRP
- Remember – Crestor in the Jupiter trial only lowered hsCRP by 37%!



# Biochemical and Physiologic Considerations

- Thought Experiment – hunger and eating refined carbohydrates
- Thought Experiment – timing of meals and importance of small dinners

## Biochemical and Physiologic Considerations

- Glucose and other carbohydrates can be converted to fatty acids and glycerol by the liver
- Fatty acids synthesized in this fashion are more saturated because of the liver's inability to synthesize linoleic acid
- These fatty acids are **MORE** atherogenic as they are more saturated

## Biochemical and Physiologic Considerations

- The Body has limited storage capacity for glucose polymers (70g of glycogen in the liver and skeletal muscle), but nearly unlimited capacity to store fatty acids
- In other words – eating an excess of carbohydrates as opposed to an excess of fats is **MORE** atherogenic

# But...

- Surely there must be some evidence to support the low fat diet...
- The AHA references the NCEP guidelines

# Where's the Evidence

- “The evidence that lowering serum cholesterol levels by decreasing intakes of saturated fatty acids reduces the risk for CHD has been demonstrated in the metaanalysis by Gordon.”  
409,410
- 409. Gordon DJ. Cholesterol and mortality: what can meta-analysis tell us? In: Gallo LL, ed. Cardiovascular disease 2: cellular and molecular mechanisms, prevention, and treatment. New York: Plenum Press, 1995:333-40.
- 410. Gordon DJ. Cholesterol lowering and total mortality. In: Rifkind BM, ed. Lowering cholesterol in high-risk individuals and populations. New York: Marcel Dekker, Inc., 1995:333-48.
- Jason Fung “This is your evidence? He wrote an opinion in a book, not a peer reviewed journal. It wasn't even a friggin' study!”

# Where's the Evidence

- “Some epidemiological data, namely the Western Electric Study, suggest dietary cholesterol increases heart disease risk independently of its effect on serum LDL cholesterol levels.”<sup>661</sup>
- 661. Stamler J, Shekelle R. Dietary cholesterol and human coronary heart disease: the epidemiologic evidence. *Arch Pathol Lab Med* 1988;112:1032-40
- Jason Fung “This is your evidence? A single clinical epidemiology study in a **PATHOLOGY** journal? I don't even think pathologists read this journal!”

# National Cholesterol Education Program

- **Evidence statement:** Unsaturated fatty acids do not raise LDL cholesterol concentrations when substituted for carbohydrates in the diet (A2, B2).
- **Recommendation:** It is not necessary to restrict total fat intake for the express purpose of reducing LDL cholesterol levels, provided saturated fatty acids are reduced to goal levels.
- Note that this evidence statement is nowhere to be found in the executive summary but instead buried within 284 pages of (boring) text

# NCEP

- Dietary cholesterol causes marked hypercholesterolemia in many laboratory animals, including nonhuman primates. High intakes of cholesterol in humans, however, do not cause such a marked increase in serum cholesterol.
- Jason Fung – “Non human primates should **DEFINITELY** avoid dietary cholesterol. Humans, though, not so much.”



# National Cholesterol Education Program

- Further, although some prospective studies have suggested a relationship between the percentage of dietary fat and obesity recent prospective studies (or meta-analysis of studies) have failed to detect a causative link between them.
- In other words – despite 40 years of trying to link dietary fat and mortality there is still no evidence.

# A word on Fructose

- JCI April 20, 2009 Havel et al.
- Consuming fructose-sweetened, not glucose-sweetened, beverages increases visceral adiposity and lipids and decreases insulin sensitivity in overweight/obese humans

# Fructose

- Studies in animals show diets high in fructose results in increases de novo lipogenesis, dyslipidemia, insulin resistance, and obesity
- Double blinded parallel arm study
- 2 weeks inpatient baseline metabolic study followed by 8 weeks intervention with fructose or glucose sweetened beverages 3/day with meals providing 25% of daily energy requirements
- First human study

# Fructose

- 32 patients in study
- Beverages provided to patients – Kool Aid sweetened with fructose or glucose.
- Riboflavin used as biomarker to check compliance
- Baseline characteristics of 2 groups similar

# Fructose

- Similar gains in body weight (1.4-1.8 kg)
- No difference in total body fat but intraabdominal fat increased in fructose group  
14% vs 3.2%
- Total abdominal fat 8.6% vs 4.8%

# Effect on Lipids

TG 18.2% increase vs 2.5%

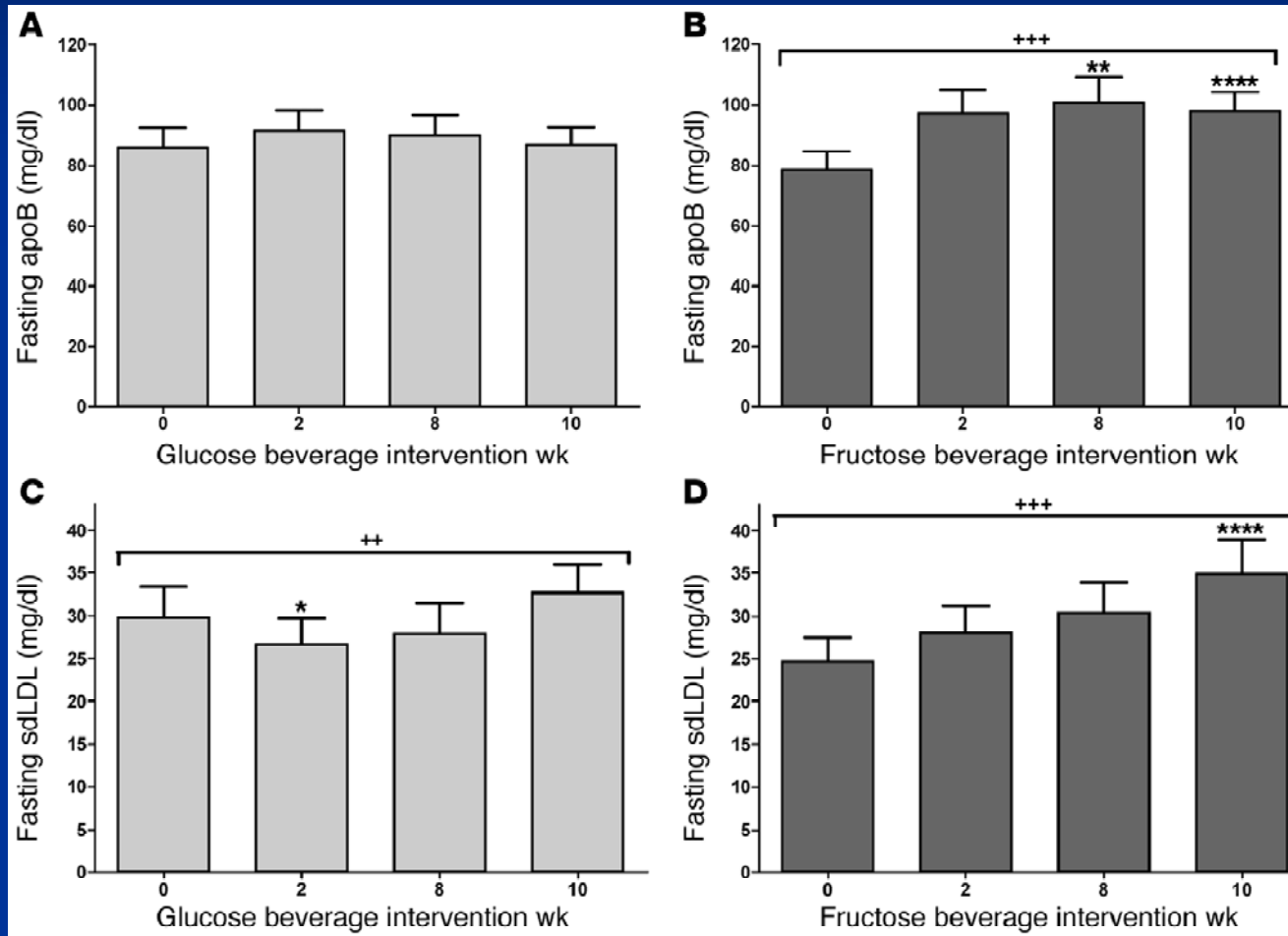
LDL 13.9% vs 3.6%

HDL +3.5% vs -2.4%

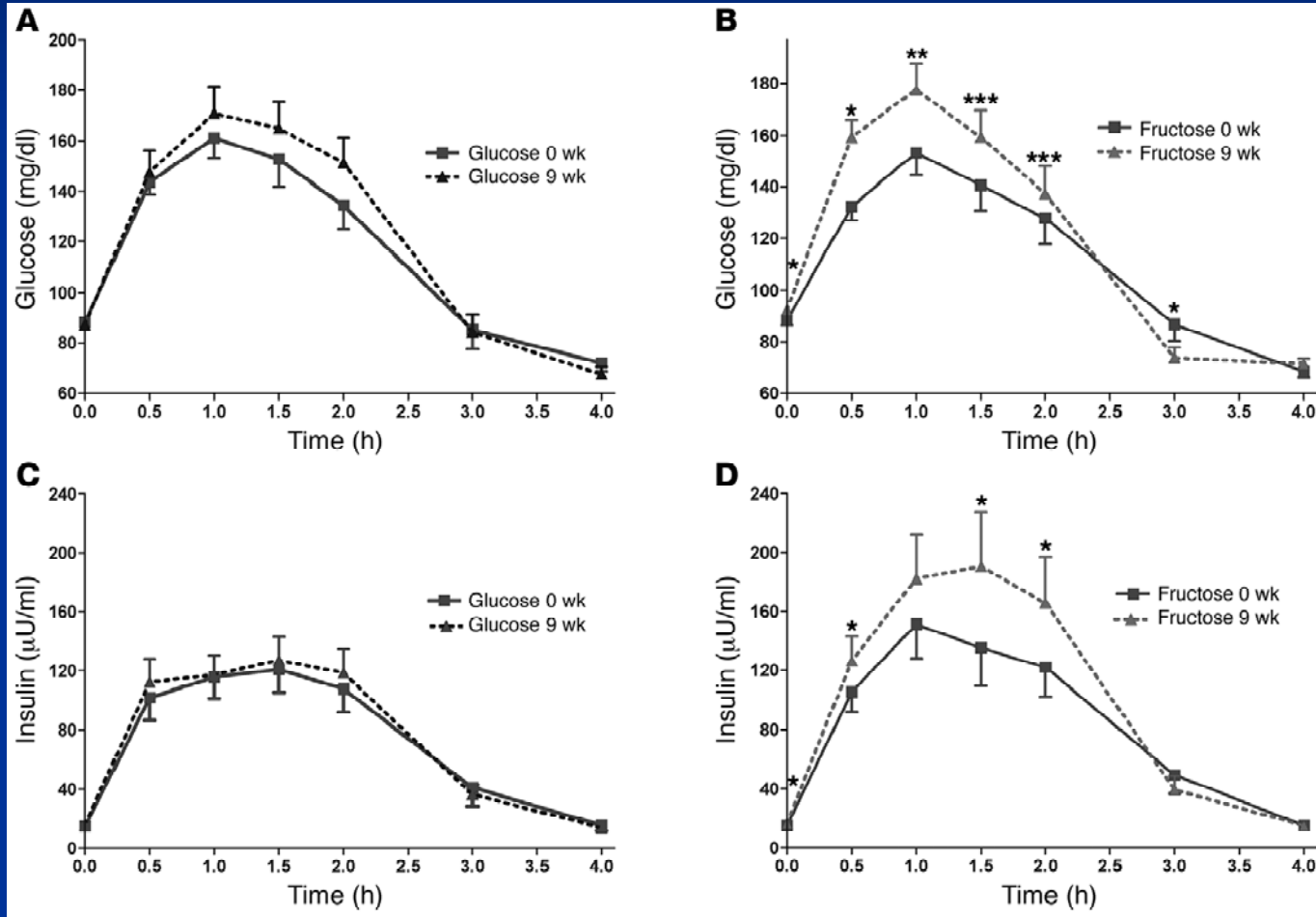
apoB 27.2% vs 3%

Small dense LDL 44.9% vs 13.3%

# Effect on lipids

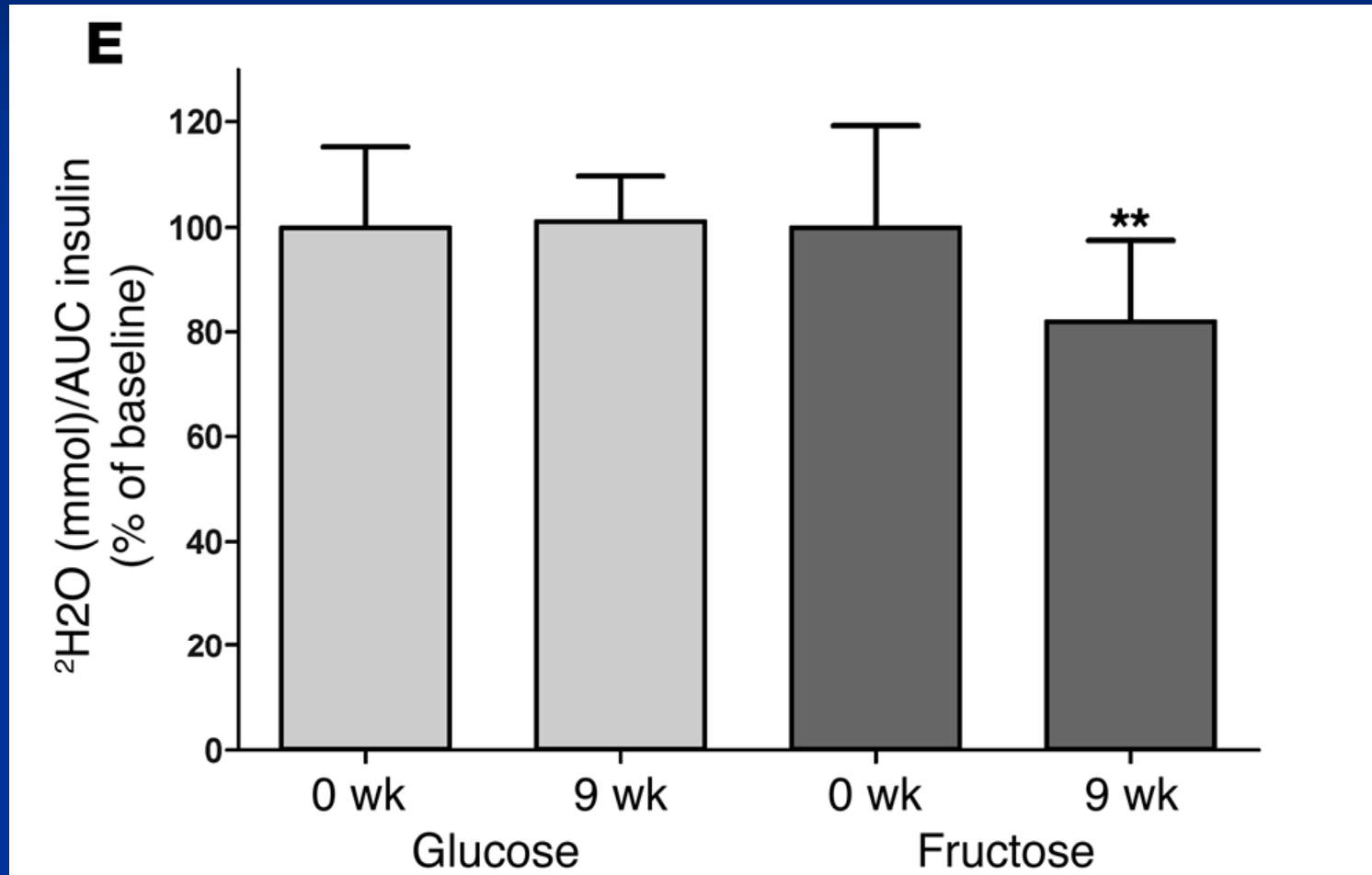


# Effect on OGTT

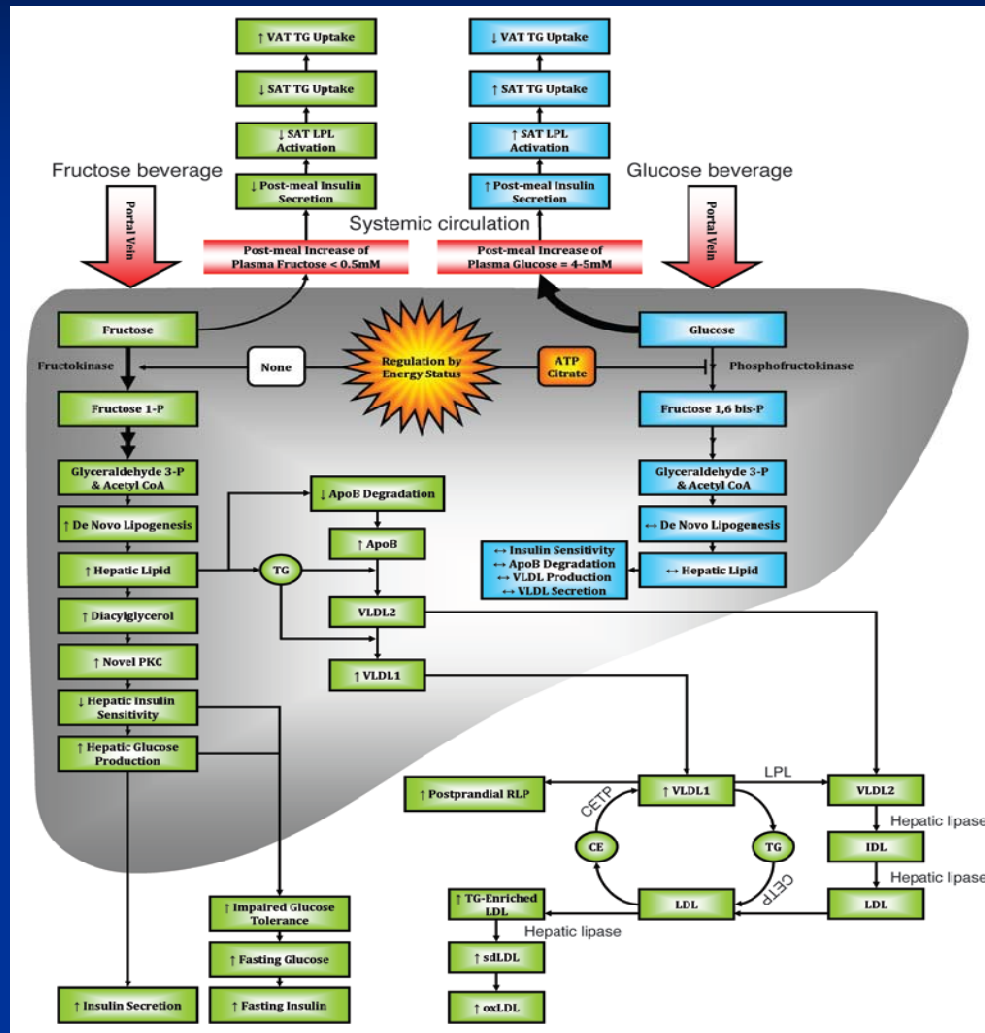




# Effect on insulin sensitivity



# Metabolic Pathway



# Mechanisms

- Hepatic glucose metabolism is regulated by phosphofructokinase which is inhibited by ATP thus limiting hepatic uptake of dietary glucose and production of DNL substrates (de novo lipogenesis)
- Hepatic metabolism of dietary fructose is independent of energy status resulting in unregulated hepatic fructose uptake and increased lipogenesis

# Effect of sugars

Fasting glucose +5.3% vs -1.4%

Fasting insulin 10.2% vs 2.9%

Insulin sensitivity index -17.3% vs 1.1%

# A word on Fructose

- The stuff is just killing you
- Just as the type of fat is important, the type of sugar can be just as important
- High fructose diets gives you a measureable increase in OGTT – the stuff is causing diabetes!

# “Ask your Doctor”

- Hypothetical nutritional education of a Dr. J.F.,  
FRCP(C) Internal Medicine and Nephrology, ABIM
- 1992-1996 Medical School – 2 hours
- 1996-2001 Residency – 0 hours
- 2001 – 2009 Clinical Practice – 0 hours
- So, for a doctor in practice over 15 years had about 2  
hours of lectures 15 years ago
- So, by listening to this lecture, you have had almost as  
much nutritional training as this other fool - Dr. J.F.

# Ask your Doctor

- At a recent Diabetes Forum
- Dr. David Fitchett “We have a wonderful treatment for hypertension, hypercholesterolemia, insulin resistance, metabolic syndrome and anxiety with no side effects – its called exercise”
- He then spent the next 59 minutes talking about.... drugs

# Ask your Doctor

- Dr. Alice Cheng – “Lifestyle changes should be your 1<sup>st</sup>, 2<sup>nd</sup>, and 3<sup>rd</sup> choices for treatment of diabetes”
- She then spent the next 59 minutes talking about....drugs
- We then had a coffee break where, surprise, surprise there were booths displaying the very drugs that they had been talking about



# Ask your Doctor

- CRP lowering by Crestor – 37%
- CRP lowering by diet – 30-50%
- Number of lectures given about Crestor and CRP – a kajillion
- Number of lectures any doctor gives about nutrition and CRP lowering 1 (me)
- Why?
- Number of drug reps for statins – a bazillion
- Number of drug reps for diet - 0

# Ask your Doctor

- Your doctor is likely the least knowledgeable person about diet
- Regarding diets you should have listened to your mother (who knows) and not your doctor (who doesn't)

# Practical Advice

Avoid refined carbohydrates

- Avoid high fructose corn syrup
- Avoid Trans fats
- Eat breakfast
- Eat lots and lots of healthy fats
- Eat a variety of food including lots of whole grains and vegetables

# Practical Advice

- When you're hungry – eat
- When you're full – stop
- Eat a variety of food including lots of whole grains and vegetables
- Eating small meals will shrink gastric capacity

# Reduced stomach capacity in obese subjects after dieting

- Am J Clin Nutr Feb 1996 63(2); 170-3
- Stomach capacity measured by latex balloon before and after dieting – after mean weight loss of 9.1 kg stomach capacity reduced by 27-36% compared to no change in placebo group (no diet)

# Conclusions

AHA diet recommendations to follow the most atherogenic diet available seems a little strange given the clear evidence from basic science all the way to randomized controlled trials against it.

Fats are not bad. Fats are an essential and tasty part of the diet. It is the restriction of fats and its replacement by refined carbohydrates that leads to obesity, increased triglycerides, low HDL, insulin resistance (aka the metabolic syndrome)

- The funny part is that everybody except the doctors knew it already
  - 10 Million copies of Atkins book sold
  - Millions more of the zone diet

# Conclusions

- The low fat diet endorsed by the AHA and NCEP causes low HDL and increased TG resulting in a high TC/HDL-C ratio
- Replacement of glucose by fructose in our industrialized society is likely directly causing insulin resistance and metabolic syndrome

# Jason Fung's inflammatory statement of the day

- By advocating a low fat diet based on quack science, the AHA and its cronies have been contributing to the epidemic of obesity, diabetes and the metabolic syndrome. By their continued ignorance and bad advice, they are responsible for killing patients.