**Carbohydrates**

Read on to learn...

- More about the purpose of carbohydrates (often referred to as “carbs”).
- What the difference is between complex carbohydrates and simple sugars
- Which type of carbohydrates will maximize your energy, health, and fitness goals
- How to manage sugar cravings
- More about how carbohydrates can lead to weight gain

**What is the purpose of carbohydrates?**

Carbohydrates are the body’s preferred source of energy. Some of our cells (like our brain and red blood cells) can ONLY use carbohydrates for energy. Because of their vital role, most of our daily Calories should come from carbohydrates. But, the exact amount you personally need varies anywhere between 45 and 65% of total Calories, depending on your individual health and fitness needs. For most active, healthy college students, 55-60% of total Calories from carbohydrates is a reasonable goal.

**Who may benefit from eating less carbohydrate?**

Someone with diabetes or insulin resistance may enjoy better blood sugar control with a lower (i.e. 45%) carbohydrate eating plan. People with these conditions can’t handle carbohydrate as well, especially if they are not physically active or they are obese.

**Who may benefit from eating more carbohydrate?**

Endurance athletes, such as those preparing for the LA marathon, may train and compete better if they consume 65% of total Calories from carbohydrate (or even up to 70% of total Calories from carbohydrate a few days before the race if carbohydrate loading). A higher carbohydrate intake will help maximize their muscle carbohydrate (or glycogen) stores and, as a result, help increase their endurance.

**Types of carbohydrate: simple vs. complex**

Carbohydrates can be classified into two general categories based on their chemical structure: simple carbohydrates (or sugars) and complex carbohydrates (or starches).

1. **Simple carbohydrates (sugar)**

   Much of the sugar Americans consume comes from what is added to processed foods (such as cookies, cakes, muffins, ice cream, candies, breakfast cereals, sports bars, and especially sodas). The most common form of added sugar is plain white table sugar (or sucrose). Other sugars that are added to foods include molasses, honey, high fructose corn syrup, and fruit juice concentrate. Read labels to identify these sources.

   Sugar is also naturally occurring in some foods. For example, fruit has fruit sugar (called fructose), and milk has milk sugar (called lactose). Just because these foods are high in sugar doesn't make them "bad" foods. On the contrary, these foods are loaded with important vitamins and minerals, and they are relatively low in Calories. It’s only when sugar is concentrated or extracted from natural sources and then added to nutrient-poor processed foods (like the foods mentioned above) that sugar can become a problem.
Is it normal to crave sugar?

Many students worry about having sugar cravings. They feel as if they are "bad" for craving sweet things. Keep in mind that it’s actually very natural for all of us to crave sugar to some extent. As infants, we instinctively turn to our mother’s breast to satisfy our innate craving for sweet milk. Sometimes, though, these cravings can get out of hand; and sweets begin replacing other nutrient-rich foods in the diet.

2. Complex carbohydrates (starch)

Complex carbohydrates are in foods such as bread, cereal, rice, pasta, tortillas, crackers, pretzels, beans, and starchy vegetables (like potatoes, peas, corn, and yams). Because whole pieces of fruit have fiber (unlike fruit juices or fruit juice concentrate sweeteners), they too can be considered complex carbohydrates.

Much of the complex carbohydrate Americans consume comes from refined and processed products (such as white breads, white rice, white pasta, and white instant potatoes or French fries). The refinement of these foods takes away many of their nutrients and fiber and leaves just a white starchy final product. These foods are “enriched,” but only with five nutrients (four B vitamins and iron). All the other nutrients are forever lost. Foods in their whole form (such as whole wheat bread, brown rice, oats, and whole grain cereals) retain all of their nutrients and fiber.

<table>
<thead>
<tr>
<th>Simple Carbohydrate (Sugar)</th>
<th>Complex Carbohydrate (Starch)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Added sugars (added to sodas, breakfast cereals, baked goods, frozen desserts, candies, and other sweets)</td>
<td>Refined, processed foods (low fiber)</td>
</tr>
<tr>
<td>- White table sugar (100% sucrose)</td>
<td>- “Enriched wheat flour” breads and cereals</td>
</tr>
<tr>
<td>- Molasses (Syrup left over from refining sucrose from sugar cane)</td>
<td>- White rice</td>
</tr>
<tr>
<td>- Brown sugar (white sugar with molasses added)</td>
<td>- White pasta</td>
</tr>
<tr>
<td>- Honey (Concentrated solution of fructose and glucose)</td>
<td>- Instant potatoes and French fried potatoes</td>
</tr>
<tr>
<td>- High fructose corn syrup (Fructose, glucose, and maltose)</td>
<td>Whole foods (high fiber)</td>
</tr>
<tr>
<td>- Concentrated fruit juice sweetener (Concentrated syrup of dehydrated fruit juice)</td>
<td>- “Whole wheat or grain” breads and cereals</td>
</tr>
</tbody>
</table>

Naturally occurring sugars (found in fruits, vegetables, and milk)

- Fruit sugar (fructose)
- Milk sugar (lactose)

Whole foods (high fiber)

- Oats
- Brown and wild rice
- Whole wheat pasta
- Beans and peas
- Whole vegetables
- Whole pieces of fruit

Does it matter which type of carbohydrate you choose?

All carbohydrates (whether simple or complex) are ultimately broken down in the body to the same thing:
sugar (i.e. blood sugar or blood glucose). And all carbohydrates ultimately fuel your brain and body the same way. So does it matter whether carbohydrate fuel comes from a diet of mostly added sugars in gummy bears, Oreo cookies, and soda vs. a diet of mostly whole grains, beans, vegetables, and fruits? Absolutely!

1. Simple sugars (when added to foods) are a more concentrated form of carbohydrate and Calories. Naturally occurring sugars in whole pieces of fruit and complex carbohydrates in grains and vegetables are diluted with fiber and water, which makes them more bulky (so they fill you up) without extra Calories.

   Similarly, naturally occurring sugar in nonfat milk is diluted with water, protein, and many important vitamins and minerals.

2. Simple “added sugars” have few (if any) vitamins or minerals. They’re just “empty Calories.”

   Calories from added sugars are hiding in many foods. Take a look at the Calorie difference between foods that have a lot of hidden added sugar vs. no hidden added sugar:

<table>
<thead>
<tr>
<th>FOOD COMPARISON</th>
<th>TOTAL CARBOHYDRATE / SUGAR</th>
<th>TOTAL CALORIES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plain fat free yogurt with fresh berries (1 c.) Vs. One brand* of fat free fruit-sweetened yogurt (1 c.)</td>
<td>13 g -- all naturally occurring sugars Vs. 51 g -- 12 g naturally occurring sugars + 39 g (10 tsp.) added sugar</td>
<td>94 Calories 250 Calories</td>
</tr>
<tr>
<td>*Not all brands have this much added sugar. Read your labels!</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Water (12 oz.) Vs. Cola beverage (12 oz.)</td>
<td>0 g -- no added sugar Vs. 38 g -- 10 tsp. added sugar</td>
<td>0 Calories 150 Calories</td>
</tr>
</tbody>
</table>

3. Simple added sugars (as well as many refined, low fiber starchy foods) are digested and absorbed more quickly, resulting in a rapid rise in blood sugar levels. This gives you a rapid, immediate burst of energy. But, this energy is short lasting. High blood sugar levels trigger a rapid surge of the hormone insulin. Insulin causes a rapid drop in blood sugar, leaving you feeling tired, hungry, and craving more sugar shortly after you eat.

   Not everyone experiences these "highs" and "lows" as a result to eating simple, sugary, refined foods. But as many as one in four adults (without diabetes) may be at risk due to a genetic predisposition to insulin resistance. Insulin resistance can lead to increased insulin levels, increased sugar cravings, and increased risk for obesity, diabetes, and heart disease. Whether or not you have insulin resistance, there are simple lifestyle choices you can make to maintain and/or achieve healthy blood sugar levels.

   **Why carbs can lead to weight gain**

   There are two main reasons why carbohydrates can lead to weight gain in some people: 1) eating large portion sizes and 2) smothering them with high Calorie, high fat toppings.
1. **Eating large portion sizes:** Over the past several years, portion sizes of carbohydrate-rich foods have doubled or even tripled in restaurants. As a result, we have become accustomed to jumbo, deluxe, and super-sized portions whether we eat out or at home.

2. **Smothering them with large amounts of high Calorie, high fat toppings:** For every tablespoon of butter, margarine, or even “heart-healthy” olive oil you add to bread, potatoes, or pasta you’ve packed on an extra 100-120 Calories. If you add ¼ cup of pesto or ½ cup of alfredo sauce, you’ve got 300 additional Calories.

**BOTTOM LINE:**
- One of the good points about many of the popular low carbohydrate diets is that they draw attention to the quality of the carbohydrates that we’re eating. Most Americans are choosing lots of refined, sugary, Calorie-rich (but nutrient-poor) carbohydrates like soda, candy, white bread products, white rice, and processed French fried potatoes.
- A healthy eating plan consists of 45-65% of mostly high quality, wholesome carbohydrates (including whole wheat bread, brown rice, oats and other whole grains, beans, vegetables, fruits, and low fat milk foods).
- That doesn’t mean that it’s “bad” to eat sweets or processed foods once in a while or even every day. There are no “good” or “bad” foods. Balance is key.
- For instance, white rice or white pasta is not “bad” if you’re eating it with high fiber vegetables and a good source of lean protein. The whole meal is rich in fiber. And, the protein and fat in the meal help slow down how fast the carbohydrate is digested and absorbed, so the result is a lower insulin response.
- Further, if you’re active and spending many Calories a day, you can afford to enjoy some “empty Calories” in your diet. It’s all about balance and moderation!

*Take the Carbohydrates Quiz!*