The Truth About Carbohydrates

Katherine Langlois, RD, LDN
What are Carbohydrates (CHO)?

- Carbohydrates are part of food that your body uses for energy.
- Most important is the *type of carbohydrate* you choose to eat. Some sources are healthier than others.
- There are two types of carbohydrates:
  - **Simple** – from food with sugar, like candy, fruit, milk, syrup, soft drinks, honey or jam/jelly.
  - **Complex** – from food with starches and fiber, like potatoes, corn, beans, lentils, peas, oatmeal, pasta or whole-grain bread
- It’s more important to eat carbohydrates from healthy foods than to follow a strict diet limiting or counting the number of grams of carbohydrates consumed.
Why Carbohydrates are important:

- When you eat carbohydrates, your body breaks them down into blood sugar, called glucose.
- Glucose feeds your cells.
- When you eat food with more than five grams of carbohydrates, your blood sugar levels go up.
- When your blood sugar levels go up, your pancreas releases the hormone insulin.
- Insulin is important for metabolism and utilization of energy from the ingested nutrients - especially glucose.
Why is insulin important?

• Insulin can regulate blood glucose. The body senses and responds to rise in blood glucose by secreting insulin.

• There are two major types of diabetes:
  
  • **Type 1** – no or very low production of insulin from the pancreatic beta cells. Patients with Type 1 diabetes mellitus depend on external insulin (most commonly injected under the skin) for their survival.
  
  • **Type 2** diabetes mellitus – demands of insulin are not met by the amount produced by the pancreatic beta cells. Patients may be treated with medication to reduce their blood sugar or may eventually require externally supplied insulin if other medications fail to control blood glucose levels adequately.
Starches and Grains

- Most calories in starchy foods come from carbohydrates.
- These foods are a good source of energy and give you fiber, vitamins, and minerals. But be mindful of how much you eat.
- Each serving on the following lists contain about
  - 15 grams carbohydrates
  - 0-3 grams protein
  - 0-1 gram fat
  - 80 calories
<table>
<thead>
<tr>
<th>GREEN STARCHY FOOD</th>
<th>ONE SERVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Winter, acorn or butternut squash</td>
<td>1 cup</td>
</tr>
<tr>
<td>Sweet potato/yam</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Cooked beans (black, garbanzo/chickpeas, kidney, lima, navy, pinto or white)</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Cooked lentils (brown, green or yellow)</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Cooked peas (black-eyed or split)</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Quinoa, cooked</td>
<td>1/3 cup</td>
</tr>
<tr>
<td>Couscous</td>
<td>1/3 cup</td>
</tr>
<tr>
<td>Bulgur, cooked</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>YELLOW STARCHY FOOD</td>
<td>ONE SERVING</td>
</tr>
<tr>
<td>---------------------------------------------------------</td>
<td>---------------</td>
</tr>
<tr>
<td>• Whole-wheat bread</td>
<td>1 slice (1 oz)</td>
</tr>
<tr>
<td>• Rye bread</td>
<td>1 slice (1 oz)</td>
</tr>
<tr>
<td>• Whole wheat hot dog/hamburger bun</td>
<td>1/2 bun</td>
</tr>
<tr>
<td>• Cereal, cooked (oats, oatmeal)</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>• Cereals, ready-to-eat</td>
<td></td>
</tr>
<tr>
<td><em>Pick those with at least three grams of fiber and less than six grams of sugar</em></td>
<td>1/2 cup</td>
</tr>
<tr>
<td>• Granola, low-fat</td>
<td>1/4 cup</td>
</tr>
<tr>
<td>• Whole wheat cereal</td>
<td>1/3 cup</td>
</tr>
<tr>
<td>• Brown rice</td>
<td>1/3 cup</td>
</tr>
<tr>
<td>• Corn, cooked</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>• Corn on cob, large (5 oz)</td>
<td>1/2 cob</td>
</tr>
<tr>
<td>• Peas, green, cooked</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>• Whole-wheat English muffin</td>
<td>1/2 muffin</td>
</tr>
<tr>
<td>• Popcorn (air-popped)</td>
<td>3 cups</td>
</tr>
<tr>
<td>RED STARCHY FOOD</td>
<td>ONE SERVING</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>---------------------------------</td>
</tr>
<tr>
<td>Potato baked with skin</td>
<td>1/4 large (3 oz)</td>
</tr>
<tr>
<td>Pretzels</td>
<td>3/4 oz</td>
</tr>
<tr>
<td>White bread</td>
<td>1 slice (1 oz)</td>
</tr>
<tr>
<td>White English muffin</td>
<td>1/2 muffin</td>
</tr>
<tr>
<td>Cornbread</td>
<td>1 ¾ inch cube or 1 ½ oz</td>
</tr>
<tr>
<td>Bagel, large (about 4 oz)</td>
<td>1/4 bagel</td>
</tr>
<tr>
<td>Biscuit, 2 ½ inches across</td>
<td>1</td>
</tr>
<tr>
<td>White hot dog/hamburger bun</td>
<td>1/2 bun</td>
</tr>
<tr>
<td>Pancake (4 inches across, ¼ inch thick)</td>
<td>1</td>
</tr>
<tr>
<td>Pita pocket bread (6” across)</td>
<td>1/2</td>
</tr>
<tr>
<td>Roll, plain, small</td>
<td>1</td>
</tr>
<tr>
<td>Tortilla, corn or flour (6” across)</td>
<td>1</td>
</tr>
<tr>
<td>RED STARCHY FOOD</td>
<td>ONE SERVING</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>• Waffle (4 inch square)</td>
<td>1</td>
</tr>
<tr>
<td>• Pasta, cooked</td>
<td>1/3 cup</td>
</tr>
<tr>
<td>• White rice</td>
<td>1/3 cup</td>
</tr>
<tr>
<td>• Potato boiled, all kinds</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>• Potato mashed with milk and fat</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>• French fries (oven-baked)</td>
<td>1 cup</td>
</tr>
<tr>
<td>• Round, butter-type crackers</td>
<td>6 crackers</td>
</tr>
<tr>
<td>• Saltines</td>
<td>6 saltines</td>
</tr>
<tr>
<td>• Graham cracker, 2 ½ inch square</td>
<td>3</td>
</tr>
<tr>
<td>• Snack chips (tortilla chips, potato chips)</td>
<td></td>
</tr>
<tr>
<td>Fat-free or baked</td>
<td>15-20 chips</td>
</tr>
<tr>
<td>Regular</td>
<td>9-13 chips</td>
</tr>
<tr>
<td>• Baked beans</td>
<td>1/3 cup</td>
</tr>
</tbody>
</table>
Fruits

- Fresh, frozen or dried fruits are good sources of fiber.
- Fruit juices contain very little fiber, so eat real fruit instead of juice whenever you can.
- For canned fruit, choose fruit packed in its own juice or light syrup.
- Each serving from the following lists contain about
  - 15 grams carbohydrates
  - 0 grams fat
  - 0 grams protein
  - 60 calories
<table>
<thead>
<tr>
<th>GREEN FRUIT</th>
<th>ONE SERVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple, unpeeled, small (4 oz)</td>
<td>1</td>
</tr>
<tr>
<td>Blackberries</td>
<td>3/4 cup</td>
</tr>
<tr>
<td>Blueberries</td>
<td>3/4 cup</td>
</tr>
<tr>
<td>Raspberries</td>
<td>1 cup</td>
</tr>
<tr>
<td>Strawberries (whole)</td>
<td>1 1/4 cup</td>
</tr>
<tr>
<td>Cantaloupe, cubed</td>
<td>1 cup</td>
</tr>
<tr>
<td>Cherries</td>
<td>12 cherries</td>
</tr>
<tr>
<td>Grapefruit, large</td>
<td>1/2</td>
</tr>
<tr>
<td>Grapes, small</td>
<td>17 grapes</td>
</tr>
<tr>
<td>GREEN FRUIT</td>
<td>ONE SERVING</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>----------------------------------</td>
</tr>
<tr>
<td>Kiwi</td>
<td>1</td>
</tr>
<tr>
<td>Mango, small</td>
<td>1/2 fruit or 1 cup</td>
</tr>
<tr>
<td>Orange, small</td>
<td>1</td>
</tr>
<tr>
<td>Papaya cubed</td>
<td>1/2 fruit or 1 cup</td>
</tr>
<tr>
<td>Peaches (fresh, medium)</td>
<td>1</td>
</tr>
<tr>
<td>Pears (fresh, large)</td>
<td>1/2</td>
</tr>
<tr>
<td>Pineapple (fresh)</td>
<td>3/4 cup</td>
</tr>
<tr>
<td>Small plums</td>
<td>2</td>
</tr>
<tr>
<td>Watermelon</td>
<td>1 slice</td>
</tr>
<tr>
<td></td>
<td>or 1 ¼ cup (cubes)</td>
</tr>
</tbody>
</table>
### YELLOW FRUIT

<table>
<thead>
<tr>
<th><strong>One Serving</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Applesauce, unsweetened</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Banana, extra small</td>
<td>1</td>
</tr>
<tr>
<td>Dried fruits (blueberries, cherries, cranberries, mixed fruit, raisins)</td>
<td>2 tbsp</td>
</tr>
<tr>
<td>Mandarin oranges, canned</td>
<td>3/4 cup</td>
</tr>
<tr>
<td>Dried prunes</td>
<td>3</td>
</tr>
</tbody>
</table>

### RED FRUIT

<table>
<thead>
<tr>
<th><strong>One Serving</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple, grapefruit, orange, pineapple juice</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Fruit juice blends, 100% juice, grape juice, prune juice</td>
<td>1/3 cup</td>
</tr>
</tbody>
</table>
Milk/Dairy

• Dairy products like milk and yogurt are rich in calcium and protein, but they have carbohydrates too.
• Choose fat-free, low-fat and reduced-fat types. These have less saturated fat and cholesterol than whole-milk products.
• Each serving from the following lists contain about
  • 12 grams of carbohydrates
  • 8 grams protein
  • 90-146 calories
  • 0-8 grams fat
<table>
<thead>
<tr>
<th>GREEN DAIRY</th>
<th>ONE SERVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fat-free milk, buttermilk, Lactaid</td>
<td>1 cup</td>
</tr>
<tr>
<td>Evaporated milk</td>
<td>1/2 cup</td>
</tr>
<tr>
<td>Yogurt, plain or flavored with a low calorie sweetener</td>
<td>2/3 cup</td>
</tr>
<tr>
<td>Reduced-fat milk, Lactaid</td>
<td>1 cup</td>
</tr>
<tr>
<td>Greek yogurt</td>
<td>6 oz</td>
</tr>
<tr>
<td>Whole milk, buttermilk, goat’s milk</td>
<td>1 cup</td>
</tr>
<tr>
<td>Soy milk, regular, plain</td>
<td>1 cup</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>YELLOW DAIRY</th>
<th>ONE SERVING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smoothies, flavored, regular</td>
<td>10 oz</td>
</tr>
</tbody>
</table>
Sweets/Desserts

• Sweets tend to be high in carbohydrates and do not have as many vitamins, minerals and fiber as other foods.
• These foods should be used as special treats, not something you eat every day.
• Many sugar-free, fat-free and reduced-fat desserts are made with ingredients that contain extra carbohydrates, so check the Total Carbohydrate information on the food label to be aware of what you are eating.
Dessert Examples

- Brownie, cake, candy, chocolate, cookies, fruit juice bars, ice cream, muffins, pie, pudding, syrup and frozen yogurt

- **Sample serving sizes:**
  - Brownie – 2 inch square
  - Packaged cookies = 2 cookies
  - Ice cream = 1/2 cup
  - Muffin = 1/4 of a regular 4 oz. muffin
Read the Labels

- Look at the number of “Total Carbohydrate” grams listed on the Nutrition Facts label.
- This tells you how many grams of carbohydrates are in one serving of that food.
- 15 grams total carbohydrate = 1 serving size
- There can be more than one serving size in the package.
Read the Labels

- Check the ingredient list on a food label.
- Limit foods that have sugar or starch listed in the first five ingredients.
- **All of these are forms of sugar:**

<table>
<thead>
<tr>
<th>Sucrose</th>
<th>Brown rice syrup</th>
<th>Cane juice crystals</th>
<th>Confectioner’s sugar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dextrose</td>
<td>Molasses</td>
<td>Cane sugar</td>
<td>Treacle</td>
</tr>
<tr>
<td>Fructose</td>
<td>Evaporated cane juice</td>
<td>Caramel</td>
<td>Turbinado sugar</td>
</tr>
<tr>
<td>Maltose</td>
<td>Fruit juice</td>
<td>Carob syrup</td>
<td>Sorbitol</td>
</tr>
<tr>
<td>Lactose</td>
<td>concentrate</td>
<td>Corn syrup solids</td>
<td>Mannitol</td>
</tr>
<tr>
<td>Glucose</td>
<td>Corn sweeteners</td>
<td>Crystalline fructose</td>
<td></td>
</tr>
<tr>
<td>Honey</td>
<td>Galactose</td>
<td>Diastatic malt</td>
<td></td>
</tr>
<tr>
<td>Syrup</td>
<td>Agave nectar</td>
<td>Ethyl maltol</td>
<td></td>
</tr>
<tr>
<td>High-fructose</td>
<td>Beet sugar</td>
<td>Maltodextrin</td>
<td></td>
</tr>
<tr>
<td>corn syrup</td>
<td>Brown sugar</td>
<td>Panela</td>
<td></td>
</tr>
<tr>
<td>Maple syrup</td>
<td></td>
<td>Panocha</td>
<td></td>
</tr>
</tbody>
</table>
Beverages count too!

### Vanilla Latte

<table>
<thead>
<tr>
<th>Grande 16oz ✔</th>
<th>Whole Milk ✔</th>
</tr>
</thead>
</table>

**Nutrition Facts Per Serving (16 fl oz)**

- **Calories**: 290
- **Calories from Fat**: 100
- **% Daily Value**
  - **Total Fat**: 11g, 17%
  - **Saturated Fat**: 6g, 30%
  - **Trans Fat**: 0g
  - **Cholesterol**: 35mg, 12%
  - **Sodium**: 140mg, 6%
  - **Total Carbohydrate**: 37g, 12%
  - **Dietary Fiber**: 0g, 0%
  - **Sugars**: 35g
  - **Protein**: 11g
  - **Vitamin A**: 10% • **Vitamin C**: 0% • **Calcium**: 35% • **Iron**: 0%
  - **Caffeine**: 150mg**

*Percent Daily Values are based on a 2,000 calorie diet.

**Each caffeine value is an approximate value.
Beverages count too!

Gatorade Perform™ Lemon-Lime Thirst Quencher
Boisson désaltérante Gatorade Performer™ Citron-Lime

Nutrition Facts
Valeur nutritive
Per 321 mL / par 551 mL

Amount
% Daily Value

Calories / Calories 20
Fat / Lipides 0 g 0 %
Sodium / Sodium 11 mg 0 %
Potassium / Potassium 60 mg 2 %
Carbohydrate / Glucides 35 g 13 %
Sugars / Sucres 30 g
Protein / Protéines 0 g

Ingredients:
Water (sodium benzoate and citric acid), natural flavors, acesulfame potassium, sucralose, and trimethylamine N-oxide.

G2 Perform™ Blueberry Pomegranate Electrolyte Beverage
Boisson d’électrolytes G2 Performer™ Bleuet grenade

Nutrition Facts
Valeur nutritive
Per 250 mL / par 250 mL

Amount
% Daily Value

Calories / Calories 20
Fat / Lipides 0 g 0 %
Sodium / Sodium 5 mg 0 %
Potassium / Potassium 31 mg 1 %
Carbohydrate / Glucides 9 g 3 %
Sugars / Sucres 8 g
Protein / Protéines 0 g

Ingredients:
Water (natural fruit essences, potassium citrate), natural flavors, vitamin C, and calcium carbonate.

100% Grape Juice
Nutrition Facts
Serving Size: 1 Bottle (12 FL. OZ.) (355mL)

Amount Per Serving

Calories 260
Fat 0 g
Sodium 0 mg
Total Carb 64 g
Sugars 63 g

Ingredients:
100% grape juice (concentrated grape juice, water), natural fruit essences, natural flavors, and citric acid.

Welch's Light Concord Grape Juice
Nutrition Facts
Serving Size: 8 FL. OZ. (240mL)

Amount Per Serving

Calories 45
Fat 0 g
Sodium 75 mg
Total Carb 12 g
Sugars 11 g

Ingredients:
Concentrated grape juice, water, citric acid, natural flavors, and vitamin C.

COKE ZERO
Nutrition Facts
Serving Size: 330 mL

Amount Per Serving

Calories 0
Fat 0 g
Sodium 0 mg
Total Carb 0 g
Sugars 0 g

Ingredients:
Water, natural flavors, and acesulfame potassium.

Welch's Concord Grape Juice

Our Family Farmers’ Promise to Your Family.

Taste you can trust.

Ingredients:
Filtered water, concentrated grape juice, ascorbic acid, citric acid, natural flavors, and acesulfame potassium.
Artificial sweetener vs Sugar

- Artificial sweeteners are synthetic sugar substitutes, but may be derived from naturally occurring substances.
- There's no sound scientific evidence that any of the artificial sweeteners approved for use in the U.S. cause cancer or other serious health problems.
- Artificial sweeteners don't contribute to tooth decay and cavities.
- They may also help with the following:
  - **Weight control.** Artificial sweeteners are non-nutritive — they have virtually no calories.
  - **Diabetes.** Unlike sugar, artificial sweeteners generally don't raise blood sugar levels because they are not carbohydrates.
Don’t Fall for False Claims

Serving Size 1/2 Cup (65g)
Servings Per Container 12
Amount Per Serving
Calories 140
Calories From Fat 60

% Daily Value*
Total Fat 7g 11%
Saturated Fat 4.5g 23%
Trans Fat 0g
Cholesterol 45mg 15%
Sodium 50mg 2%
Total Carbohydrate 16g 5%
Dietary Fiber 0g 0%
Sugars 14g
Protein 2g
Vitamin A 4%
Vitamin C 0%
Calcium 8%
Iron 0%

Serving Size 1/2 Cup (56g)
Servings Per Container 12
Amount Per Serving
Calories 80
Calories From Fat 25

% Daily Value*
Total Fat 3g 5%
Saturated Fat 2g 10%
Trans Fat 0g
Cholesterol 10mg 3%
Sodium 45mg 2%
Total Carbohydrate 13g 4%
Sugar Alcohol 6g
Dietary Fiber 0g 0%
Sugars 4g
Protein 2g
Vitamin A 6%
Vitamin C 0%
Calcium 6%
Iron 0%

*Percent Daily Values are based on a 2,000 calorie diet

Nutrition Facts
MILK, CREAM, SUGAR, CORN SYRUP, EGG YOLKS, WHEY, CAROB BEAN GUM, MONO AND DIGLYCERIDES, VANILLA BEANS*, NATURAL FLAVOR, RUM, NATURAL VANILLA FLAVOR*, TARA GUM, ANNATTO (FOR COLOR), GUAR GUM, SALT.

Nutrition Facts
SKIM MILK, MALTITOL SYRUP, MALTODEXTRIN (CORN), CREAM, WHEY, CONTAINS 2% OR LESS OF EACH OF THE FOLLOWING: MONO AND DIGLYCERIDES, GUAR GUM, CAROB BEAN GUM, NATURAL FLAVORS, CARRAGEenan, ACESULFAME POTASSIUM, SUCRALOSE (SPLENDa® BRAND), TARA GUM, VITAMIN A PALMITATE, ANNATTO (FOR COLOR).
Dos and Don'ts
of breakfast from office cafeteria

DO
• Oatmeal
• Fruit cup
• Grits

DON'T
• Cinnamon Roll
• Muffin

MAYBE
• Pancake
• Waffle
How Should Your Plate Look

- **Monday cafeteria special:** Red Beans and Rice with Sausage, veggies, salad, cornbread

- **Better option:**
  - 1/3 cup rice
  - ½ cup beans
  - 3oz pork chop
  - 1 cup green beans
  - 1 orange
Vending Machine vs...

... Healthy Snacks!

- Hummus with carrots or cucumbers
- Protein bars
- Greek yogurt
- Nuts with dried fruit
- Cottage cheese with fruit
- String cheese with ½ avocado
Resources:

- [http://www.news-medical.net/health/What-is-Insulin.aspx](http://www.news-medical.net/health/What-is-Insulin.aspx)
- How You Can Eat Healthy and Watch Carbohydrates – BCBSLA handout
- [http://www.mayoclinic.org](http://www.mayoclinic.org)
Questions?