Lecture #10
Dietary Approaches to Weight Loss and Reducing CardioVascular Risks

Gabe Mirkin, M.D.
Monday, October 2, 2017
9:55 – 10:15 AM
WHAT you eat may be more important than HOW MUCH you eat

- Your gut can absorb only single sugars, single & chains of amino acids & fatty acids
- More than 13 trillion bacteria in your colon produce enzymes that break down carbohydrates, fats & protein into their basic absorbable building blocks, mostly monosaccharides and short-chain fatty acids.
Only Single Sugars Are Absorbed

Cellulose

Glucose Glucose Glucose Glucose

Amylase Cannot Reach the Bond!
Only 4 Sugars Are Absorbed

Glucose  Mannose  Galactose  Fructose
Only one sugar passes into circulation

D-glucose
20 Feet of Small Intestines, 5 Feet of Colon

• Intestinal enzymes break down chains of sugar into single sugars.
• You lack the enzymes necessary to absorb most carbohydrates
• Bacteria in your colon can have the enzymes to break down and absorb carbohydrates from your Colon.
Gut Bacterial ENZYMES Determine Obesity

90% of gut bacteria are Bacteroidetes and Firmicutes.

- Firmicutes increase absorption more than Bacteroidetes.
- Obese humans and rats have more Firmicutes than Bacteroidetes

Colon Bacteria: Obesity & Diabetes

BAD FIRMICUTES make acetates associated with obesity and diabetes
Enter gut endothelial cells to cause inflammation and insulin resistance
Clin Ther. 2015;37(6):1172-1177

GOOD BACTEROIDES convert fiber to Short chain fatty acids (butyrate) that reduce inflammation and insulin resistance
Feces from Fat & Normal Monozygotic Human Twins

- Feeding feces from fat twin made germ-free mice fat
- Feeding feces from normal-weight twin did not affect weight

Science. 2013;341(6150):1204-1214
Treat Obesity with Unrefined Carbohydrates

Eating a plant-based diet **and** restricting **refined carbohydrates** is a safe & effective way of changing colon bacteria to control obesity & high blood sugars

*Gut Microbes. Jan-Feb, 2012;3(1):29-34*
Right-side colon cancer is far more likely than left-sided to spread and kill.

Colon cancer is associated with red meat and sugared foods and drinks. Bacteria in your right colon eat the same food that you do. Bacteria in your left colon eat what's left over from what the right-side bacteria eat.

PLoS ONE. Dec 6, 2016;11(12):e0167540
Whole Foods Not Components

• Cholesterol and saturated fats may not be harmful any more (TMAO, Choline, Lecithin, Neu5Gc)

• Sugar is safe in fruits and harmful when added to foods and drinks (Galactose, Fructose)

• Cooking without water forms potent carcinogens (Advanced Glycation Endproducts called AGEs)
The Same Foods That Increase Risk For Diabetes Also Increase Risk For Cancers, Heart Attacks & Death

red meat          sugared drinks  sugared foods  fried foods
Healthful Diet Defined By Foods, Not Nutrients

“Your blood sugar is too high, but your salt, pepper, ketchup, mustard, and grated cheese levels are fine.”

“Your blood sugar is too high, but your blood salt, pepper, catchup, mustard and grated cheese are fine.”
Healthful Diet

Eat Lots of
Fruits
Vegetables
Nuts
Whole grains
Healthful Diet

RESTRICT

• Red Meat
• Sugared Drinks
• Sugar-Added Foods
• Fried Foods

Overweight or Diabetic

• Processed and refined CHO
Healthful Diet

Controversial

Eggs (choline, lecithin TMAO)

Dairy (galactose)

Chicken (animal protein)

Fish (oxidized W-3s & animal protein)
Blood sugar > 140 after meals causes cell damage. *Diabetes Care.* 2001;24 (8):1448-1453
Normal Fasting Blood Sugar does not Rule out Diabetes

Articles showing that people whose blood sugar >140 one hour after meals are at increased risk for all the side effects of diabetes and arteriosclerosis

Review: Non-diabetics With High Blood Sugar Levels

16 studies/ 900,000 people: 15% increased risk for cancers of breast, colon, liver, stomach, pancreas and endometrium (Diabetologia, September 8, 2014).

Insulin increases cancer risk (JCI May, 2013;4(3))
Fruits and vegetables are Healthful


fruits, vegetables (including olives), whole grains, beans, seeds, nuts, fish, and up to two glasses of red wine a day. No red meat and limited dairy.

Sugar Added to Foods Harmful

Sugar in fruits are protected by antioxidants, fiber & nutrients

http://drmirkin.com/nutrition/dangers-of-processed-foods.html
**TABLE SUGAR HARMFUL**
Sugar not used for energy or stored as glycogen is converted to triglycerides, that fill liver to block insulin receptors to cause **HIGH BLOOD SUGAR**

**FRUIT HEALTHFUL**

* soluble fiber slows absorption of sugar.
* antioxidants prevent inflammation that causes insulin resistance
How Fatty Liver Causes Diabetes

HEALTHY LIVER: When blood sugar rises, insulin drives sugar into liver cells

FATTY LIVER:
* not accept sugar from blood &
* makes new glucose from fat

Get a liver sonogram to determine if your patients have high blood sugar levels.
Sugared Drinks Associated with Metabolic Syndrome

Elevated fasting insulin levels increase risk of abdominal obesity

Maturitas. April 2017;98:1–6
High triglycerides, Low HDL
Abdominal Obesity, Fatty Liver

High blood GLUCOSE ⇔ High INSULIN ⇔
Convert glucose to triglycerides (HIGH TRIGLYCERIDES) ⇔ HDL carries triglycerides back to liver (LOW HDL) ⇔ FATTY LIVER ⇔ DIABETES
Sugared Drinks Associated with Increased Risk for

Sugared Drinks Cause Highest Rise in Blood Sugar

Fruit juices and sugared soft drinks are not stopped by the pyloric sphincter. They enter the intestines immediately to cause a rapid rise in blood sugar.

Quart. J. Med. Sept 18, 2015

An orange can stay in your stomach for 5 hours

JAMA. August 25, 2004
Fruit Juice is Sugar Water

How can I be sure I'm getting 100% pure orange juice?

Buy an orange!
For each increase of three ounces of red meat/day

• 16% increased risk of death from heart attacks,
• 10% increased risk from death from cancer,
• 12% increased risk of death overall.

Archives of Internal Medicine, November 12, 2012
Advanced Glycation End Products (AGEs)

Cooking without water causes sugar to attach to fat, protein, and nucleic acids to form AGEs that cause cancers. You eat them in food or form them in your body.

Nuts Full Of Fat, But Not Fattening

Fat in almonds inside cells.

*In mouth: Most almond cells remain intact after being chewed.

*In upper GI tract: fat is not absorbed.


*In colon: fat is released from cells by Bacterial fermentation and then absorbed.


(Roasting almonds not increase fat absorption)

Br J Nutr. 2014 Nov 14;112(9):1521-9
Nuts Are Healthful

1) associated with reduced likelihood of heart attacks, gallstones, diabetes, & cancer. 2) lower blood pressure & cholesterol, belly fat, & metabolic syndrome, 3) not associated with increased risk for gaining weight

Nutrients. 2010 Jul;2(7):652-82

4) almonds lower belly fat

J. Am Ht Assoc. pub online 1/11/15
Whole Grains prevent diabetes because they do not cause a high rise in blood sugar.

American Journal of Clinical Nutrition, online Dec. 12, 2012
Anatomy of a Whole Grain

- Bran layers (fiber)
- Endosperm (starch/carbohydrates)
- Germ or embryo (protein, fat, vitamins, minerals)
- Husk or hull (papery covering—removed)
Whole grains increase insulin sensitivity, help prevent diabetes & myocardial infarctions & lower cholesterol.

Current Opinion in Cardiology, 08/13/2015
MILK:
Galactose causes oxidative damage (8-iso-PGF2a) and chronic inflammation (serum interleukin 6) associated with diabetes, heart attacks, certain cancers, and bone loss (Biogerontology. 2004;5:317-25).
Galactose causes aging (short telomeres & DNA damage) in mice, rats, and Drosophila flies (J. of Neuroscience Research, 2006;84(3):647-654).
Most clients who lost weight at one year regained their lost weight in three years

*Annals of Internal Medicine.* April, 2015;162(7):501-512
The Biggest Loser

Contestants on the famous television program dropped an average of 129 pounds. Six years later, most regained more than 70% of their lost weight, largely because dieting decreased their ability to burn calories by 500 calories per day.

*Obesity*, published online May 2, 2016
More Effective Than Calorie Counting
A review of the literature shows that “intermittent Fasting” can lower blood sugar and fat levels, reduce high blood pressure, help people lose weight, and help to prevent and treat diabetes and heart attacks.

British Journal of Diabetes and Vascular Disease, April 2013
Nutrition Journal, Feb, 2014
Intermittent Fasting vs Calorie Restriction

*lose more weight
*lose more belly fat (Transl Research, Oct 2014;164(4):302–311)
*lose more total fat
*lose less muscle tissue
*increases LDL particle size
*increases leptin (decreases hunger)
*decreases ghrelin (increases hunger)
*helps prevent & treat diabetes and heart attacks
*lowers blood pressure, triglycerides, CRP, homocysteine, heart rate
*increases Blood adiponectin (sensitizes cells to insulin)
*increases hypothalamic nor epinephrine & neuropeptide Y gene

Intermittent “Fasting” Prevents

• heart attacks  *Research in Endocrinology*, June 2014

• diabetes  *Translational Research*, October 2014;164(4):302–311

• certain cancers  *Sci Transl Med*, 2012;4:124ra127

Types of Intermittent “Fasting”

1) **DAILY** limited-time fasting: *such as eating only between noon and 6PM, *eating three meals and then fasting overnight from 6PM to 7AM, or *eating only twice a day at the times of your choice

2) **WEEKLY** combinations of fasting and non-fasting days in each week: such as *fasting on alternate days, or *5:2 (5 eat days & 2 fast days, on days of choice)

3) **MONTHLY** variations: *such as fasting 5 days/month
**Intermittent “Fasting”**

5 DAYS A WEEK

* Eat a healthful normal diet five days a week.
* Two days a week, usually not on consecutive days, restrict your intake of food to fewer than 500 calories.
* Eat plenty of fruits, vegetables, whole grains, beans, seeds and nuts.
* You can include moderate amounts of fish and chicken.
* Restrict red meat, processed meats, fried foods, all drinks with sugar in them, and sugar-added foods and desserts.

2 DAYS A WEEK

- Oatmeal
- Nuts
- Fruits
- Vegetables

*lowers blood pressure
(British Journal of Diabetes and Vascular Disease, April 2013)

*lowers cholesterol and triglycerides

*reduces body fat
(Int J Obes (Lond), May 2015;39(5):727-33)

*lowers insulin

*lowers blood markers of inflammation
(Free Radic Biol Med, March 2007;42(5):665-74)

*increases speed and endurance in athletes
Calorie Restriction is Temporary

*1700 calories per day helped people lose an average of 13 pounds in six months.

*At 1 year they started to regain their lost weight and

*after two years, their average weight loss fell to six pounds

*NEJM. February 26, 2009*