

Chapter 1

What Is the Glycemic Index?

In This Chapter

- ▶ Defining the glycemic index by focusing on carbohydrates
 - ▶ Getting a feel for how glycemic index measurements work
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When the glycemic index was first introduced in the 1980s, its main focus was on helping people with diabetes gain better control of their blood sugar. The original glycemic index research included only 62 foods, but if you fast forward to today, you see that hundreds of foods are now included. Although the glycemic index is a fairly new science, you can find all sorts of mainstream diet programs that incorporate it into their daily guidelines. To keep up with the glycemic index trend, many food companies are focusing on developing lower-glycemic food options, and glycemic testing institutions are creating special food labeling to make it easier for you to find the low-glycemic foods you're looking for.

So if you're thinking about starting a gimmick-free lifestyle change that's based on science (yes, we mean the glycemic index diet), get ready to dive right in! In this chapter, we give you a quick rundown of what the glycemic index is and how the glycemic index is measured.

Introducing the Main Event behind the Glycemic Index: The Effect of Carbs

The *glycemic index* isn't a diet in the sense that you have to follow specific meal plans or eliminate certain foods from your daily meals and snacks. Instead, it's a scientific way of looking at how different carbohydrates in foods affect *blood glucose*, or blood sugar, levels. Although all carbohydrates raise blood sugar to some degree, the glycemic index takes this notion a step further by figuring out how much a specific food raises blood sugar. This information is especially important to know if you want to lose weight or if

you have diabetes, heart disease, or certain other health issues. (See Chapter 2 for details on how the glycemic index diet can help you manage different health conditions.)



The glycemic index applies only to foods that contain carbohydrates, which include vegetables, fruits, grains, lentils, legumes, sugars, and the dairy portions of your meals. It shows you how these foods impact your blood sugar, which then affects everything from your energy levels to food cravings.

The following sections give you the scoop on how different types of carbohydrates impact your blood sugar and insulin levels.

Understanding the differences between carbohydrates

Most foods are made up of the following three calorie-containing macronutrients:

- ✓ **Carbohydrates:** As the body's primary fuel source, carbohydrates provide energy for the brain, muscles, and organs.
- ✓ **Protein:** The body rarely uses protein for energy because protein has other, more valuable uses — like being the building blocks of body tissues.
- ✓ **Fat:** The body uses fat for energy, but only when it has used up all the available carbohydrates.

Although health experts recommend that people get 40 to 60 percent of their total calorie intake from carbohydrates, active people need more carbohydrates to fuel their muscles, and children and adolescents need more carbohydrates to fuel growth. On the other hand, people who are sedentary or who have health issues related to *insulin resistance* (which occurs when your body produces insulin but doesn't use it properly) need smaller amounts of carbohydrates. (See Chapter 2 for details on how a low-glycemic diet can benefit folks with certain health issues.)

Because carbohydrates are the body's primary source of energy, it makes sense that just about every food group contains them. For instance, fruits, vegetables, grains, beans, lentils, and dairy products all contain different amounts of carbohydrates.

In general, carbohydrates come in these two varieties:

- ✓ **Simple carbohydrates:** Contain one or two sugar units
- ✓ **Complex carbohydrates:** Contain multiple sugar units

In the past, scientists thought simple carbohydrates raised blood sugar levels faster than complex carbohydrates because their sugar units are shorter and, thus, would break down more quickly. However, the glycemic index has shown that all carbohydrates, both simple and complex, vary greatly in regard to their blood sugar responses. For example, past reasoning dictated that a baked russet potato, which is a complex carbohydrate, would make a person's blood sugar rise more slowly than a teaspoon of sugar, which is a simple carbohydrate. But when these two foods were tested in clinical human studies, the opposite was true. The potato increased blood sugar more quickly than the sugar.



You can't tell how different foods will impact blood sugar or whether those foods are high or low glycemic just by looking at their food categories. Instead, researchers have to test specific foods to determine how the human body will respond to them. The same is true for recipes. The recipes we include in Parts III and IV are made up of low-glycemic ingredients that have been tested, but the recipes themselves haven't undergone any human clinical tests. For this reason, we can make an educated guess that the recipes will stay low glycemic when you make them, but we can't know for sure without the clinical testing. (Check out Appendix A to find the tested glycemic levels of many common foods.)

Knowing how blood sugar can work for you and against you

All carbohydrates, whether they're low glycemic or high glycemic, break down into blood sugar, which plays a crucial role in the body's ability to function properly. The body uses blood sugar as fuel for energy — much like a car uses gasoline — which is why athletes depend on carbohydrates to fuel their bodies so they can participate at peak performance.

The problem with blood sugar (and carbohydrates) arises when your blood sugar levels spike high throughout the day on a regular basis. These spikes occur when you eat mostly high-glycemic foods or large portion sizes of carbohydrate-containing foods. For many people, these spikes don't have a noticeable impact on their lives, but for others, these spikes can lead to food cravings, mood swings, energy crashes, and more serious issues like high clinical blood sugar (for diabetics or those with prediabetes), high cholesterol, or high *triglycerides* (fats found in the bloodstream that can increase your risk of heart disease when their levels are high). In addition, regular blood sugar spikes can impact how your body stores fat. How blood sugar spikes affect you personally depends on your body and genetics.



Choosing low-glycemic foods most of the time is one way to help keep blood sugar under control. We explain how to use a low-glycemic diet to battle cravings, suppress your appetite, and keep calories under control in Chapter 3.

Considering the role insulin plays in storing blood sugar

As we note in the previous section, when you eat carbohydrates, your body breaks them down into blood sugar. As soon as your blood sugar levels start to rise, your pancreas releases a hormone called *insulin*. Insulin acts like a key that unlocks the door to your cells so the blood sugar can enter them and be used as energy (see Figure 1-1).

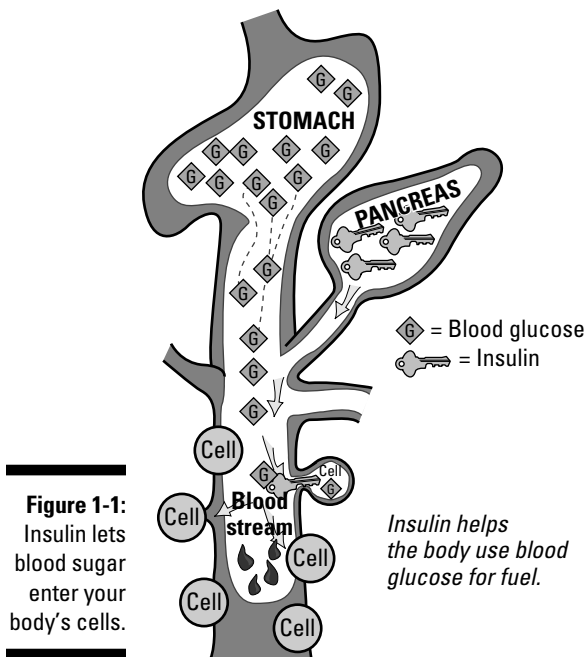


Figure 1-1:
Insulin lets
blood sugar
enter your
body's cells.

Even though insulin transports blood sugar directly to your cells, your body doesn't turn all that blood sugar into energy right away. When blood sugar levels rise above normal (in part because you're eating high-glycemic foods), insulin signals your liver, muscles, and other cells to store the extra sugar. Your body stores some of this excess blood in your muscles and liver as *glycogen* (long-term stored energy) and converts some to body fat. Eating low-glycemic foods helps you regulate insulin and blood sugar levels that could become unstable because of a health condition or because you eat excess amounts of carbohydrates or calories.



Keep in mind that your body is extremely efficient. You won't become overweight just because you have one high-glycemic meal or because you eat one too many servings of stuffing at Thanksgiving. Your body stores fat over time when you continually take in more calories than you need. (See Chapter 3 for details on how to use a low-glycemic diet to control calories.)

Measuring a Food's Glycemic Index

The *glycemic level* of a food measures how fast that food is likely to raise your blood sugar. A food that is rapidly digested and absorbed with a high increase in blood sugar is considered *high glycemic*, and a food that is slowly digested and absorbed with a gradual rise in blood sugar is considered *low glycemic*. Foods that fall in the middle are considered *medium glycemic*. The following sections describe the index measurement process; define low-, medium-, and high-glycemic foods; explain the importance of nutrition when looking at categories of foods; and spell out some of the limitations of the glycemic index.



Only carbohydrate-containing foods can be considered low, medium, or high glycemic. Other food groups, like meats and fats (think oil and butter), don't contain carbohydrates, so you have to use your nutrition know-how to determine the best choices for you.



Be sure that you don't confuse the glycemic index with the *glycemic load*, which is a measurement based on the glycemic index and which you can use to start planning meals that fit the glycemic index diet. Flip to Part II for the scoop on glycemic load and meal planning.

Graphing responses to different foods

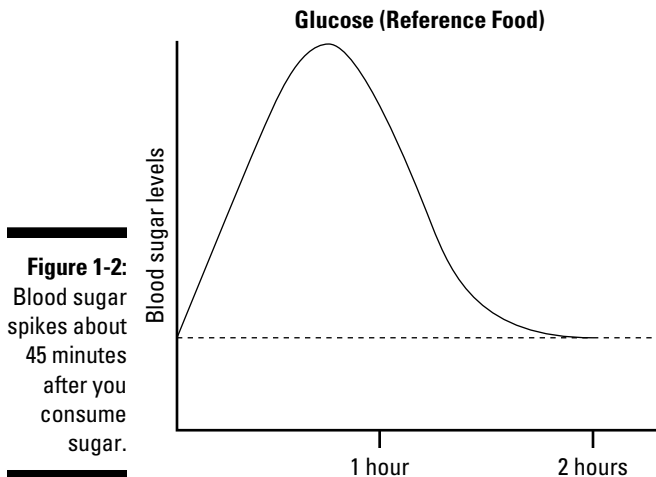
Measuring a food's glycemic index is actually a very expensive and involved process that requires human test subjects. Researchers feed 50 grams of *available carbohydrates* (that's total carbohydrates minus fiber) from a particular food item to ten or more volunteers to test how the food raises their blood sugar levels at different intervals over a two-hour period after it's consumed. The researchers plot the changes in blood sugar levels on a graph and then follow the same procedure with 50 grams of available carbohydrates from pure sugar or white bread. To determine the glycemic index of the tested food item, they compare the average blood sugar response of all ten volunteers to the tested food item and the average response to the sugar or white bread.



Researchers use pure sugar for comparison purposes because it's the simplest form of energy used by the human body. However, because most people don't typically eat sugar by itself, researchers sometimes use white bread instead to test comparisons of staple foods.

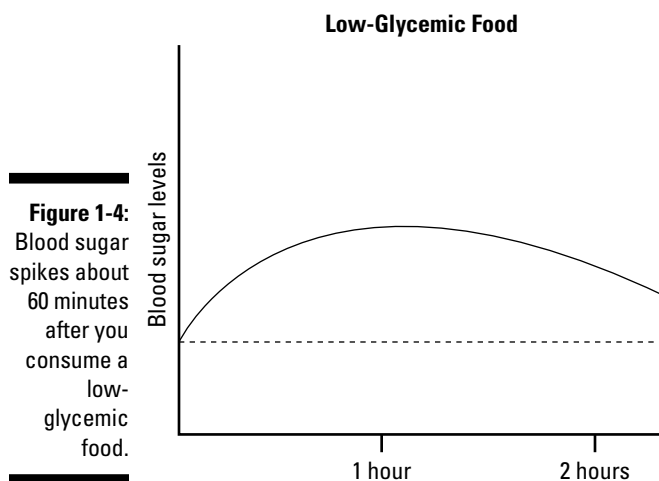
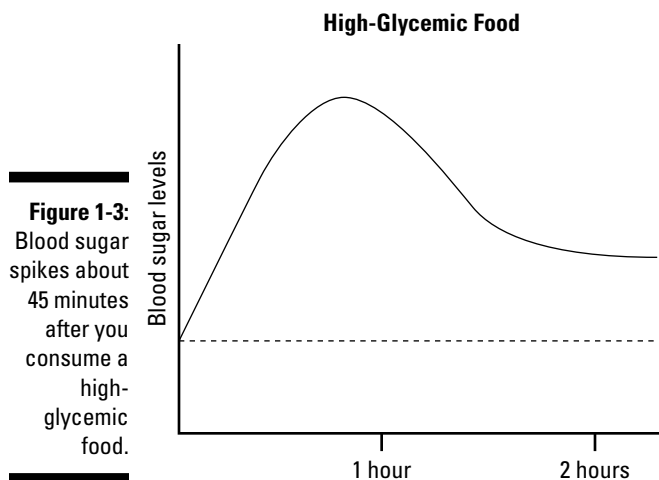
Here are a few examples that show you how this testing process may look on a graph:

- ✓ Figure 1-2 shows the sharp rise in blood sugar response when test subjects consume pure sugar. You can see the quick rise and ensuing drop over a short amount of time. Notice that the maximum blood sugar spike occurs around 45 minutes after consumption. After this peak, the blood sugar levels drop quickly.



- ✓ Figure 1-3 shows what happens when test subjects consume a high-glycemic food. Notice how the rise is similar to what you see in Figure 1-2.
- ✓ Figure 1-4 shows how the curve changes when test subjects consume a low-glycemic food. Notice that the maximum spike is much lower and occurs much later than the spike that occurs after subjects eat pure sugar or high-glycemic foods; it happens about an hour after consumption with a slow drop back to the baseline.

Because this type of blood sugar response requires lower levels of insulin, it results in better control of food cravings, hunger, and mood. For diabetics or anyone with insulin resistance, this means that your body won't require as much insulin and what insulin is needed will be required at a slower rate.



Keeping nutrition in mind when defining low- to high-glycemic foods

After a food undergoes glycemic index testing, determining whether it's low, medium, or high glycemic is pretty straightforward. High-glycemic foods have the fastest blood sugar responses, and low-glycemic foods have the slowest.



Here are the glycemic index measurements on a scale of 0 to 100:

- ✓ **Low glycemic index:** 55 or lower
- ✓ **Medium glycemic index:** 56 to 69
- ✓ **High glycemic index:** 70 or higher

High-glycemic foods aren't necessarily unhealthy foods. Similarly, low-glycemic foods aren't always healthy. The glycemic index measurement simply lets you know how quickly your blood sugar will rise from eating a particular food.



Basing your food choices solely on the glycemic index can get you into trouble because it means you're looking at only one aspect of the food and ignoring other important aspects, such as calories, fiber, vitamins, and minerals. (Chapter 3 explains why considering calories and fiber is important, especially when you're trying to lose weight.)

Many people think that whole grains, fruits, and vegetables naturally fall into the low-glycemic category. Although this estimation is true most of the time, it isn't always the case. On the same note, many non-nutritious foods are considered low glycemic. Table 1-1 shows you the glycemic index measurements of some popular healthy and unhealthy foods. As you can see, some foods fall right where you thought they'd be. For example, brown rice is a low-glycemic food. In contrast, other foods may surprise you. Notice that peanut M&M's and Snickers bars have low-glycemic indexes. Does that mean they're healthy and nutritious? No. Although they aren't a bad snack to choose once in a while, they're still a low-nutrient, high-fat, and high-calorie food.

The point at which specific types of products vary is where the glycemic index gets tricky. For example, notice that jasmine rice has a significantly higher glycemic index than basmati rice even though both types of rice are white. To help you figure out which common foods, including different rice and pasta varieties, fall into the different glycemic categories, turn to Appendix A.

Table 1-1 The Glycemic Lowdown on Some Popular Foods

<i>Food</i>	<i>Glycemic Index Number</i>	<i>Measurement</i>
Peanut M&M's	33	Low
Snickers bar	43	Low
Brown rice	48	Low
Whole-wheat bread	52	Low
Basmati white rice	57	Medium

<i>Food</i>	<i>Glycemic Index Number</i>	<i>Measurement</i>
Spaghetti	58	Medium
Plain bagel	69	Medium
Watermelon	72	High
Jasmine rice	89	High
Baked potato without skin	98	High



Beware of labeling all low-glycemic foods as “healthy.” That’s what happened during the lowfat craze of the 80s and 90s. People started eating lowfat everything, even if it meant higher sugar and calorie contents. To help you make the best food choices, use the glycemic index in combination with everything you already know about healthy eating, and incorporate high-nutrient, low-calorie foods into your everyday diet.



Watching out for a few limitations

The glycemic index is a great tool, but it does have a few limitations you need to know about:

- ✓ **The lists are limited.** Glycemic index testing has only been around for about 20 years, and it isn’t required by federal guidelines in the United States. The testing process is quite expensive and time-consuming because each variation of every food must be tested before researchers can finalize their results. Also, only a small number of researchers actually conduct the glycemic index testing, and they can’t possibly keep up with the thousands of new food products that manufacturers develop each year.

The recipes in Parts III and IV use low-glycemic ingredients with estimated glycemic loads (described in Chapter 4), but the recipes themselves haven’t been officially tested.

- ✓ **The findings vary.** Researchers have to observe humans to determine glycemic index measurements, and no two humans are alike. That means the rate at which people digest carbohydrates, their insulin responses, and even the time of day when they’re tested can cause variation in testing results. To account for these variations, researchers have to test each food on many people and then take the average.

Furthermore, the food world is full of variety. For example, you may find one long-grain rice variety with a glycemic index of 62 and another with an index of 68. The differences can result from where the grains were grown, how long they were cooked, how they were cooked, and so on.

The measurement process isn't a perfect science, but, for the most part, the same types of foods turn out to be around the same glycemic index. For example, even if one long-grain rice variety has a glycemic index of 62 and the other 68, both still fall into the medium-glycemic category. The important message to take home is focusing on whether a food generally ends up low, medium, or high glycemic and then trying to select lower-glycemic foods.

- ✔ **Combining foods in meals complicates things.** Putting foods with different glycemic index measurements together in one meal means creating a different glycemic index for that whole meal. With an infinite number of meal combinations out there, you can understand why you won't find a complete list of high-, low-, and medium-glycemic meals anytime soon. Even so, some packaged frozen meals like lasagna or macaroni and cheese have been tested. (Go to www.nutritiondata.com to find out if researchers have determined the glycemic level of the particular food or meal you want to eat.)

Despite these limitations, the glycemic index can be a very useful tool in helping you achieve your goals in health and fitness. Turn to Chapter 2 to find out how following a low-glycemic diet can help you work toward disease prevention and Chapter 3 to see how you can use a low-glycemic diet for weight loss.