

*embracing your health*

# Nutrition 101 – Class 4

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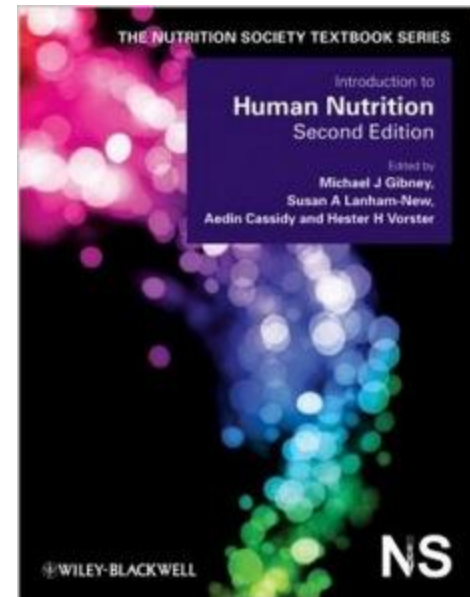


# Nutrition 101

## ❖ Introduction to Human Nutrition” second edition

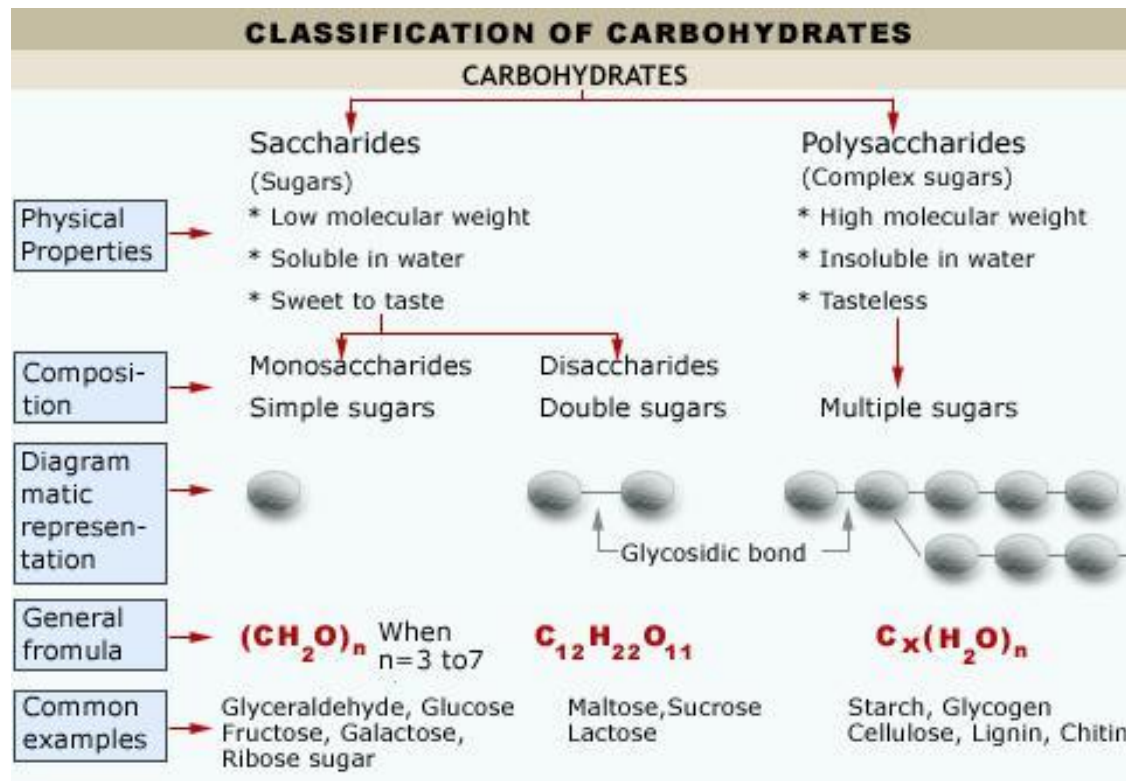
Edited by Michael J. Gibney, Susan A. Lanham-New, Aedin Cassidy, and Hester H. Vorster

May be purchased online  
but is not required for  
the class.

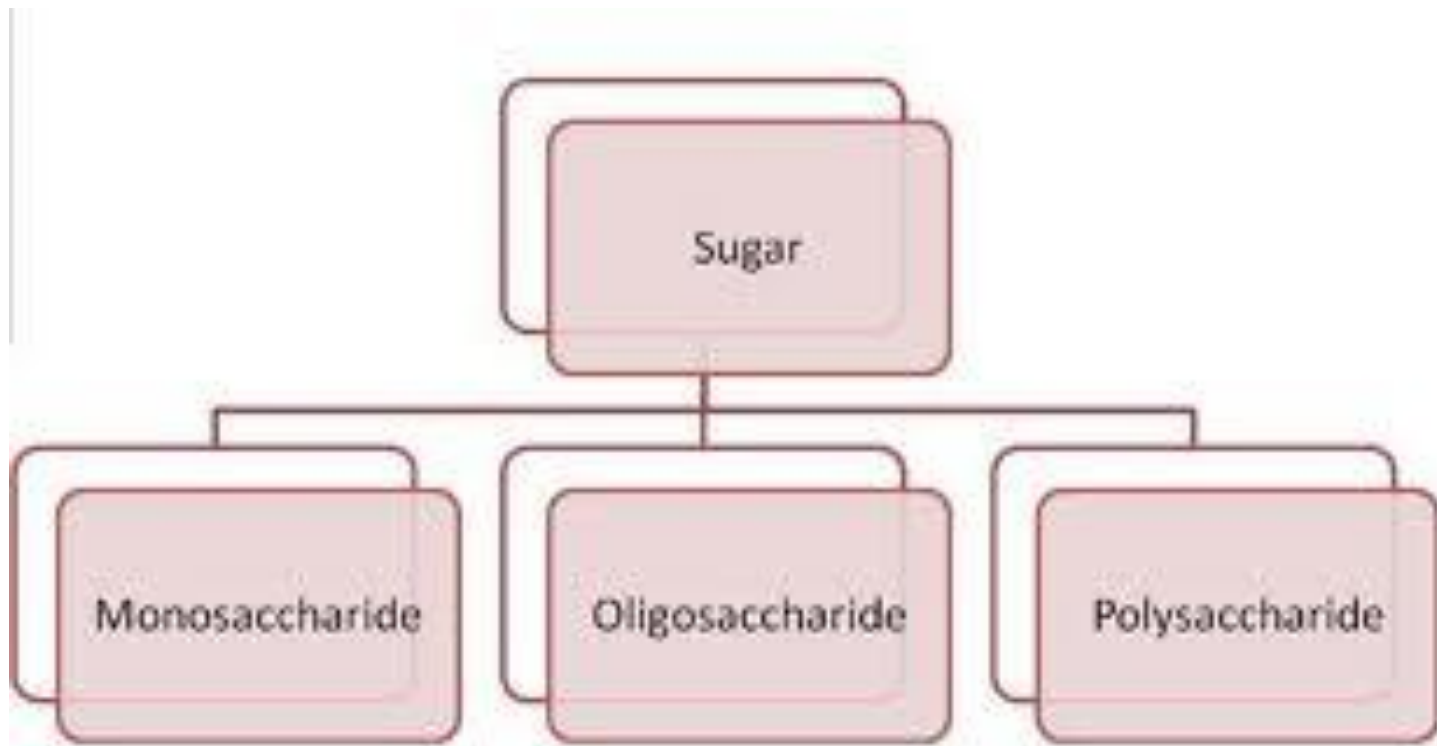


# Carbohydrates

## Classification



# Classes of Carbohydrates



# Monosaccharides

- Glucose
- Fructose
- Sucrose = glucose + fructose
- Lactose = glucose + galactose

*All are digested in the small bowel*



# Oligosaccharides

❏ Raffinose → SCFA

❏ Inulin → SCF

*Both are digested in the large bowel*



## **Foods containing raffinose and other galacto-oligosaccharides**

Baked beans	Lentils	Chickpeas
Kidney beans	Black eye beans	Borlotti beans
4 bean mix	Cabbage	Brussel sprouts
Green beans	Yellow beans	Butter beans

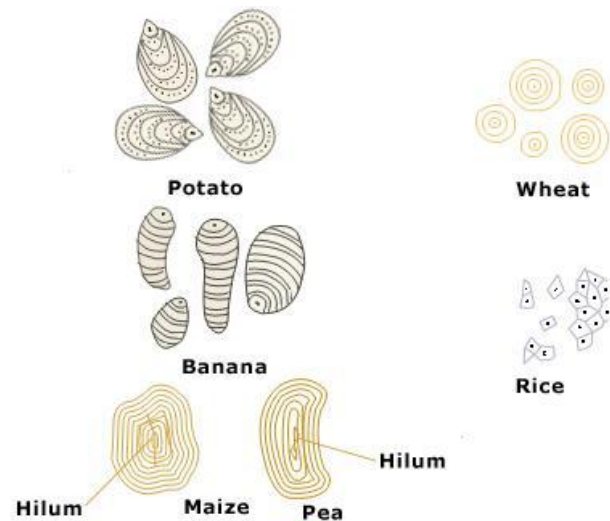
# Polysaccharides

➤ Starches → glucose

*Primarily digested in the small bowel*

➤ Nonstarch polysaccharides → SCFA

*Digested in the large bowel*



# Malabsorption

- Caused by an inherited defect
- Lactose intolerance
- Intestinal distress





# “Glycemic” Carbohydrates






- ❖ Carbohydrates that are digested to sugars and absorbed as such in the small bowel
- ❖ The rate of uptake of sugar from the gut is determined by the rate of hydrolysis of oligosaccharides and polysaccharides that are susceptible to pancreatic and brush border enzymes



MidLifeCrisisBlog.org

# Factors Influencing Rate of Hydrolysis

## Food factors

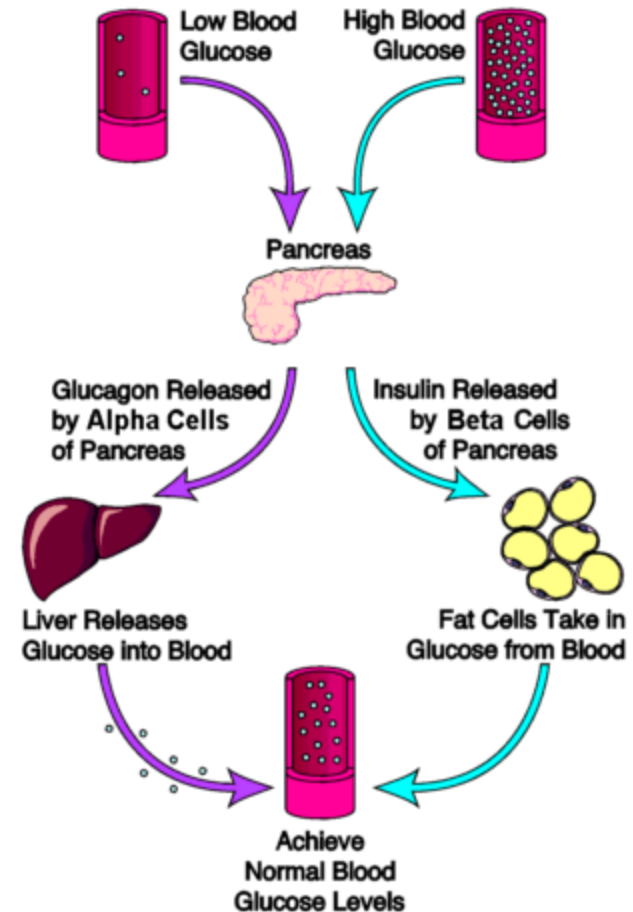
-  Particle size
-  Macro- and micro-structure of food
-  Amylose-amylopectin ratio of starches
-  Lipid content of food
-  Presence of enzyme inhibitors

## Consumer factors

-  Degree of comminution in the mouth
-  Rate of gastric emptying
-  Small bowel transit time

# Blood Glucose

- ❏ Pancreas releases insulin in response to glucose in the blood stream
- ❏ Brain needs 120g/day
- ❏ Gluconeogenesis occurs in liver and kidney



# Types of Blood Sugar Disorders

- Type 1
- Type 2
- Gestational
- Pre-diabetes
- Insulin Resistance
- Polycystic Ovarian Syndrome (PCOS)
- Hypoglycemia

# Blood Glucose Guidelines

## Normal

Fasting Glu 70-99

A1C <5.7

## Pre-diabetes

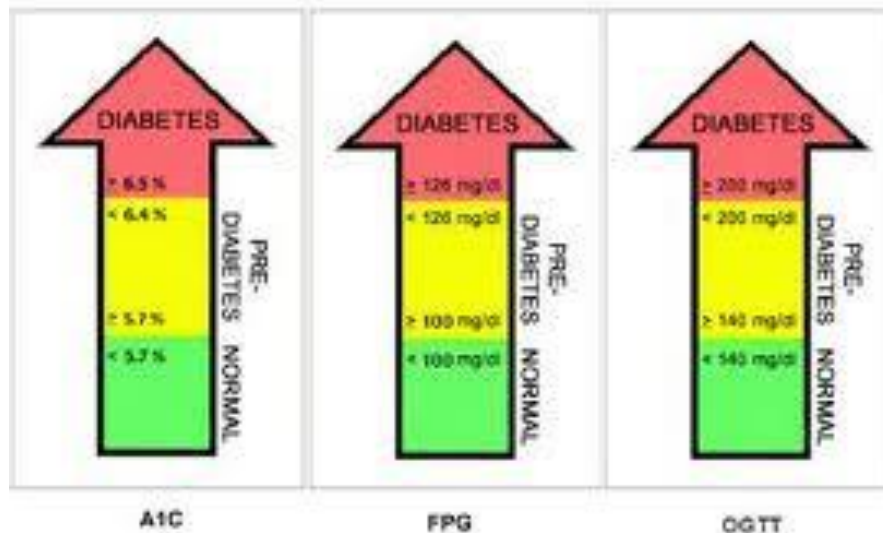
Fasting Glu 100-125

A1C 5.7-6.4

## Diabetes

Fasting Glu >125

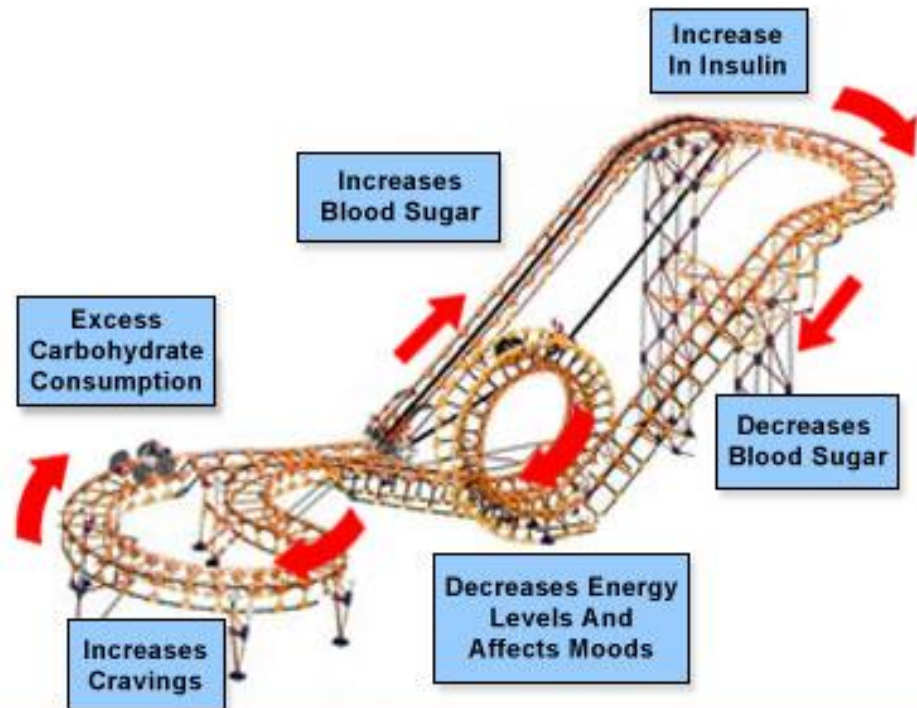
A1C >6.4



# The Carb Coaster

## The Ups & Downs of Blood Sugar

*What Routinely Consuming Lots  
of Carbs Does to Your Blood Sugar.*

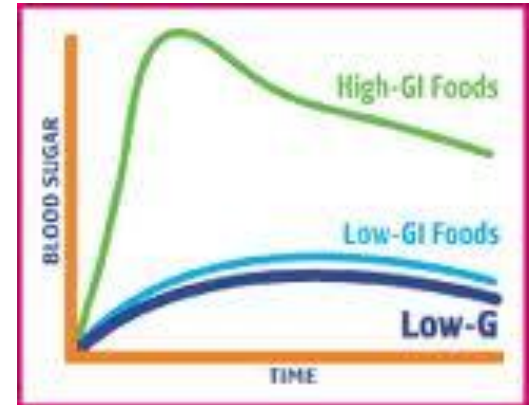


# Glycemic Index (GI)

• Jenkins, 1981

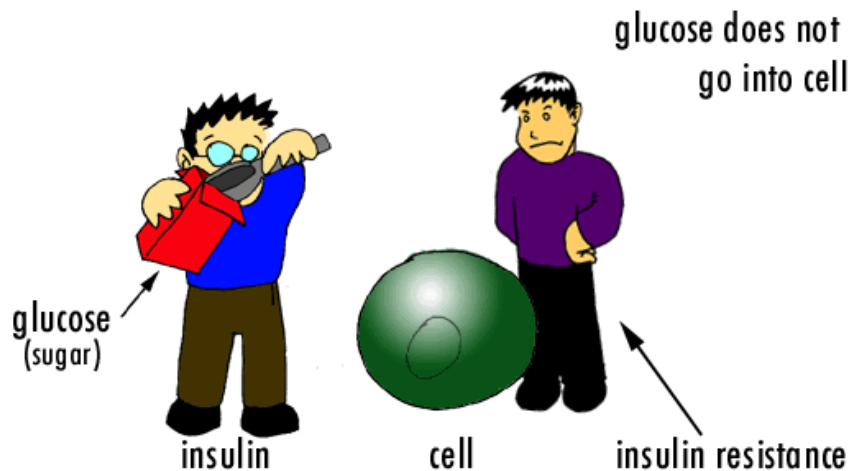
• Compares quantitatively the blood glucose responses following ingestion of equivalent amounts of digestible carbohydrate from different foods

• Rapidly Available Glucose (RAG)



# Insulin Resistance

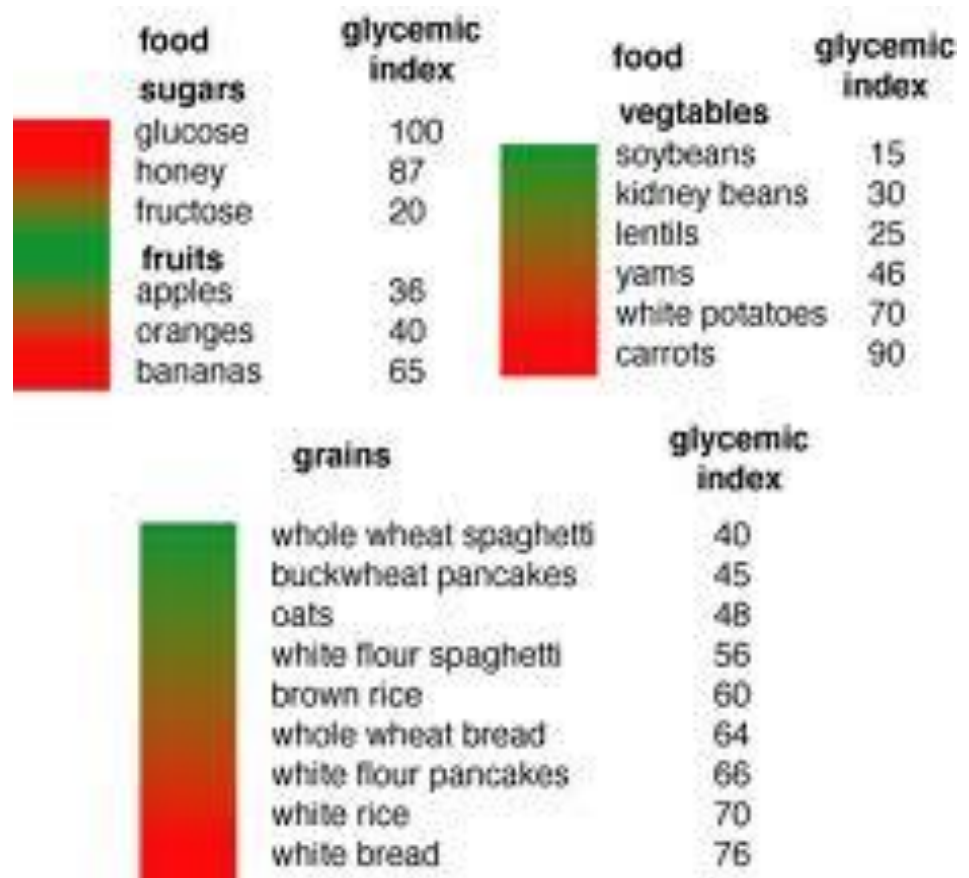
- Continued high rates of glucose absorption and challenging the pancreatic *B*-cells to secrete insulin
- Physiological condition where the natural hormone insulin becomes less effective at lowering blood sugars





# Nonglycemic Carbohydrates

- ❗ “Unavailable”- carbs not used for energy
- ❗ Carbohydrates not absorbed in the small intestine enter the large bowel, where they are partially or completely broken down by bacteria by a process called fermentation



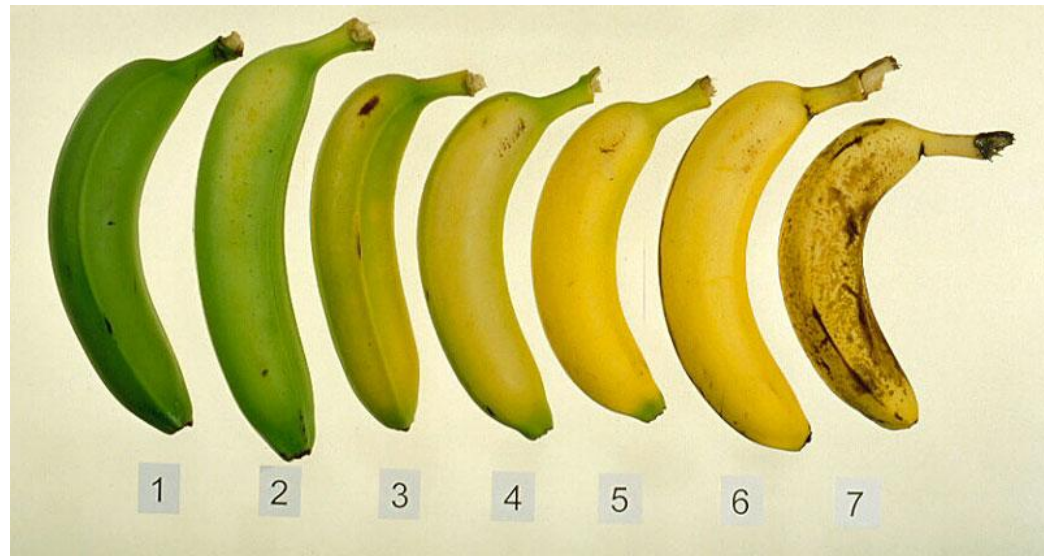
# Sugar Alcohols

- Only partially absorbed
- Has an -ol ending



# Starch

- Amylopectin or amylose
- Green banana → indigestible
- Ripe banana → starch converts to digestible sugars



# Resistant Starch

- Starch that escapes digestion in the small intestine and enters the colon



# Resistant Starch

Food	Serving Size	Amount of Resistant Starch (grams)
Navy beans	1/2 cup cooked	9.8
Banana, raw	1 medium, peeled	4.7
Cold potato	1/2" diameter	3.2
Lentils	1/2 cup cooked	2.5
Cold pasta	1 cup	1.9
Pearl barley	1/2 cup cooked	1.6
Oatmeal	1 cup cooked	0.7
Wholegrain bread	2 slices	0.5

# Dietary Fiber

- Many Western diseases are due to a lack of fiber
- 1975, Burkitt and Trowell defined fiber as the components of plant cell walls that are indigestible in the human small intestine
- Includes storage polysaccharides within plant cells

# Fiber Benefits

 Satiety

 Stool bulking

 Helps control blood sugar

 Lowers LDL cholesterol





# Fiber Needs

**Men**  
30-38 grams/day

**Women**  
25-30 grams/day

**Average consumption**  
15 grams/day







# Dental Caries

- ❖ Bacteria in the mouth ferments carbohydrates to yield acidic end-products which result in a drop in dental plaque pH
- ❖ pH < 5.5 dental enamel dissolves in plaque fluid
- ❖ Repeated low pH leads to cavities
- ❖ Sugar is readily fermented by bacteria
- ❖ Eating sugar with meals and cheese reduces caries

# Questions, Comments





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## Nutrition 101 – Class 2

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