Middle and High School Curriculum

NUTRITION 101

student notes

LESSON FOUR

A SPOONFUL OF SUGAR

by Dr. Heather Manley, N.D.

NUTRITION 101

LESSON 4
A Spoonful of Sugar

STUDENT FRIENDLY OBJECTIVES

I will examine sugar, its different types, and its effects on my body.

INTRODUCTORY INFORMATION

1. Carbohydrates are saccarides which are commonly referred to as sugars.
2. Glucose is the most common carbohydrate.
3. The primary function of carbohydrates (complex) is to provide energy for the body.
4. The key is to eat the right type of carbohydrate which will be discussed later.

The average kid eats 32 teaspoons of sugar a day.

Carbohydrates

- Simple carbohydrates are broken down quickly. Some simple carbohydrates - like fruits, milks - have beneficial nutrients in them. However others like processed and refined sugars - store bought baked goods, candy, table sugar, syrups, and soft drinks - are void of any nutrients (vitamins, minerals and fiber) and create more work for the body to digest it.

- A sugar fact: In general, the sweeter a sugar is the simpler it is.

- Complex carbohydrates are chains of 3 or more single sugar molecules and are basically long chains of sugar molecules (also referred to as starches). They are storage forms of energy and nutrients for plants which aid us - when these plants are eaten - with nutrients. Cellulose, another type of complex carbohydrate, is the main component of fiber (fiber slows the digestion and absorption of sugar).

EFFECTS OF SUGAR IN THE BODY

1. Nutrient depletion

- Processing of sugar destroys most to all nutrients.
- No nutrients means no nutrition for the body.
- Sugar actually robs the body of nutrients in order for it to be processed in the body.

2. Immune System Suppressant

Bacteria, viruses, germs and tumors (think cancer) thrive on sugar; this makes them strong, reproduce easily and very powerful.

3. Inflammation

One of the reasons inflammation occurs is due to a rapid rise in blood sugar, which causes biochemical changes in the cell = inflammation.

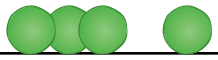
4. Hypoglycemia

- Hypoglycemia occurs when there is an abrupt drop in blood sugar level.
- Hyperglycemia occurs after a high sugar, high processed meal is ingested; people may feel a "sugar high" but then your blood sugar will drop which them bring you into a low blood sugar state - hypoglycemia - at which will bring on a craving to eat more sugar (vicious cycle).
- This may give symptoms of fatigue, dizziness and even seizures.

Interesting sugar fact: Sugar releases an opiate-like substance that activates the brain's reward system.

Pancreas, Insulin and Glucose

- The pancreas senses glucose in the bloodstream and will release the chemical enzyme, insulin.
- Insulin will attach to the glucose and acts as a key to release glucose into your body's cells to be used for energy.
- Glucose cannot get into the body's cells with out the help of insulin. Once glucose and insulin meet and bind, the pancreas will sense a decrease in blood sugar and will not release any more insulin - great communicative feedback loop.
- If this system is in a healthy balance (just enough insulin to meet glucose levels) everything is great.



Wow! Americans drink about 53 galloons of soft drinks, per person, each year.

BELOW ARE A FEW PROBLEMS THAT OCCUR WHEN THERE IS AN IMBALANCE

Type 1 Diabetes

- This is an autoimmune response in which the pancreas will begin destroying pancreatic cells that secret insulin. People, who have type 1 diabetes, need daily injections of insulin to allow their glucose to be balanced.
- This type of diabetes is discovered in childhood or early adolescence and is mostly due to genetics versus lifestyle.

Type 2 Diabetes

- Type 2 diabetes is mostly due to diet and lifestyle: overindulgence in a high sugar diet and sedentary lifestyle. Once known as adult onset diabetes, it now affects all people, including children.
- The pancreas does not release enough insulin to attach to allow glucose into the cells.
    - The cells become insulin resistant in which they will not respond to the insulin; therefore no glucose into the cells.

Insulin Resistance

- Often referred to as pre-diabetic state. It is ideal to have a fasting blood sugar level between 85 and 100 mg per deciliters.
- The cells become insulin resistant in which they will not respond to the insulin; therefore no glucose into the cells. The pancreas will release insulin into the blood but the cells will not allow the glucose insulin complex into the cells.

Remember! Simple refined sugar has no nutrient value just a bunch of empty calories.

Glycemic Index and Load

- The glycemic index is the ranking of foods according to how quickly the food – glucose – will be absorbed into the bloodstream. It is defined during a 2 hour blood glucose response after ingesting approximately 50 grams of a carbohydrate. The number obtained from this curve – from 10 human subjects (referred to as the AUC) – is then divided using the standard of either glucose or white bread and multiplied by 100.
- The glycemic index is not a very good indicator as some foods may have a high glycemic index but have many other quality aspects – packed with nutrients and fiber- that benefit the body.

- The newer version of measurement is the glycemic load. The glycemic load is a ranking system for carbohydrate content in food portions.
- It is a perfect predictor of blood sugar values in different types of foods as it puts emphasis on both the quality (key) and quantity (also key) of the food. It is the effect of our blood sugar and insulin levels after eating. The formula is:

Glycemic Load (GL) = (glycemic index x the amount of available carbohydrate) divided by 100.

Carrot (fiber and nutrient rich):
GL = (47 x 7.5) divided by 100
GL = 3.5
Notice the GI is 47 and this is considered high yet the GL is low due to the nutrients and fiber found in the carrot.

White bread (no fiber, no nutrients):
GL = (95 x 50) divided by 100
GL = 48

The key to remember here is the more fiber and nutrients the food has to offer, the more beneficial it is in the body and thus will have the desired lower GL index.

Fact
Foods that have higher fiber, protein or fat content tend to slow down the absorption of sugar therefore creating a filling of fullness sooner as well as providing nutrients.

A few food thoughts:
If you plan to eat a sugary treat do it...
1. After a meal
2. With a meal (apples with cheese, nuts or nut butter)