Carbohydrates

Unit 5
Foods and Nutrition
I. Functions of Carbs

- Carbohydrates are the main source of energy for the body.
- Provide the body with **4 calories per gram** from simple or complex.

Carbs → Blood glucose → Stored as glycogen
I. Functions of Carbs

C. **Fiber** is a form of carbohydrate which doesn’t provide energy but provides bulk in the diet.
II. Types of Carbohydrates

- **Simple carbohydrates or sugars:**
- Natural sugars end in "ose"
- Supply other **nutrients** besides just **calories**
- Food sources – **plants**
  1. Fruit – **Fructose**
  2. Grains – **Maltose**
  3. Dairy – **Lactose**
II. Types of Carbohydrates

- Refined sugars – sugars excreted from plants and used as sweeteners.
- Doesn’t supply nutrients with the calories.
- Food sources – plants
II. Types of Carbohydrates

- **Sucrose** – also known as “table sugar”.
- This is the most widely refined (harvested) type of sugar, comes from plants like sugar cane or sugar beets.
II. Types of Carbohydrates

- Sources of sucrose...
- Beets
- Sugar cane
- Honey
- Maple syrup
- Brown sugar
- Molasses
II. Types of Carbohydrates

- Sugar is a naturally occurring nutrient that makes food taste sweet!

It’s a carbohydrate along with starch. Sugars are found in fruit, vegetables, honey, jam, and many soft drinks (candy too!).
II. Types of Carbohydrates

Sugar contains “empty calories” which means it has no nutritional value to the body.

Sugar is responsible for tooth decay and linked to obesity, heart disease, diabetes, and skin problems such as acne.
II. Types of Carbohydrates

- Health concerns from eating too many refined sugars...
- Double or triple the risk for **Type 2 Diabetes**

1. A chronic health condition where the body is unable to use **insulin** and properly break down sugar (**glucose**) in the blood.
II. Types of Carbohydrates

Symptoms can include...

- Hunger
- Excessive thirst
- Excessive urination
- Dehydration
- Weight Loss
- Blurred Vision
Diabetes Untreated--- write down

- Nerve damage to hands, feet and legs
- Blindness
- Heart Disease or Stroke
- Kidney Disease
- Death
II. Types of Carbohydrates

Changes in Lifestyle are very Important....

The treatment of diabetes can require daily insulin injections, proper nutrition and regular exercise.
II. Types of Carbohydrates

Health concerns from too much sugar continued...

- Decreases HDL (good cholesterol)
- Leads to insulin resistance
- Lowers your ability to lose weight
II. Types of Carbohydrates

- Damages cells causing accelerated aging of tissues and organs.
- Negatively affects athletic performance because it causes the blood sugar level to plummet, causing muscle fatigue.
II. Types of Carbohydrates

G. Can cause addiction to sugar!
II. Types of Carbohydrates

- Complex Carbohydrates
- Starch
- Supplies nutrients and calories
- Food sources – plants
- 1. Fruits like bananas (very starchy)
II. Types of Carbohydrates

- Vegetables like squash, potato, corn, peas
- Grains – rice, oats
II. Types of Carbohydrates

2. Fiber (Cellulose)
   A. Soluble fiber – dissolves in water, improves cholesterol

1. Sources of fiber include fruits, vegetables, dried beans, peas
2. Doesn’t provide calories
More on Soluble fiber...

• Soluble fibers attract water and form a gel, which slows down digestion. Soluble fiber delays the emptying of your stomach and makes you feel full, which helps control weight. Soluble fibers can also help lower LDL (“bad”) blood cholesterol.

• More Sources of soluble fiber: oatmeal, apples, oranges, pears, oat bran, strawberries, nuts, flaxseeds, beans, dried peas, blueberries, and carrots.
II. Types of Carbohydrates

B. Insoluble fiber – won’t dissolve in water, improves gastrointestinal health.

1. Sources include fruits and wheat, wheat bran
2. Doesn’t provide calories
More on Insoluble Fiber...

- Insoluble fibers are considered gut-healthy fiber because they have a laxative effect and add bulk to the diet, helping prevent constipation. These fibers do not dissolve in water, so they pass through the gastrointestinal tract relatively intact, and speed up the passage of food and waste.

- Sources of insoluble fiber: whole wheat, whole grains, wheat bran, corn bran, seeds, nuts, barley, brown rice, zucchini, broccoli,
Did you Know...

- Dietary fibers are found naturally in the plants that we eat. They are parts of plant that do not break down in our stomachs, and instead pass through our system undigested. All dietary fibers are either soluble or insoluble.

- Both types of fiber are equally important for health, digestion, and preventing conditions such as heart disease, diabetes, obesity, diverticulitis, and constipation.
II. Types of Carbohydrates

C. Needs – how much?

1. Based on your growth years
2. Adolescents add 5 to your age = grams per day (ages 13-19)
3. Adults – 20-35 grams per day
II. Types of Carbohydrates

D. Crucial for moving food through the digestive system.

Transit time should not be more than 16 hours.

Average American transit time is 72 hours.
II. Types of Carbohydrates

When food sits too long in your digestive tract, food starts to rot, resulting in gas, diverticulitis, constipation, and hemorrhoids.
Here are possible diseases or illness caused by lack of fiber. Can you diagnose the right disease to the symptoms?

- Diverticulitis
- Constipation
- Hemorrhoids
- Irritable Bowel Syndrome
- Anal Fissure
1. What is Diverticulitis?

- Caused by the development of small sacs in the colon, which may be due to the lack of dietary fiber.
- Feces accumulate in these sacs, which lead to ulceration and bleeding.
- Rectal bleeding or pain in the abdomen may indicate a need for a medical checkup.
2. What is Constipation?

- Constipation occurs when bowel movements become difficult or less frequent. Going longer than three days without a bowel movement is too long. After three days, the stool or feces become harder and more difficult to pass.
What causes Constipation...

- Inadequate water intake
- Inadequate fiber in the diet
- A disruption of regular diet or routine; traveling
- Inadequate activity or exercise or immobility
- Eating large amounts of dairy products
- Stress
- Depression
- Eating disorders
- Irritable bowel syndrome
3. What are Hemorrhoids?

- A hemorrhoid results when the veins in and around the rectum and anus become swollen; internal and external.

- Common problem for people with irritable bowel syndrome (IBS) or inflammatory bowel disease (IBD) who have diarrhea and/or
What causes Hemorrhoids?

There are a variety of situations and conditions that may contribute to the development of hemorrhoids. Some of these include:

- Age
- Chronic constipation or diarrhea
- Pregnancy
- Straining during bowel movements
- Overuse of laxatives
4. Irritable Bowel Syndrome

- Irritable bowel syndrome (IBS) is a common disorder that affects your large intestine (colon). Irritable bowel syndrome commonly causes cramping, abdominal pain, bloating gas, diarrhea and constipation. Despite these uncomfortable signs and symptoms, IBS doesn't cause permanent damage to your colon.
5. What are Anal Fissures??

- An anal fissure is a tear in the lining of the lower rectum that causes pain during bowel movements. It is a common condition.

- Most anal fissures heal with home treatment after a few days or weeks.

- Anal fissures affect people of all ages, particularly young and otherwise healthy people. They are equally common in men and women.
What are ways to prevent these from happening?

- Eat more fiber: helps form soft, bulky stools.
- Drink plenty of water and fluids
- Get enough exercise: Regular exercise helps your digestive system stay active and healthy.
- Give yourself time: Our hectic schedules keep us feeling in a hurry all the time that we don't pay attention to our body's needs
- Consult your doctor
Questions

- What is fiber?
- Where does it come from?
- List five food sources that have fiber....
- What is one new thing that you learned from the video?
- What is one small change that you will make today to help prevent such issues?
  - (constipation, hemorrhoids, gas, diverticulitis)
Bread Activity

- Small Changes make a HUGE difference in your overall Health
- In a 10-year Harvard study completed in 1994, men and women who ate high-fiber breads had fewer heart attacks and strokes than those whose tastes ran to bagels and baguettes.
- Simply switching from white to whole wheat bread can lower heart disease risk by 20 percent, according to research from the University of Washington reported in the April 2, 2003 issue of The Journal of the American Medical Association.
Bread Activity

- Fiber has long been known to aid digestive health too.
- Fiber can help you lose or maintain weight because eating fiber-dense wheat bread helps you feel full.
- When flour is refined, it loses the most nutritious parts of the grain the fiber, essential fatty acids, and most of the vitamins and minerals. In fact, about 30 nutrients are removed, but by law only five must be added back (though others often are): iron, niacin, thiamin, riboflavin and folic acid. You’d have to eat eight pieces of white bread to get the fiber in just one piece of whole wheat bread.
III. Grains

A. Grains contain 3 main parts

1. **Germ** – a tiny embryo in a seed that will grow into a new plant.

2. **Endosperm** – the food supply for the seed’s embryo, made up of protein, starches, and other nutrients.
III. Grains

3. Bran – the edible, outer protective layers of a seed.
III. Grains

B. Nutrients of a grain

1. Endosperm is high in complex carbohydrates and proteins with some vitamins and minerals.
III. Grains

2. The bran is rich in fiber, B vitamins, and some trace minerals.
III. Grains

3. The germ provides B vitamins, vitamin E, iron, zinc, some protein and fat. (most nutritious)
III. Grains

c. **Whole grains** – the entire edible grain kernel is used which contains original nutrients.

   - *(bran, endosperm and germ)*
III. Grains

D. Processing removes the grain’s bran and germ and many of the nutrients and fiber.

Examples: white flour, white rice – it’s only endosperm (no germ or bran)
III. Grains

E. **Enrichment** – process to PUT BACK nutrients that are lost in processing.

F. **Fortification** – adding 10 percent or more of the Daily Value for a specific nutrient that WAS NEVER PRESENT in the food.

*Look for these words on your cereal box!*
III. Grains

c. Advantages of eating whole grains and foods with fiber

1. Protects against diabetes by keeping the body’s sugar control system functioning properly.
III. Grains

-Cola beverages, white bread, white rice, french fries, and cooked potatoes are associated with increased risk of diabetes.

Fiber delays the absorption of glucose (which is a good thing!)
III. Grains

2. Protects against heart disease.

5 grams of fiber cuts the chances of heart disease by $\frac{1}{3}$.

Fiber lowers cholesterol
III. Grains

3. Improves gastrointestinal health. Fiber gives bulk to the stool and softens it.
III. Grains

4. May protect against cancer. Whole grains reduce the risk of cancer of the colon, mouth, stomach, gall bladder, and ovaries.

Phytoestrogens or plant estrogen may give protection against these cancers.
IV. Changing Eating Habits

A. Eat whole grains for breakfast!
   1. Hot cereals – like *old fashioned oatmeal*, not instant.
   2. Cold cereals – whole grains such as Wheaties, not Fruit Loops.
IV. Changing Eating Habits

B. Eat whole grain breads!
   1. Check the label to be sure the first ingredient has the word **WHOLE**.

C. Forget the **french fries**
   1. Substitute other grains like brown rice.
IV. Changing Eating Habits

D. Substitute refined pastas (white) with whole wheat pasta.
IV. Changing Eating Habits

E. Try baking with whole wheat flour.
   1. Start with one part whole wheat to 3 parts white flour.
   2. Increase the ratio of whole wheat to white flour gradually.
   3. Absorbs water differently (so some adjustments to recipes may be needed).
Write this word down!!!

• GLYCEMIC INDEX

Read the next few slides and get a good idea of what it means....
Glycemic Index

- The body forms glucose when it breaks foods that a person eats down into a useable form of energy. Some foods containing carbohydrates make blood sugar spike in a flash, other foods yield their sugars more slowly, acting like cold capsules.
Glycemic Index

• The carbohydrate ranking they developed, called the glycemic index, counters the notion that all complex carbohydrates are good and all simple ones are bad. In this index, white bread is assigned a score of 100. A handful of jelly beans is 82.....
Glycemic Index

- Choosing low GI carbs is the secret to long-term health reducing your risk of heart disease and diabetes and is the key to sustainable weight loss.
Glycemic Index

- Eating a lot of high GI foods can be detrimental to your health because it pushes your body to extremes. This is especially true if you are overweight and sedentary.