

Nutrition in Clinical Practice

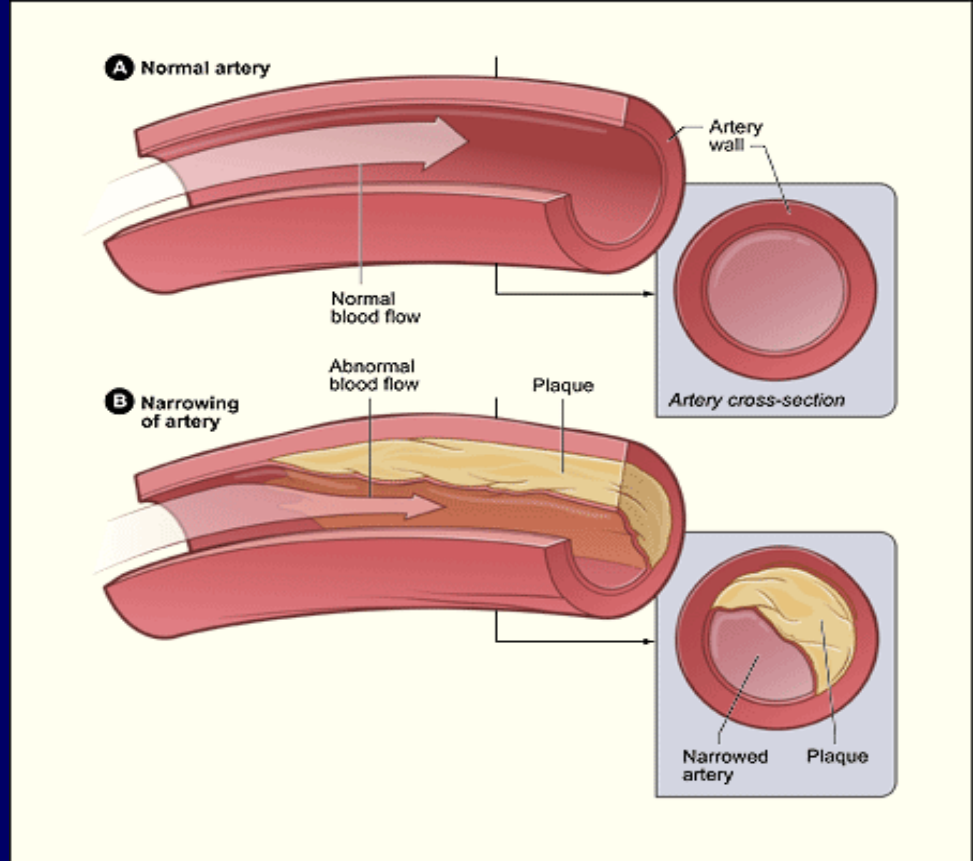
Neal Barnard, MD, FACC
Adjunct Associate Professor of Medicine,
George Washington University
Physicians Committee for Responsible Medicine

Lifestyle Heart Trial

Dean Ornish, M.D.
Preventive Medicine Research
Institute
Sausalito, California

lifestyle intervention
vs.
usual care

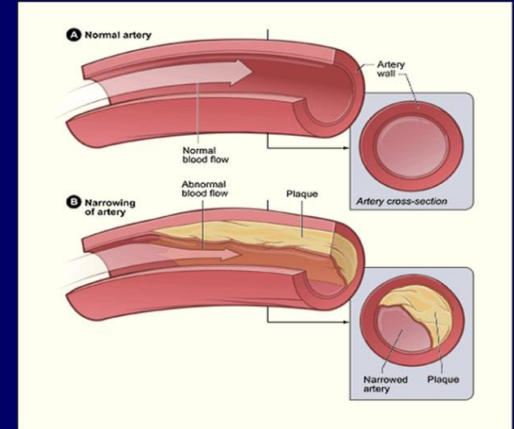
Ornish D. Lancet 1990;336:129-33.



Lifestyle Heart Trial

Experimental program:

1. Vegetarian foods
2. Half-hour walk daily
3. Manage stress
4. Avoid tobacco



Lifestyle Heart Trial

1-year results

Cholesterol ↓ 24%

LDL ↓ 37%

Weight ↓ 22 lbs (10 kg)

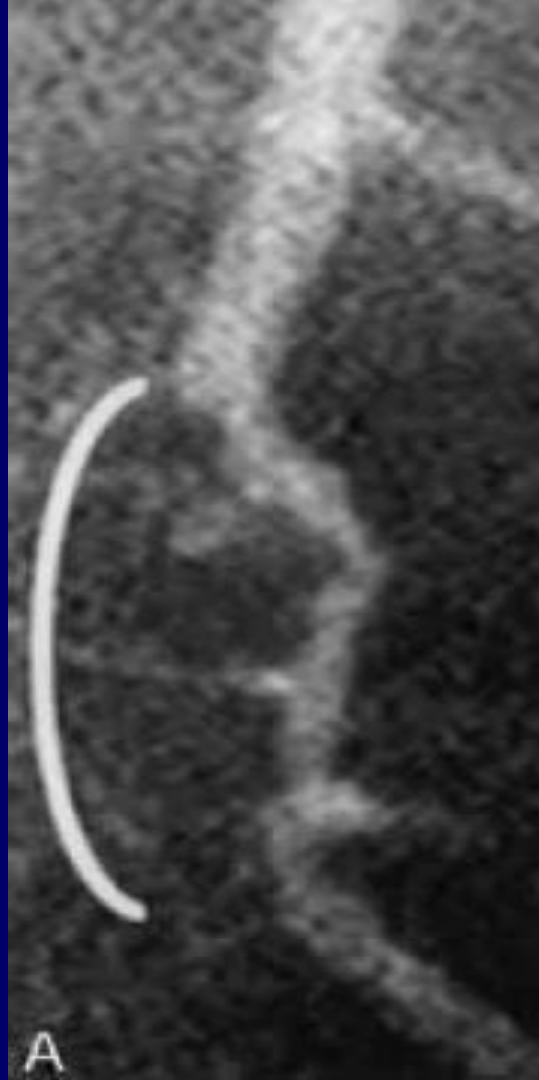
Reversal 82% of participants

Esselstyn 2014

Cleveland Clinic

A. Diseased distal left anterior
descending artery

B. After 32 months on low-fat,
vegan diet with no lipid-
lowering medications



Esselstyn CB Jr J Fam Practice.
2014;63(7):356-364b.

Weight-Loss Trial in Healthy Participants

64 overweight women

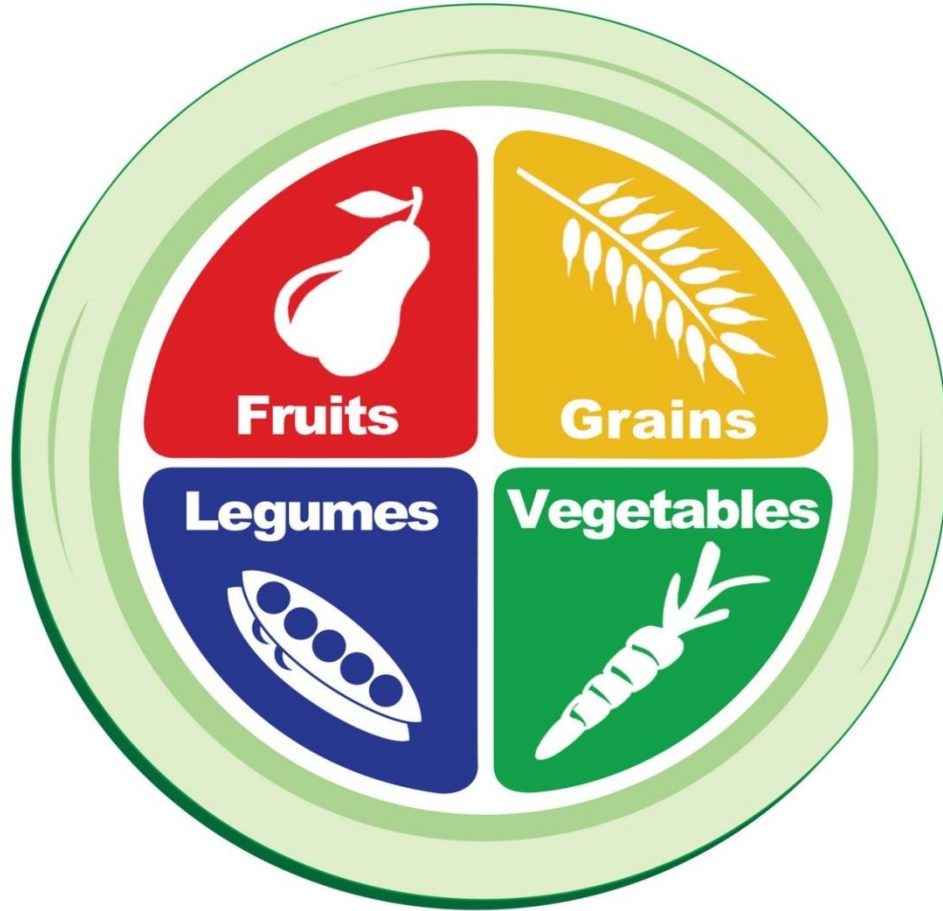
Low-fat vegan vs “conventional” diet

No calorie limits

No exercise

No food provided





Typical Day's Meals

Breakfast

Blueberry pancakes
or Oatmeal with cinnamon and raisins
Half cantaloupe
Rye toast with jam

Lunch

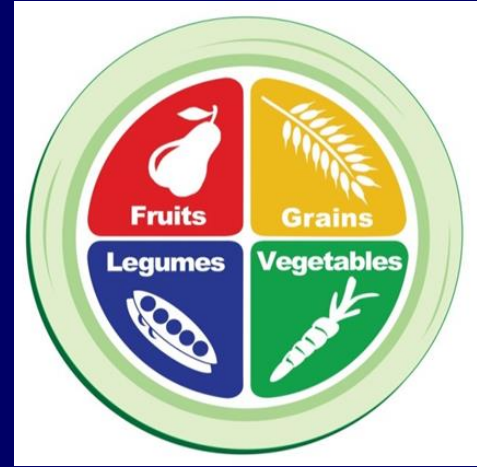
Chunky vegetable chili
Garden salad with sesame dressing

Snack

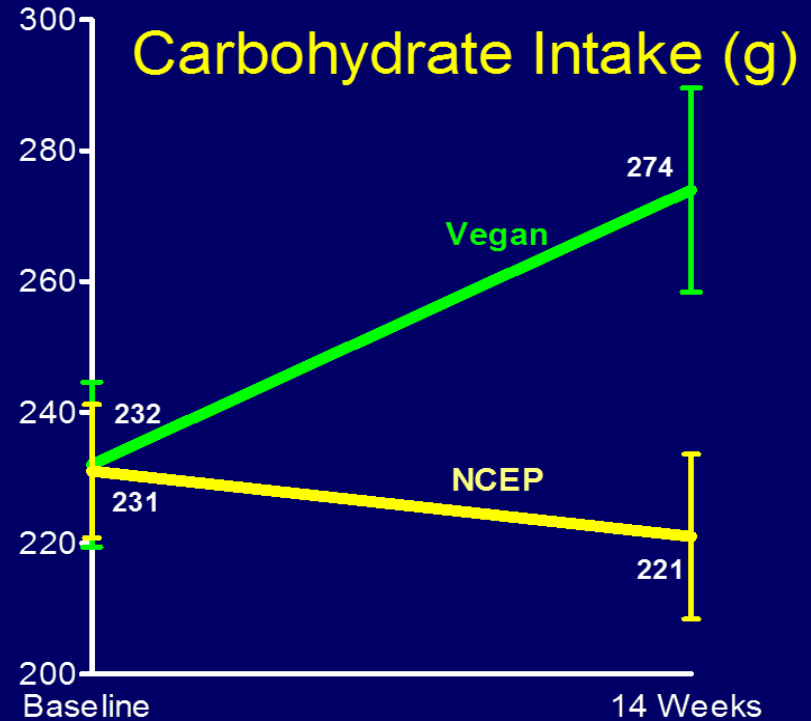
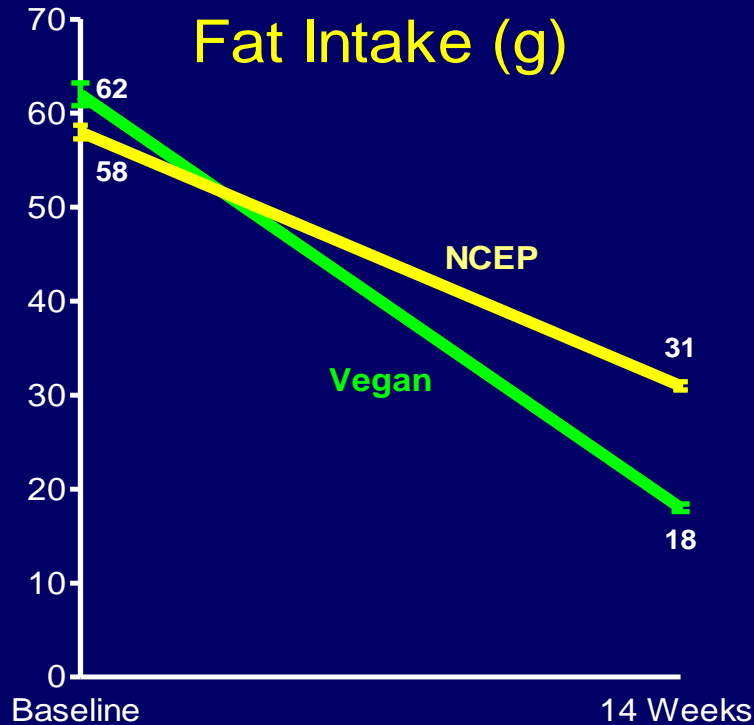
Banana

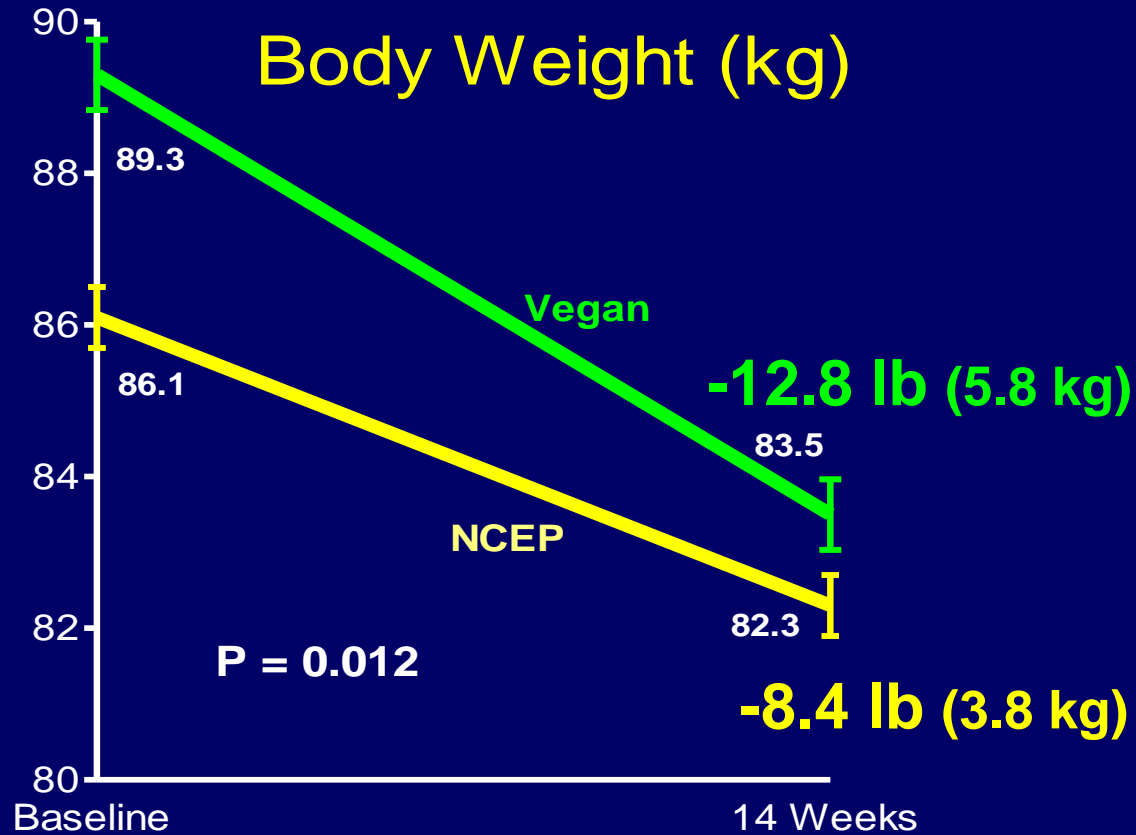
Dinner

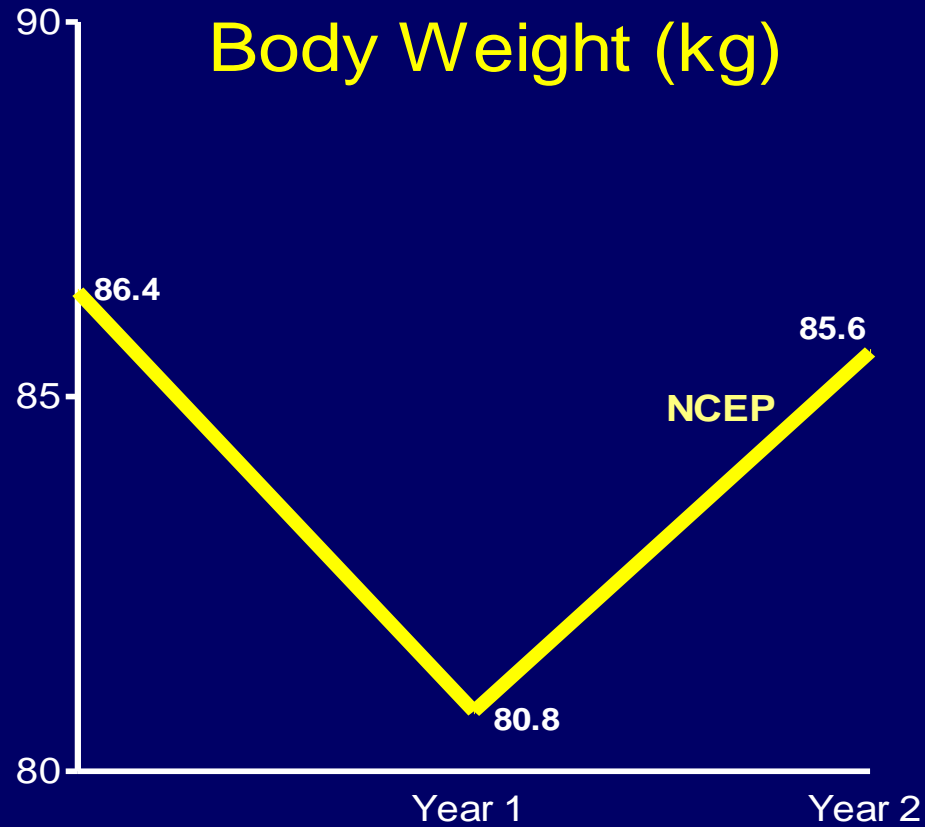
Lentil soup with crackers
Linguine with artichoke hearts and seared oyster mushrooms
Steamed broccoli



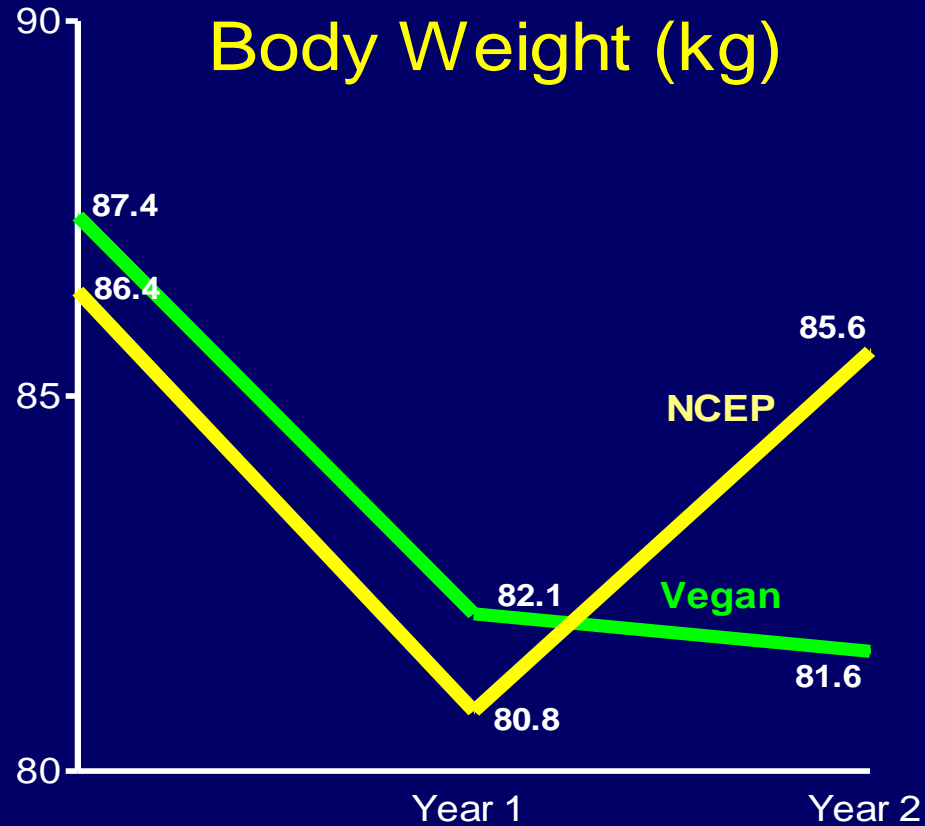
Nutrient Intake







Intention-to-treat model, last value brought forward.
Turner-McGrievy. Obesity 2007;15:2276-81.



Intention-to-treat model, last value brought forward.
Turner-McGrievy. Obesity 2007;15:2276-81.

Mechanisms

- ↑ fiber



- fat (9 kcal/g) → carbohydrate (4 kcal/g)

The After-Meal Calorie Burn



Barnard ND. Am J Med 2005;118:991-997.

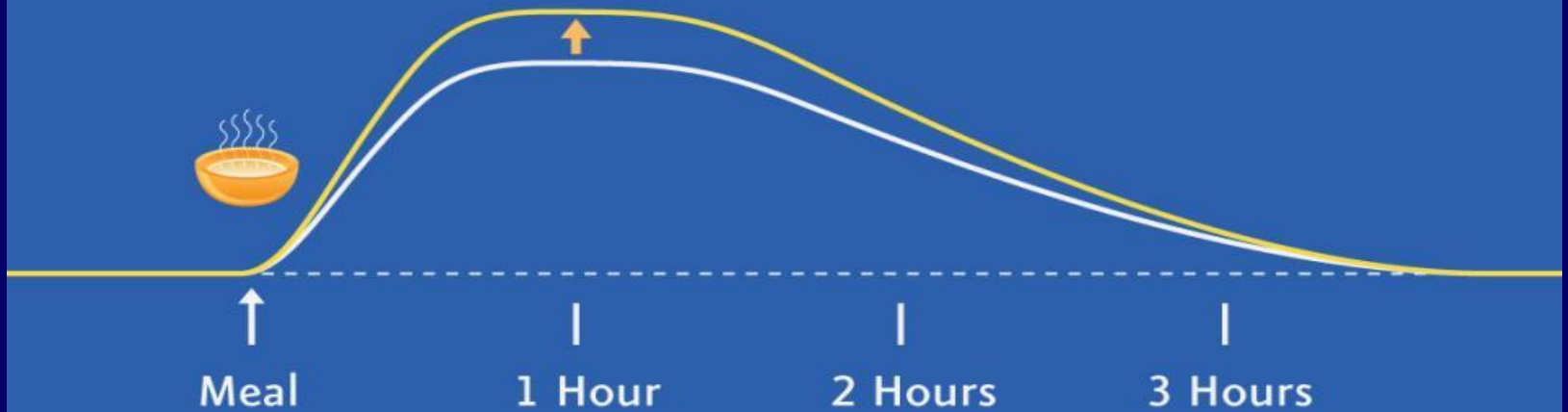


The After-Meal Calorie Burn



Barnard ND. Am J Med 2005;118:991-997.

The After-Meal Calorie Burn



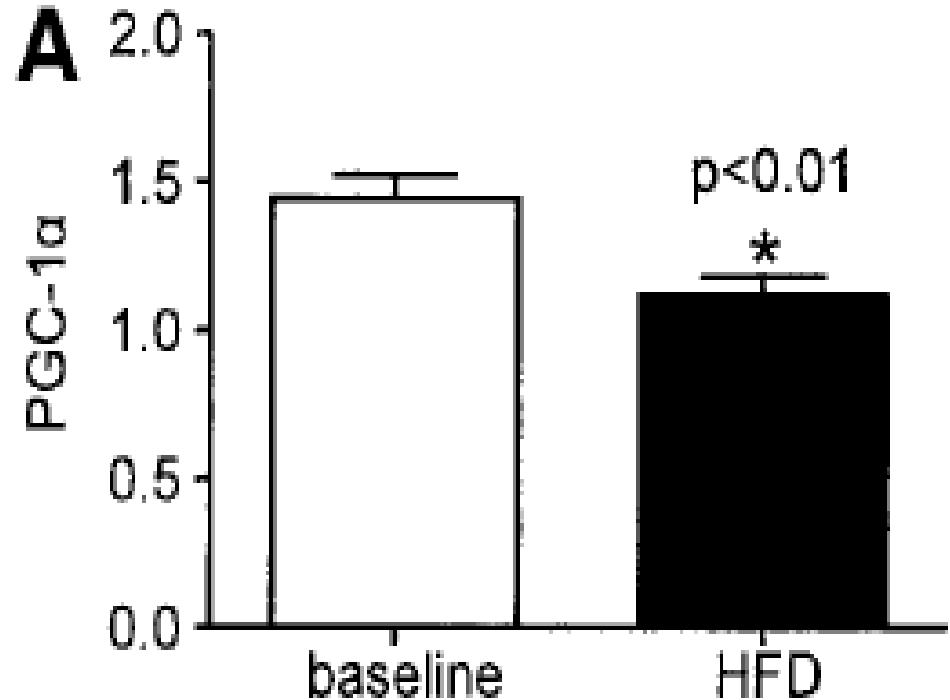
Barnard ND. Am J Med 2005;118:991-997.

Does fat slow metabolism?

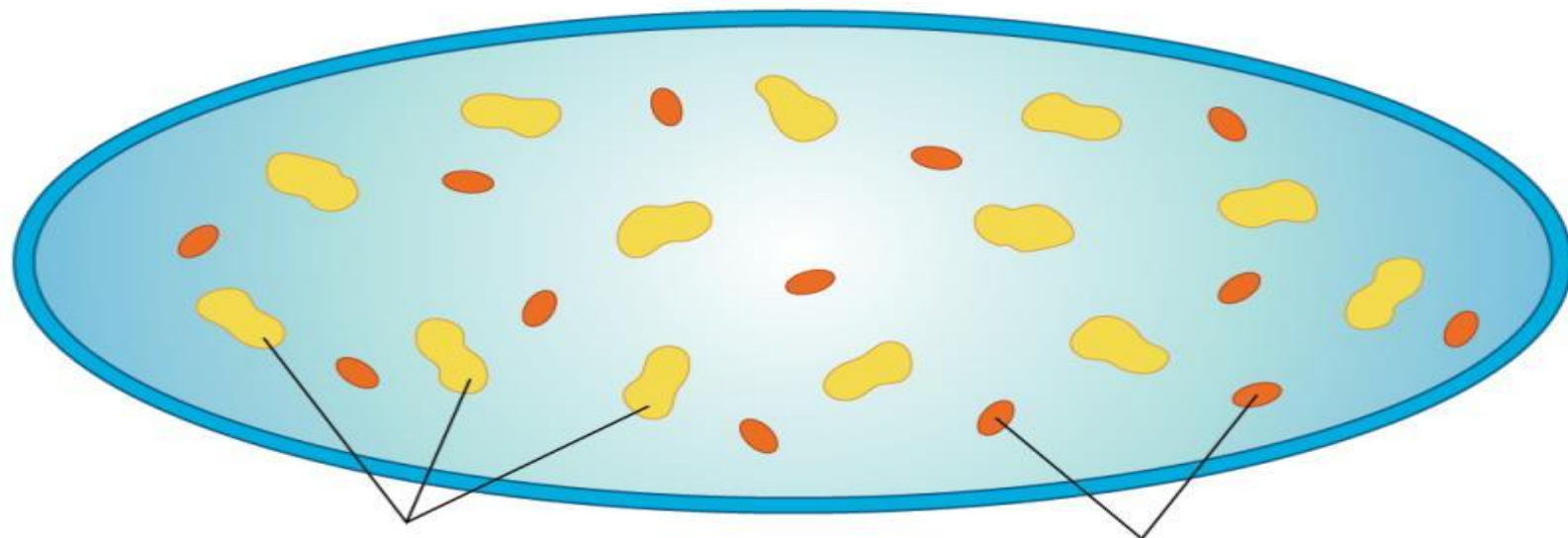
Fatty Diet Impairs Mitochondrial Biogenesis

Pennington Biomedical
Research Center

50% fat diet for 3 days

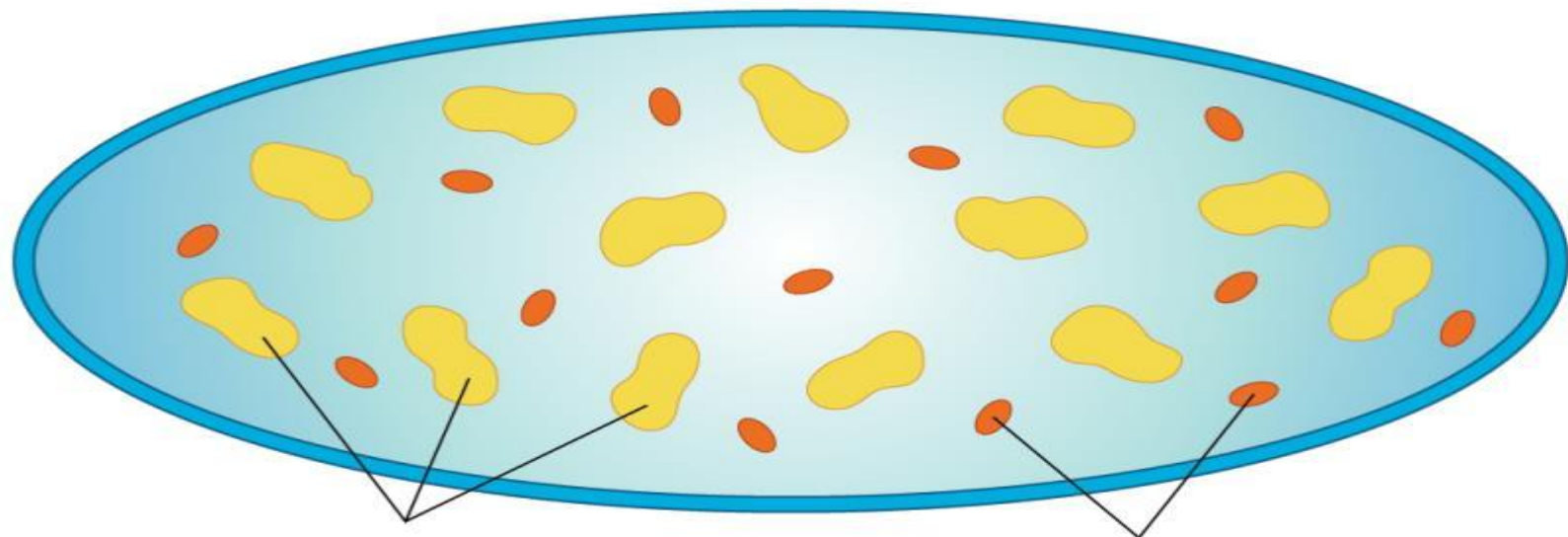


Sparks LM, et al. A high-fat diet coordinately downregulates genes required for mitochondrial oxidative phosphorylation in skeletal muscle, *Diabetes*. 2005;54:1926–33.



Intramyocellular lipid

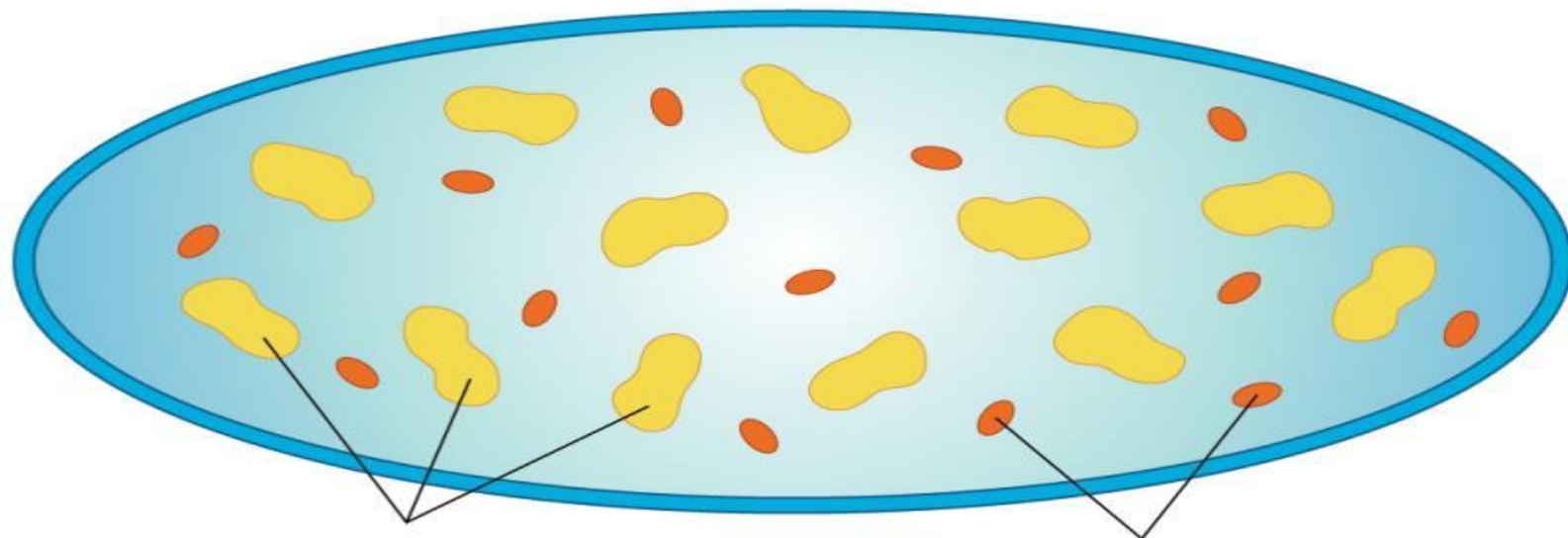
Mitochondria



Intramyocellular lipid

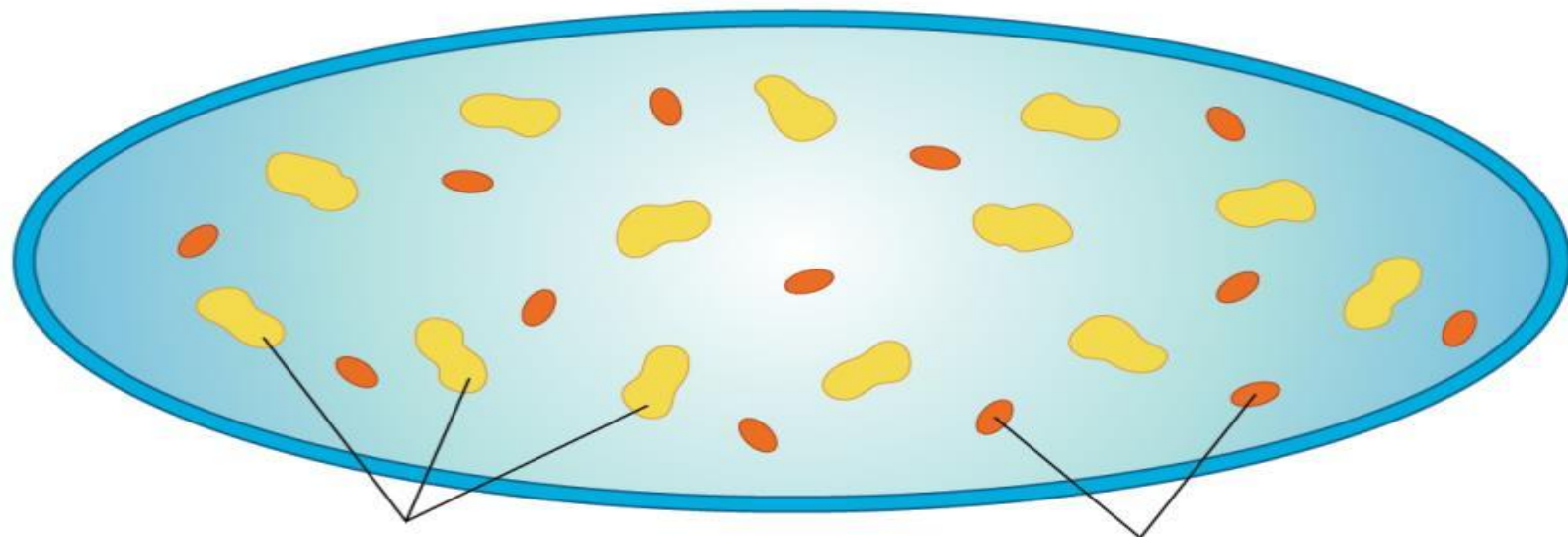
Mitochondria

Fat in cells slows your after-meal
calorie burn.



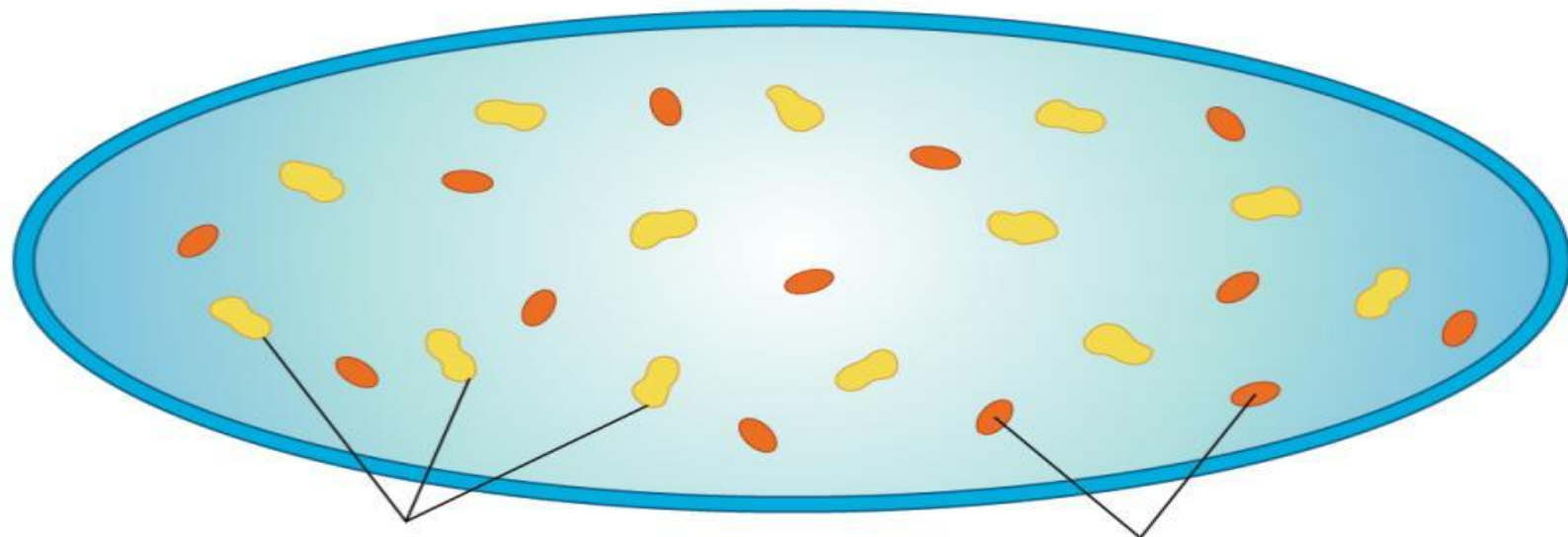
Intramyocellular lipid

Mitochondria



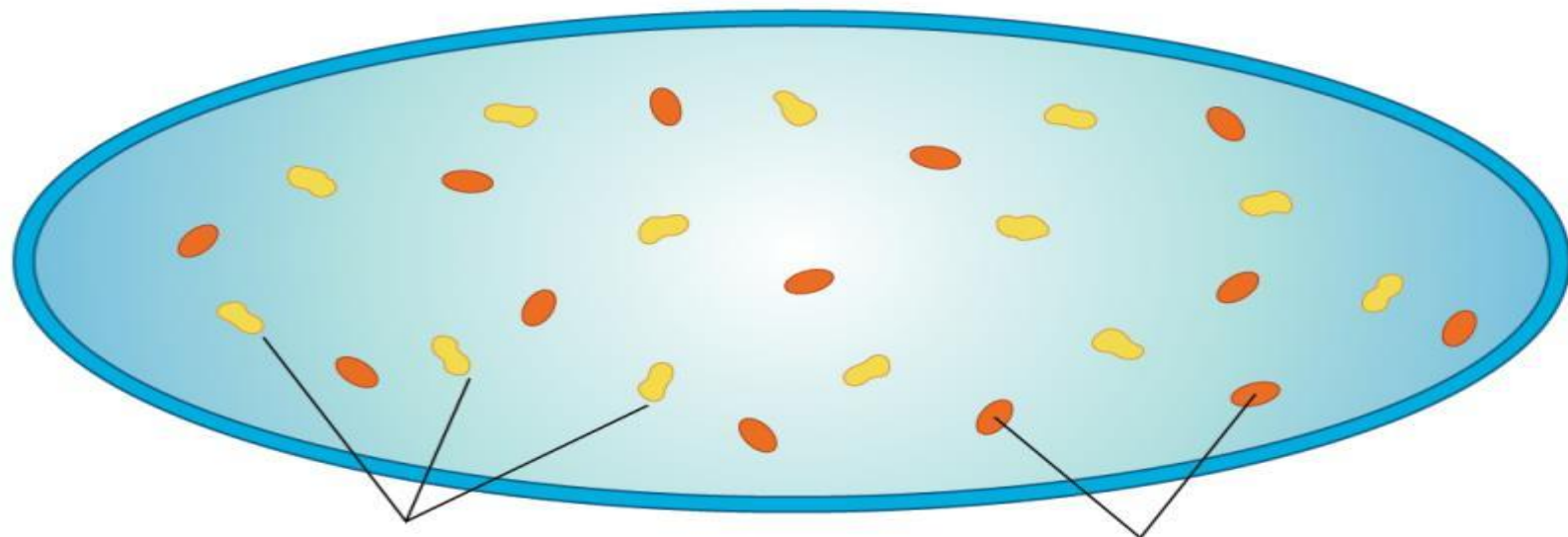
Intramyocellular lipid

Mitochondria



Intramyocellular lipid

Mitochondria



Intramyocellular lipid

Mitochondria

Getting fat out of cells boosts
your after-meal calorie burn.

Randomized 74-Week Trial in Type 2 Diabetes

“Conventional diet” vs Plant-based diet

Barnard ND, Cohen J, Jenkins DJ, et al. A low-fat, vegan diet improves glycemic control and cardiovascular risk factors in a randomized clinical trial in individuals with type 2 diabetes. *Diabetes Care* 2006;29:1777-1783.

Barnard ND, Cohen J, Jenkins DJ, et al. A low-fat vegan diet and a conventional diabetes diet in the treatment of type 2 diabetes: a randomized, controlled, 74-week clinical trial. *Am J Clin Nutr* 2009;89(suppl):1588S-96S.

Dietary Interventions

“Conventional”:

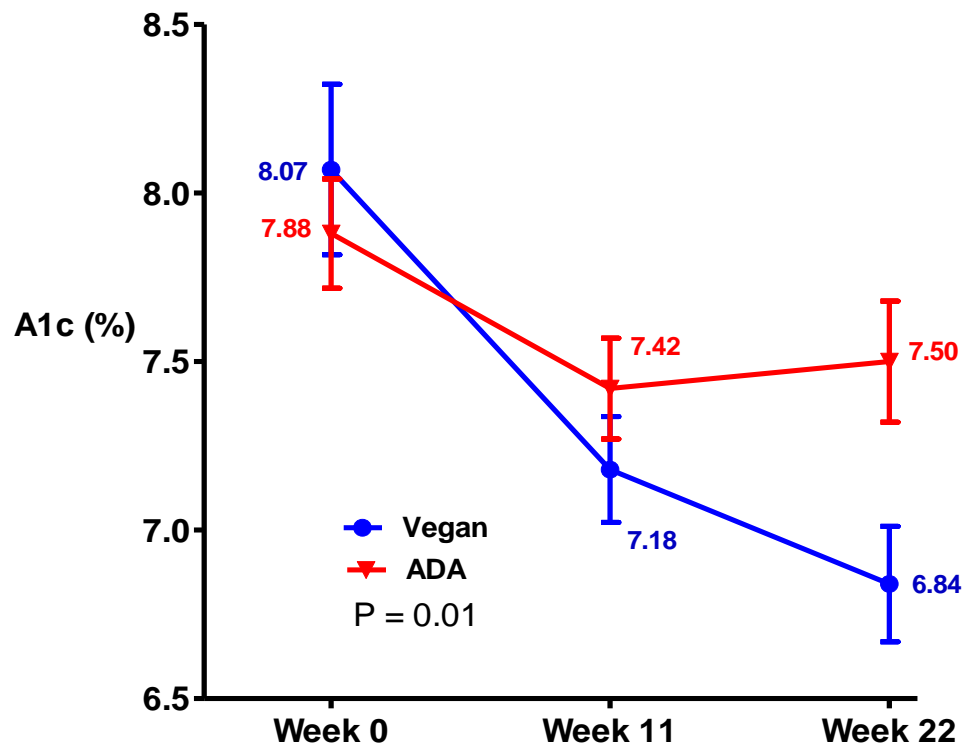
1. Limit calories
2. Keep carbohydrate steady
3. Limit “bad” fats

Plant-based:

1. No animal products
2. Minimize oils
3. Low-Glycemic Index

Hemoglobin A1c at Baseline and at 11 and 22 Weeks

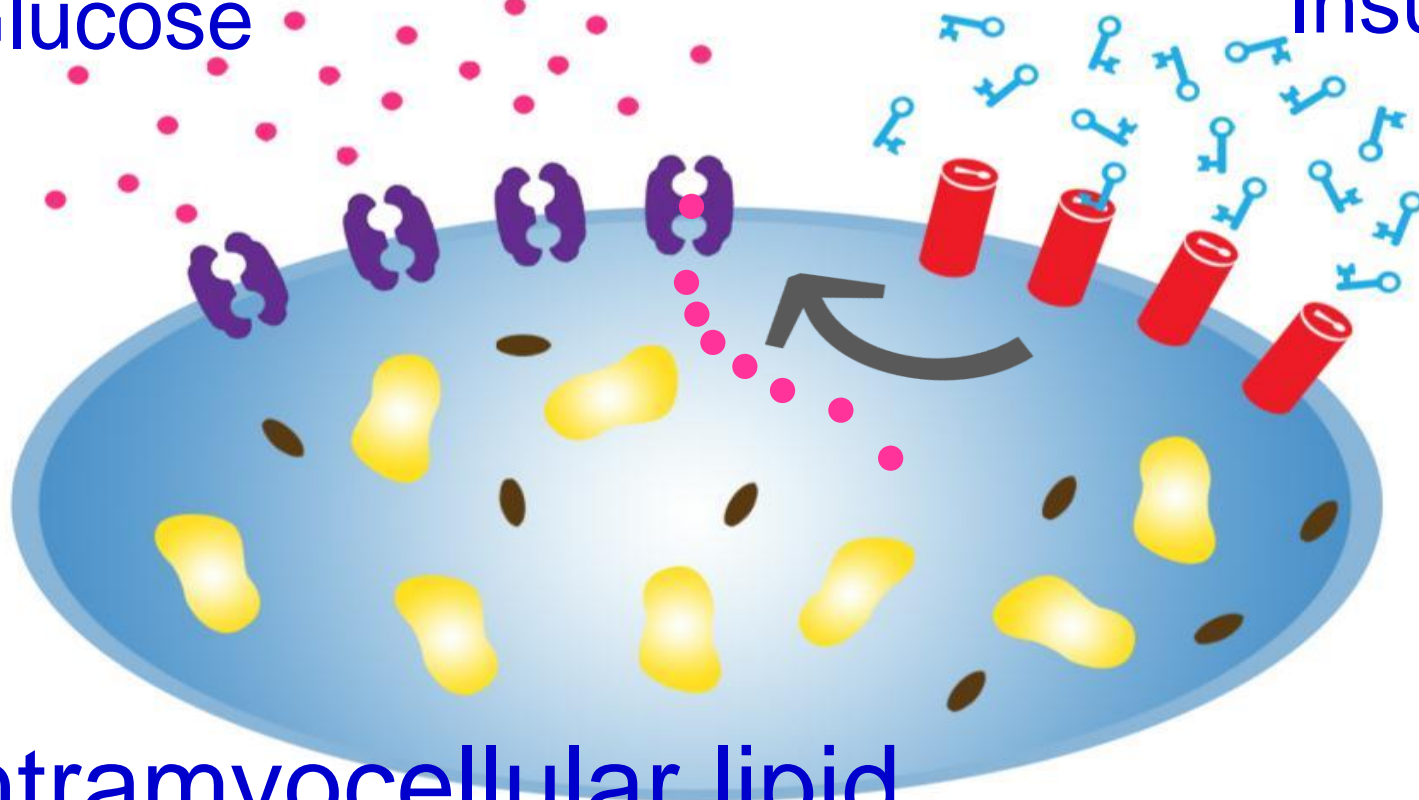
Individuals with no medication changes, n = 24 vegan, 33 ADA



Inside the Cell

Glucose

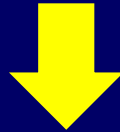
Insulin



Intramyocellular lipid

Offspring of Patients with Type 2 Diabetes

26 healthy volunteers



Glucose-tolerance test



Insulin sensitive
n = 14



Insulin-resistant
n = 12

Petersen KF, Dufour S, Befroy D, Garcia R, Shulman GI. Impaired mitochondrial activity in the insulin-resistant offspring of patients with type 2 diabetes. N Engl J Med. 2004;350:666-73.

Offspring of Patients with Type 2 Diabetes

Insulin sensitive

controls

Insulin-resistant

Parent or grandparent with
diabetes

Age

28y

26y

Weight

132 lb (60 kg)

141 lb (64 kg)

A1C

5.1%

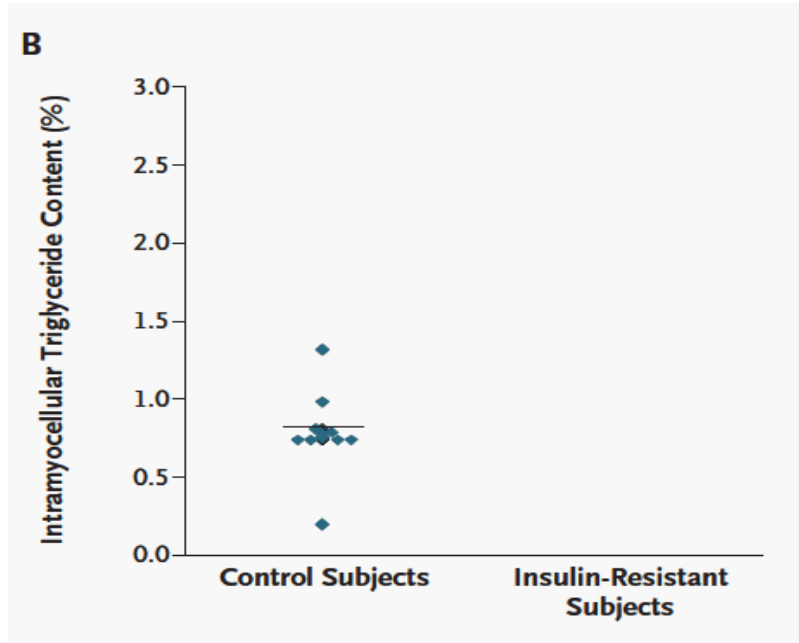
5.2%

Petersen KF, Dufour S, Befroy D, Garcia R, Shulman GI. Impaired mitochondrial activity in the insulin-resistant offspring of patients with type 2 diabetes. N Engl J Med. 2004;350:666-73.



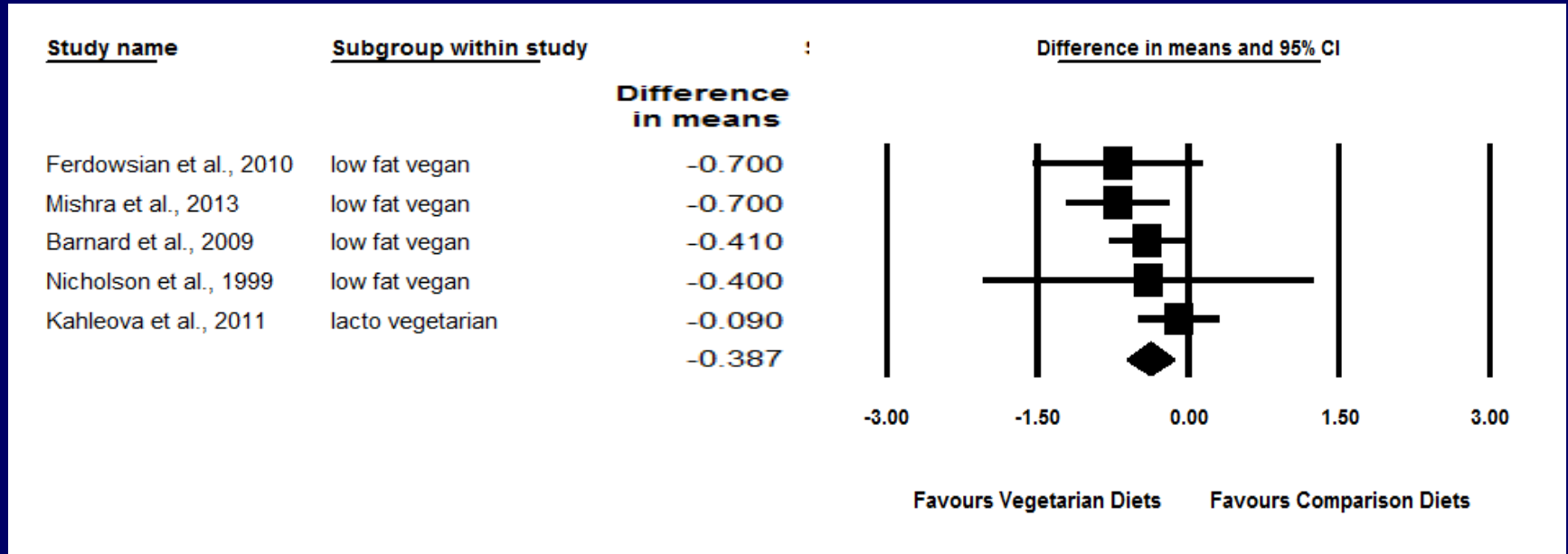
Intramyocellular lipid

Mitochondrial activity



Petersen KF, Dufour S, Befroy D, Garcia R, Shulman GI. Impaired mitochondrial activity in the insulin-resistant offspring of patients with type 2 diabetes. N Engl J Med. 2004;350:666-73.

Meta-Analysis: Plant-Based Diets & A1C



Combined effect = 0.39

Yokoyama et al. Cardiovascular Diagnosis and Therapy. 2014;4(5):373-82.



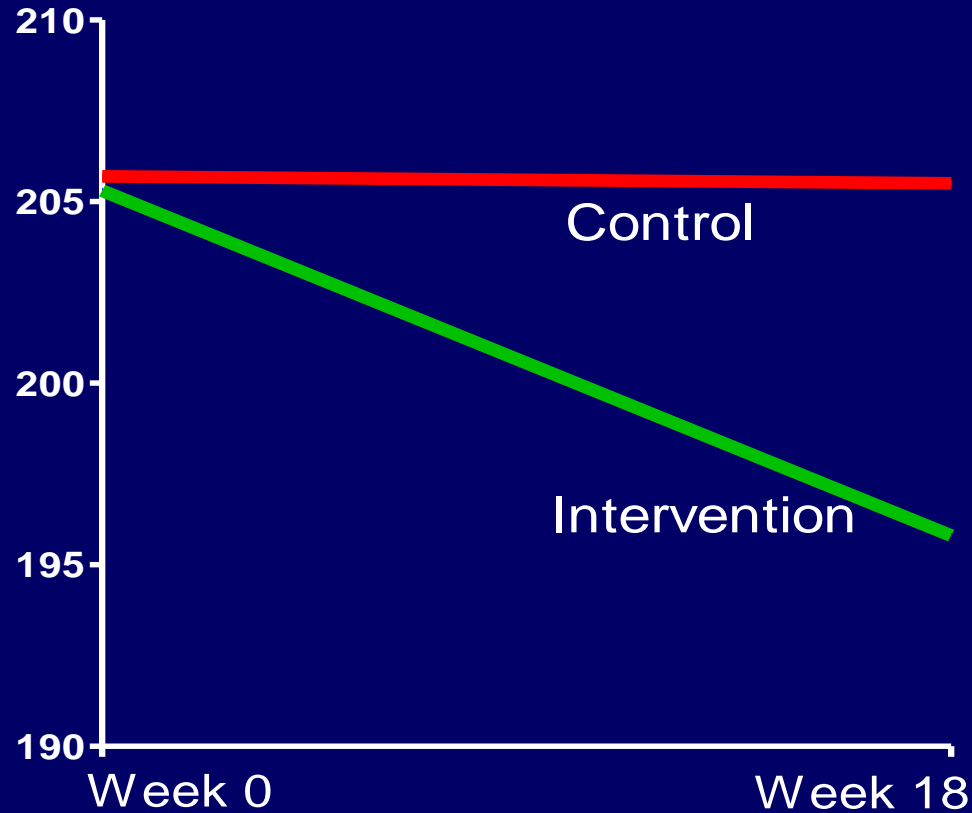
There were a few missteps along the way...

Vegan Burger with Bacon &
Cheese

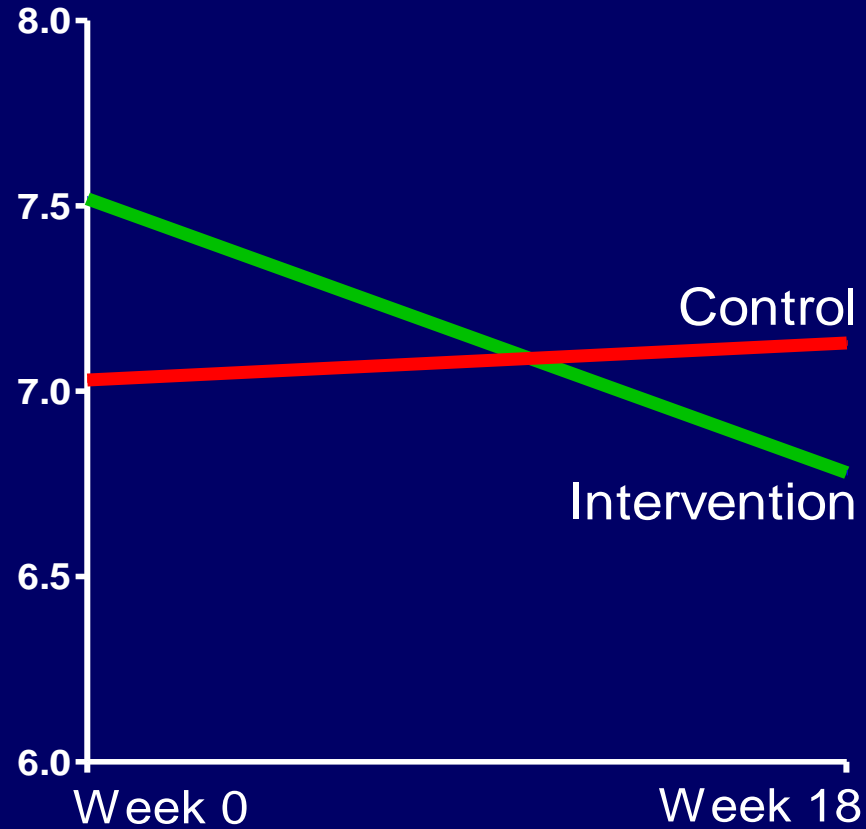
*Quarter pound vegan burger topped with bacon
and cheese on kaiser served with your choice of
two house sides*

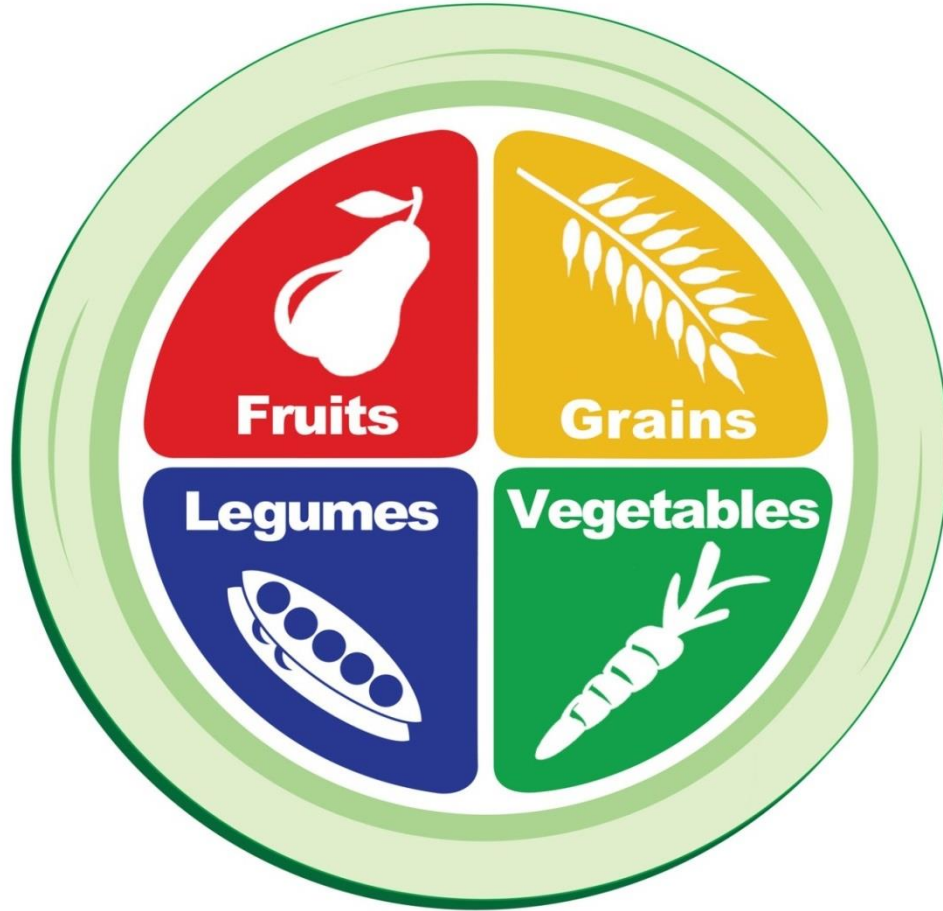
\$5.99

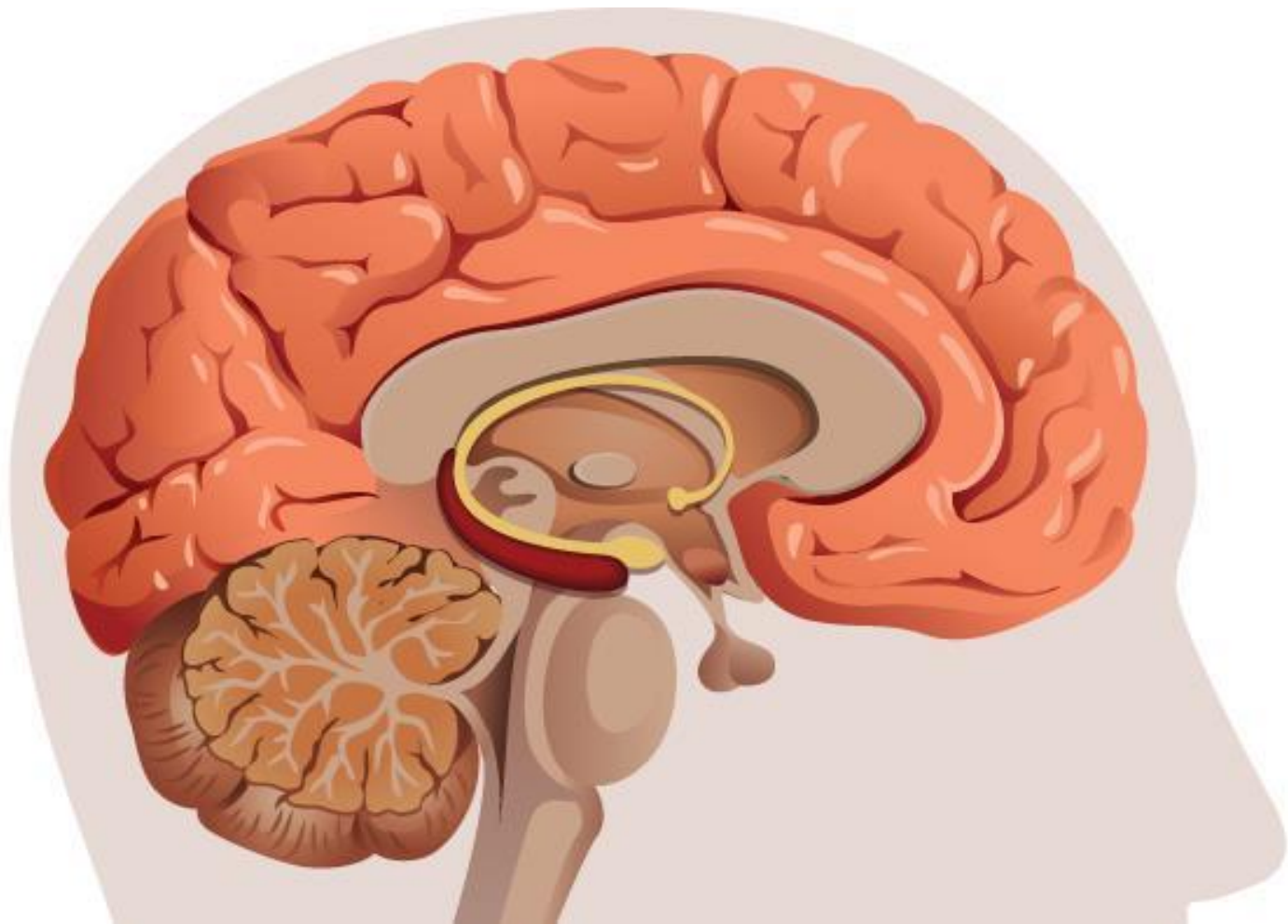
Body Weight (pounds)

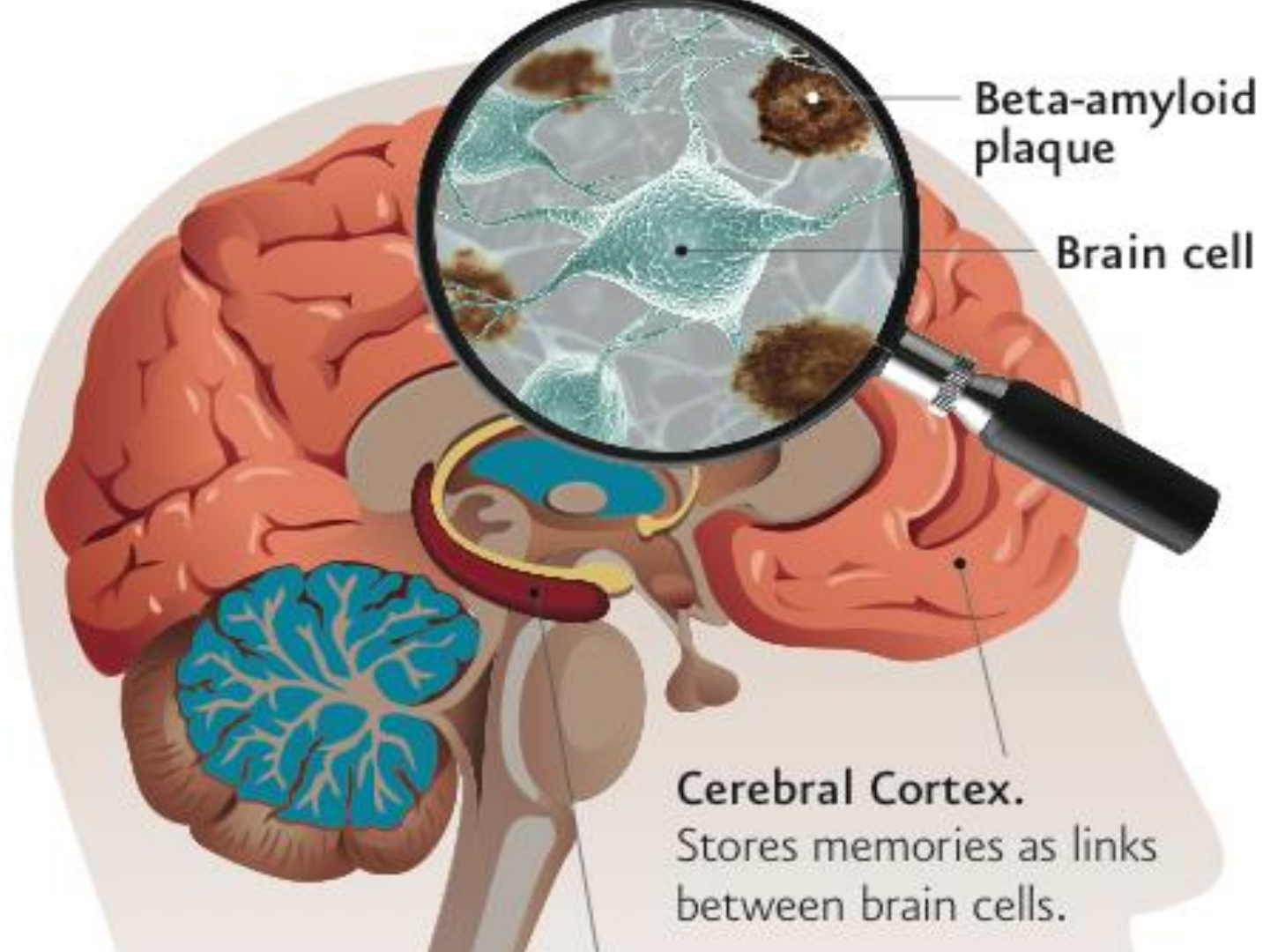


Hemoglobin A1c





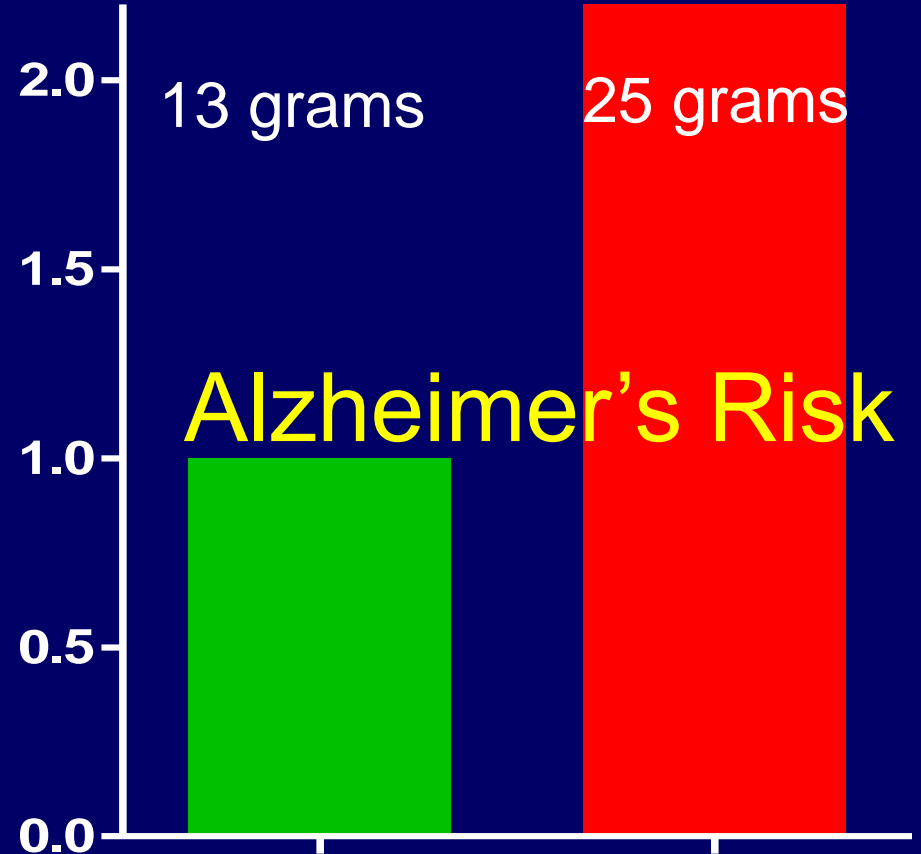




Chicago Health and Aging Project



Saturated Fat



Trans Fats



Low:
1.8 grams

High:
4.8 grams

Alzheimer's Risk



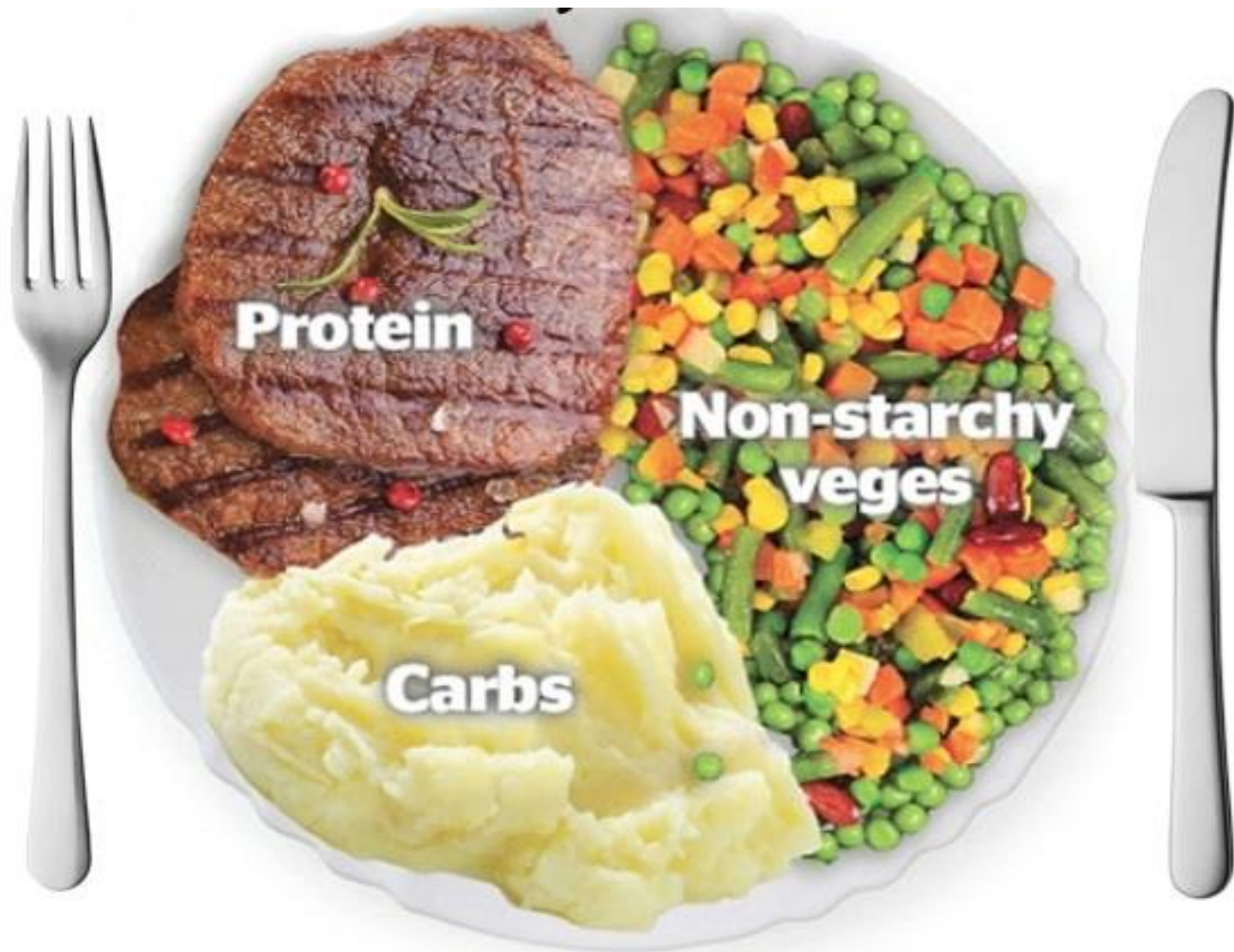


“Where do you get your protein?”

Protein Requirements

Women: 46g

Men: 56g



Protein in Everyday Foods

In 2000 calories:

Broccoli	146
Lentils	157
Corn	79
Oatmeal	62
Carrots	49
Blueberries	48
Brown rice	43
Potato (skinless)	42

Calcium (mg/cup)

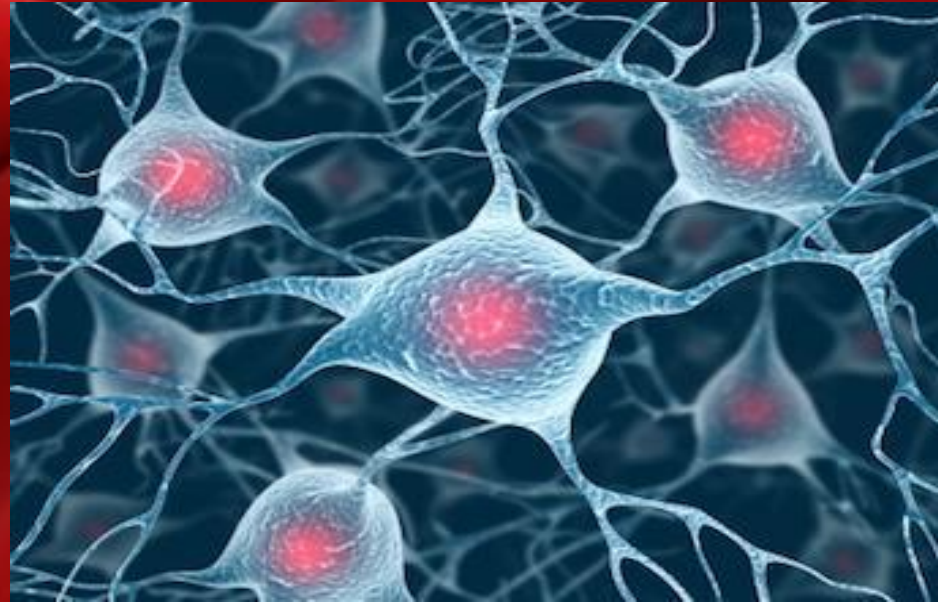
Broccoli	94
Collards	358
Kale	94
Mustard greens	150
Swiss chard	102
Spinach	(244)

Vitamin B12 (cobalamin)

Healthy blood cells

Healthy nerves

RDA: 2.4 mcg



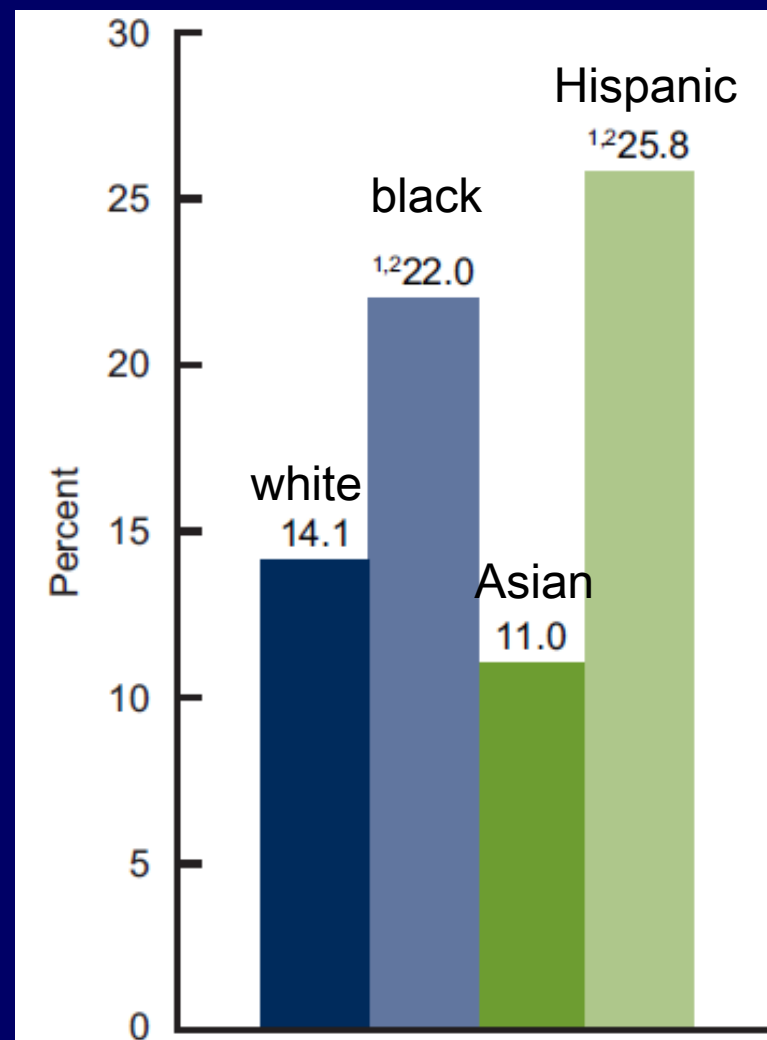
What about children?

CDC on Childhood Obesity

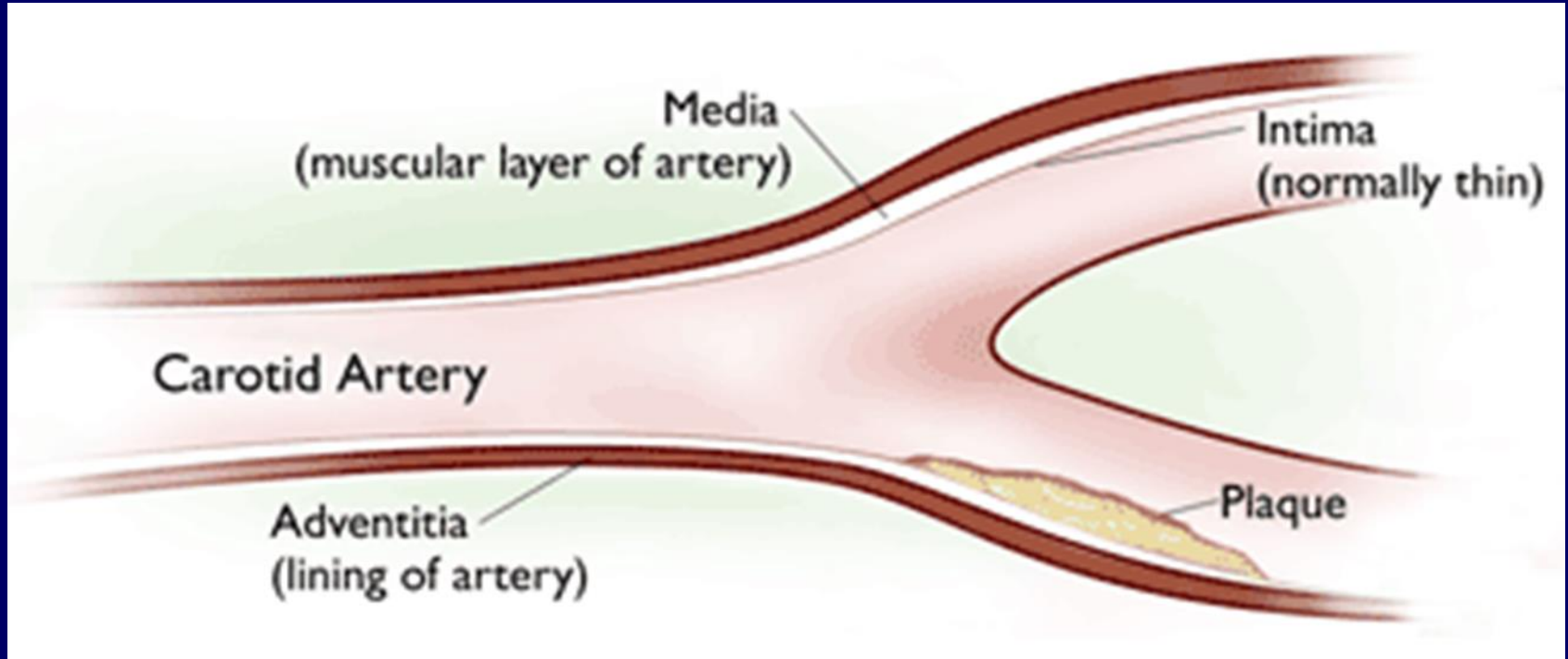
18.5% of children are
obese.

National Center for Health Statistics. Prevalence of
Obesity Among Adults and Youth: United States, 2015–
2016

<https://www.cdc.gov/nchs/data/databriefs/db288.pdf>



Heart Disease at Birth?



Heart Disease at Birth?

University of Sydney

23 women and their newborns

Aortic thickness: 0.65mm to 0.97mm

Babies born to overweight mothers had 0.06mm thicker aortic walls.

Combat Childhood Obesity

- Introduce healthful foods at a young age
- Work with your school's food service director to add plant-based options
- Be a healthy role model

Why Plant-Based Meals?

Fiber, vitamins, minerals

Low in saturated fat, no cholesterol

Reduce risk for diet-related diseases

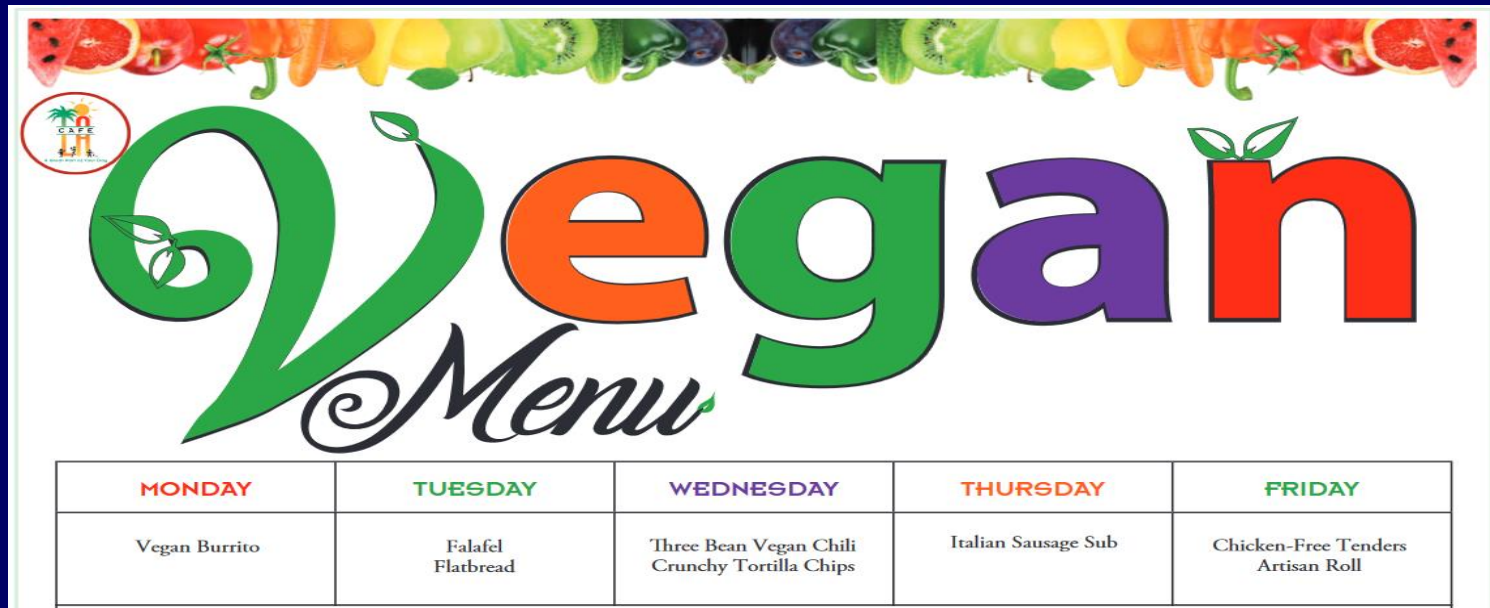
Successful Schools: NYC

- ✓ Meatless Mondays
- ✓ 4 fully vegetarian schools
- ✓ Daily plant-based option at every school



Successful Schools: Los Angeles

Vegan pilot program in 14 schools



Successful Schools: Santa Barbara

50% of meals are vegan

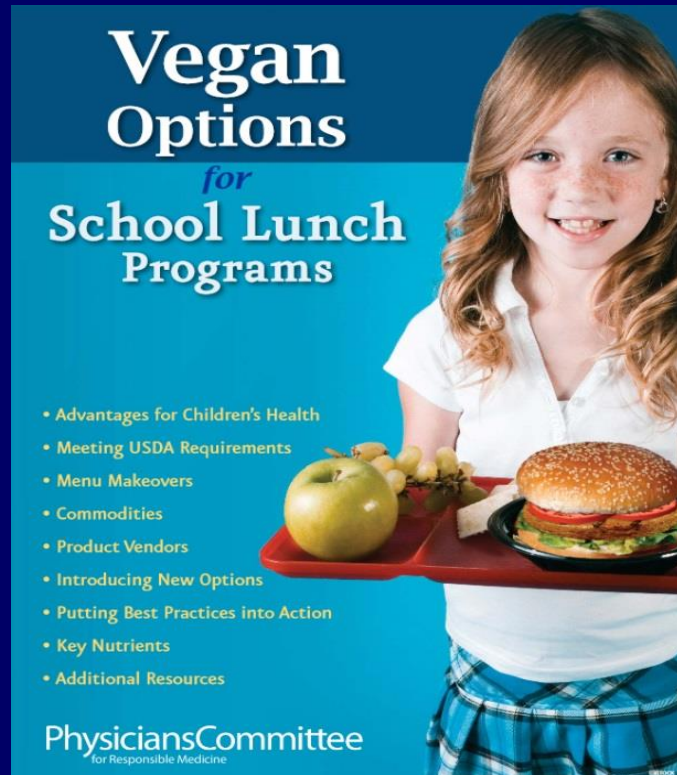
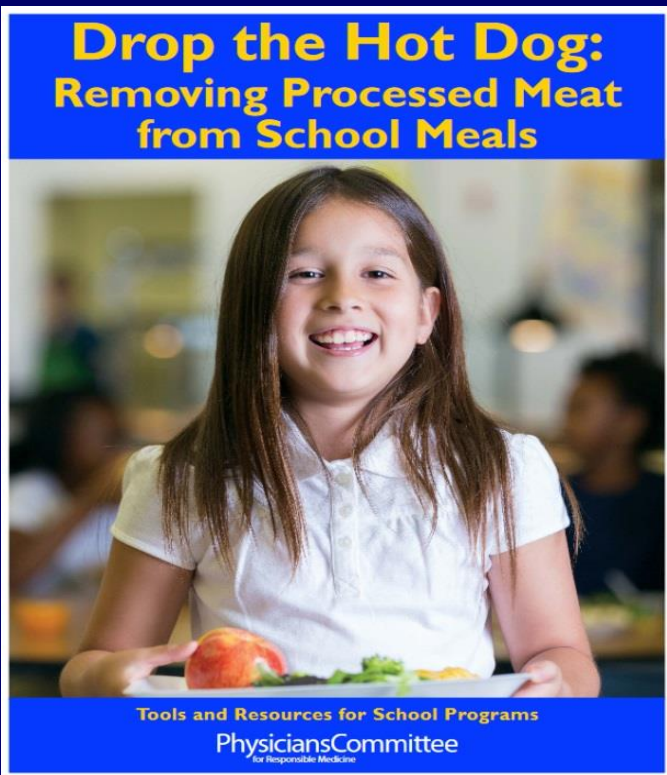
No processed meats



Santa Barbara Unified
School District Becomes
First in the U.S. to
DROP PROCESSED MEAT!

Resources and Recipes

HealthySchoolLunches.org

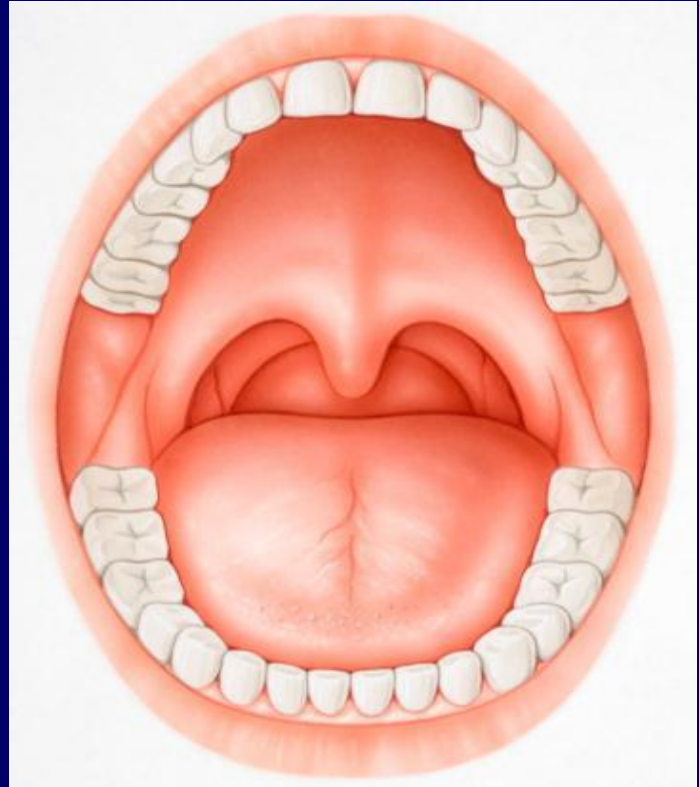


What is the Natural Diet of
Human Beings?





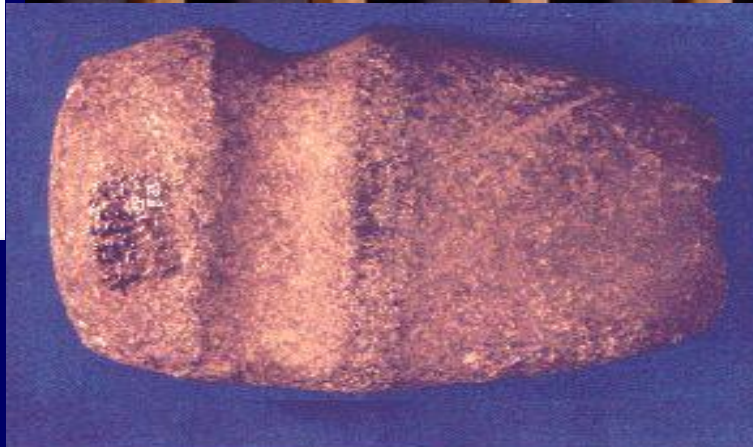
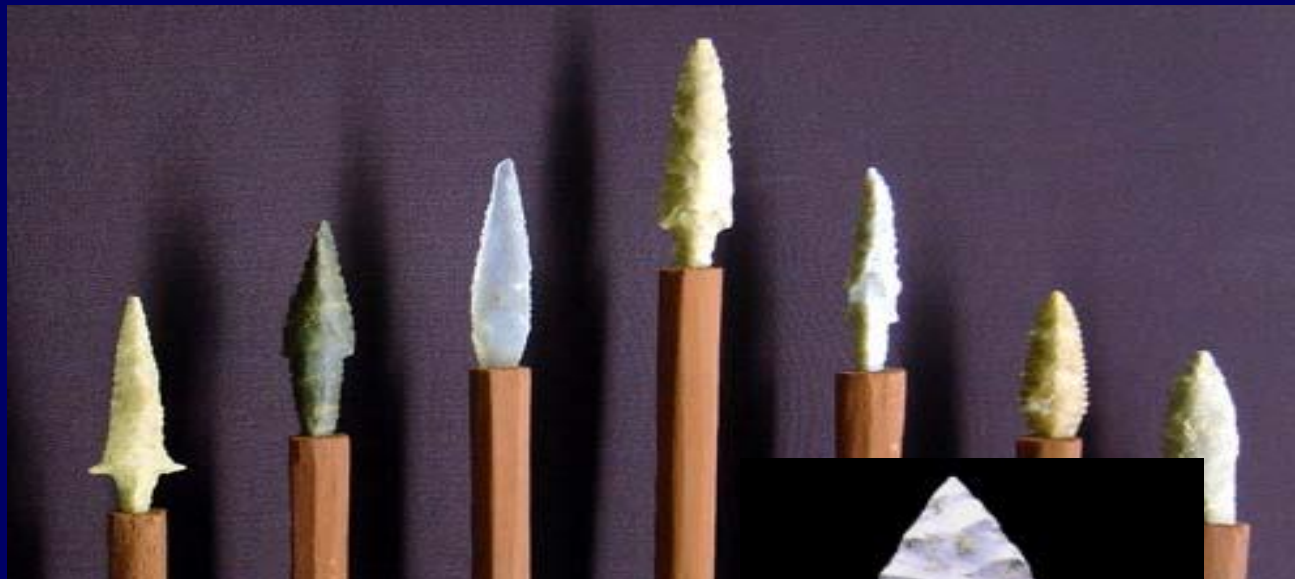
The Dental Test

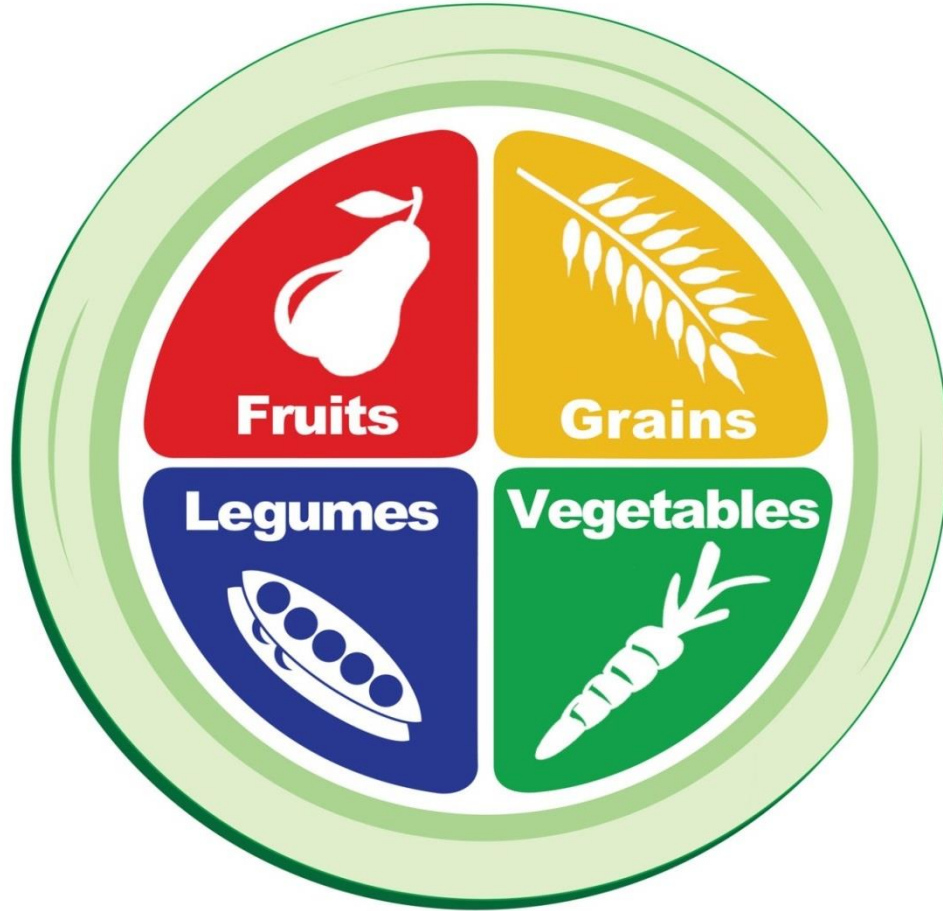


The Bunny Test









Starting a Healthful Diet

Step 1. “Check out the possibilities”

Foods to Try this Week

Breakfast

Lunch

Dinner

Snack

Healthy Breakfasts

- Cinnamon Raisin Oatmeal
 - Blueberry Pancakes
- Bran Flakes with Almond Milk
- Veggie sausage, veggie bacon
 - Breakfast Scrambler
 - Fantastic Fruit Smoothie
- Whole-Grain Bagel with Jam
 - Swiss Style Muesli
- Slow Cooker Whole-Grain Porridge
 - Orange-Pineapple Crush

Lunches and Dinners

- Veggie Pizza
- Chunky Vegetable Chili
- Bean Burrito
- Veggie burgers, veggie hot dogs
 - Mandarin Stir-Fry
- Portobello Mushroom Steaks
- Oven-Barbecued Tofu Steaks
 - Sweet & Sour Tempeh
- Southern Beans & Greens
 - Seitan Cassoulet
- Stuffed Vegetable Rolls

Italian Cuisine



Latin American Cuisine



Chinese Cuisine



Japanese Cuisine



Fast-Food Options



Veggie sub



Bean burrito, hold the cheese

Foods to Try this Week

Breakfast

Cornflakes with almond milk
Oatmeal with blueberries
Veggie sausage
Scrambled tofu w/ mushrooms

Lunch

Veggie sub
Split pea soup
Black bean chili

Dinner

Angel hair pasta arrabbiata
Veggie burger
Cucumber sushi (at restaurant)

Snack

Bananas, apples, oranges
Papayas, mangos
Low-fat hummus w/ crackers

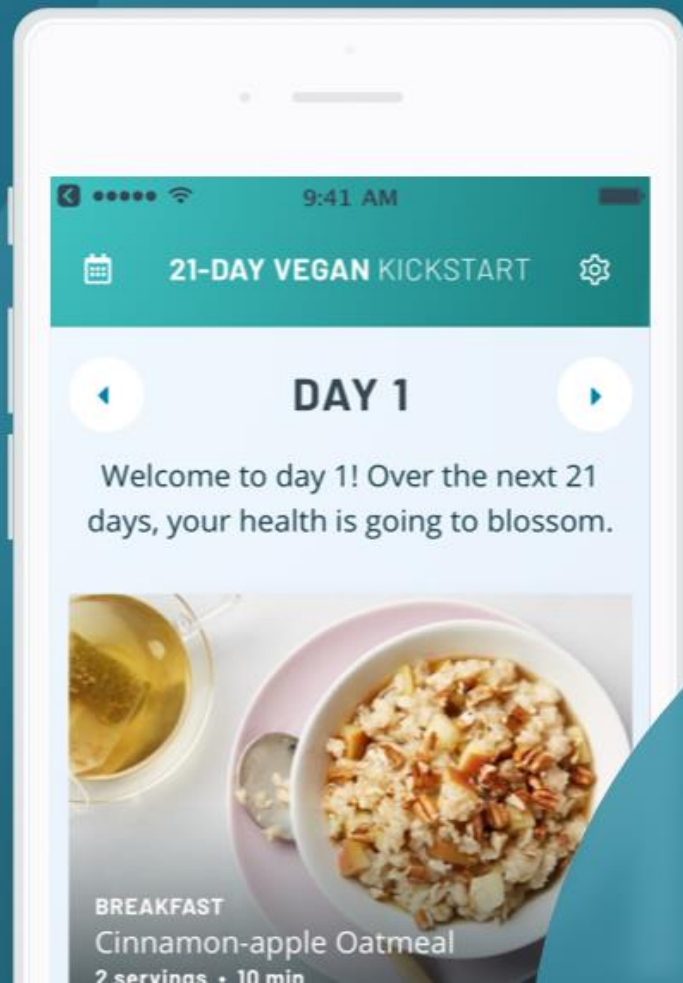
Beginning a Healthful Diet

Step 1. “Check out the possibilities”

Step 2. A 3-week “test drive”

Kickstart Your Health

Download the free 21-Day Vegan Kickstart app or sign up online.



GET HEALTHY WITH THE **21-DAY VEGAN** KICKSTART

BREAKFAST



LUNCH



SNACK



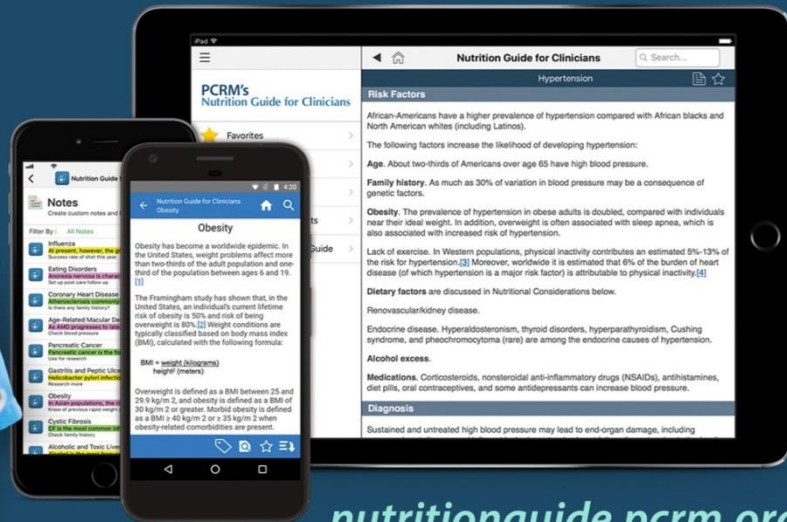
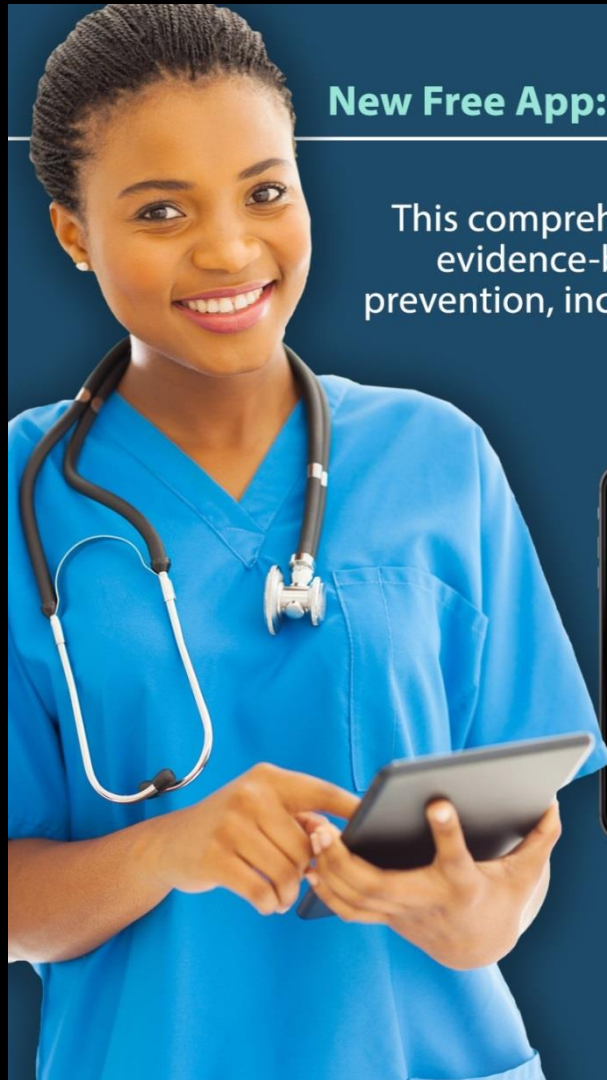
DINNER



21DayKickstart.org

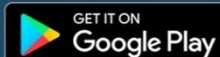
New Free App: *Nutrition Guide for Clinicians*, 3rd Edition

This comprehensive medical reference provides the latest evidence-based information on nutrition for disease prevention, including risk factors, diagnoses, and treatments.



nutritionguide.pcrm.org

PCRM's
Nutrition
Guide for
Clinicians



PhysiciansCommittee
for Responsible Medicine

NutritionCME

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International Conference on Nutrition in Medicine 2020

Grand Hyatt Washington

August 6, 2020—August 8, 2020

Thank you!

Physicians Committee

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