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Glycemic Index

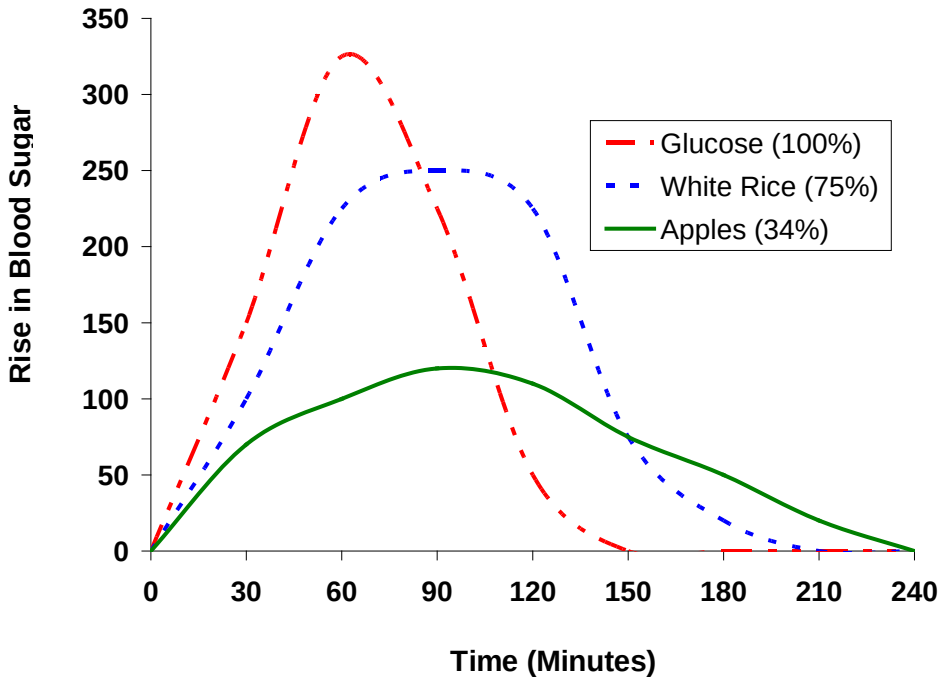
Improving your blood glucose levels

This handout explains the glycemic index (GI) and glycemic load (GL). It also lists low glycemic index foods to help you choose foods that will help you improve your blood glucose levels and the quality of your diet.

What is the glycemic index?

The *glycemic index* (GI) is a measure of how different carbohydrates raise blood glucose levels. It compares the effect of 100 grams of pure glucose to an equal amount of other carbohydrates. The GI calls the effect of pure glucose 100%. The changes in blood glucose from other carbohydrates are compared to that 100%, and they are also given in percents.

Rise in Blood Sugar Over Time



The chart above shows what happened to their blood sugars when a group of people was given 100 grams of glucose. The same group was then given 100 grams of carbohydrate from white rice. They were then given a 100-gram carbohydrate serving of apples. Their blood sugars were measured and values were charted after each intake.

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The chart on page 1 shows that:

- The GI of white rice was 75% of the glucose GI
- The GI of apples was 34% of the glucose GI

Blood glucose is most stable when foods you eat have a glycemic index less than 50%. Choosing foods with a GI less than 50% is also good for your heart and improves the overall quality of your diet. This is because most low-GI foods are less processed and have a higher fiber content.

The glycemic index should not be used as your only tool for blood sugar control. But it is very helpful when used with other food and nutrition guidelines. These include watching your total carbohydrate, fat, and protein intake, as well as food portion size.

You can learn more about the GI at these websites:

- The Official Website of the Glycemic Index and GI Database (University of Sydney), *www.glycemicindex.com*
- Living with Diabetes, *www.mendosa.com*

What is the glycemic load?

The GI ranks foods based on their blood glucose response, but it does not consider how the carbohydrate in a food portion affects glycemia. *Glycemic load* uses both the amount of carbohydrate eaten and the GI.

To calculate the glycemic load of a serving of food, you need to know:

- The glycemic index of that food
- The grams of available carbohydrates in the serving (total carbohydrate minus fiber)

To find the glycemic load, multiply the glycemic index of the food times the number of available grams of carbohydrate in the serving. Then divide the total by 100. Here is the formula:

Glycemic load = Glycemic index x **Grams carbohydrate / 100**

Here is an example:

- The glycemic index for raw carrots is 71. A ½ cup serving has about 8 grams of available carbohydrates.

  71 x 8 = 568 / 100 = 5.7 glycemic load

A glycemic load of 10 or less is **low**, a glycemic load of 11 to 19 is **medium**, and a glycemic load of 20 or more is **high**.

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Glycemic Index of Common Foods

100% Glucose **80 to 89%** Carrots Cornflakes Honey Maltose Parsnips Potatoes (instant mashed) **70 to 79%** Bread (whole grain) Broad beans (fresh) Millet Potato (new) Rice (white) Rutabaga Weetabix **60 to 69%** Bananas Beetroot Bread (white) Mars Bars Muesli Raisins Rice (brown) Ryvita Shredded Wheat Water Biscuits	**50 to 59%** All-Bran Buckwheat Digestive biscuit Oatmeal biscuit Peas (frozen) Potato chips Rich tea biscuit Spaghetti (white) Sucrose Sweet corn Yam **40 to 49%** Beans (canned navy) Oatmeal Oranges and orange juice Peas (dried) Spaghetti (whole grain) Sweet potato	**30 to 39%** Apples Butter beans Black-eyed peas Garbanzo beans (chickpeas) Haricot beans Ice cream Milk (skim or whole) Tomato soup Yogurt **20 to 29%** Fructose Kidney beans Lentils **10 to 19%** Peanuts Soybeans

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Choosing low-glycemic foods helps blood sugars stay in better balance.

Some Low-Glycemic Index Foods

Here are some common low-glycemic index foods. Please note that all amounts are estimates. See the Nutrition Facts labels on food products for more accurate numbers.

Legumes

Serving size = ½ cup cooked or as shown
(15 to 20 grams carbohydrate, 100 calories)

All beans: garbanzo (chickpeas), pinto/refried, kidney, black, lima, cannelloni, navy, mung	Lentils, red and green
Bean soups (¾ cup)	Soy: fresh soy beans (edamame), tempeh (½ cup)
Hummus (¼ cup)	Split peas, green and yellow

Non-Starchy Vegetables

Serving size = ½ cup cooked
(5 grams carbohydrate, 25 calories)

Asparagus	Eggplant
Artichoke	Green beans
Bamboo shoots	Greens: bok choy, Swiss chard, kale, collard greens, watercress, dandelion
Bean sprouts	Lettuce/mixed greens: Romaine, red and green leaf, spinach, arugula
Broccoli	Mushrooms
Brussels sprouts	Radishes
Bell peppers	Salsa, unsweetened
Cabbage: red, green, Chinese	Snow peas
Cauliflower	Sprouts
Celery	Tomatoes
Chives, onion, leeks, garlic	Zucchini, other summer squash
Cucumber	

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Starchy Vegetables

Serving size = ½ cup cooked, 1 cup raw, or as shown
(15 grams carbohydrate, 80 calories)

Carrots, beets (1½ cups cooked or 3 cups raw)	Winter squash: acorn, butternut, and others
Sweet potatoes or yams (½ medium)	

Concentrated Protein Sources

Serving size = 3 oz. (after cooking) or as shown
(150 calories)

Cottage cheese, nonfat (¾ ounce)	Parmesan cheese, grated: (4 tablespoons or ¼ cup)
Eggs (2 whole or ⅔ cup egg substitute)	Ricotta (½ cup)
Elk or buffalo (4 ounces)	Soy burger (4 ounces)
Fish, shellfish, chicken breast, turkey, lean leg of lamb, lean pork, lean beef	Tofu (8 ounces or 1 cup)

Oils

Serving size as shown
(0 grams carbohydrate, 45 calories)

Avocado (⅛ whole)	Mayonnaise made with tofu (1 tablespoon)
Flax seed oil (1 teaspoon)	Oils – expeller cold-pressed olive, canola, walnut, and sesame (1 teaspoon)
Mayonnaise made with canola oil (1 tablespoon)	Olives, ripe or green (10 medium)

Nuts and Seeds

Serving size = 10 to 12 whole almonds, cashews, or hazelnuts; 7 to 8 walnut or pecan halves; 2 tablespoons seeds
(0 grams carbohydrate, 100 calories)

Nuts (almonds, hazelnuts, pecans, walnuts)
Nut butters (from nuts above): 1 tablespoon
Seeds (sunflower, pumpkin, sesame)

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Fruits

Serving size = 1 whole fruit or ½ cup canned in juice or water, or ½ cup sliced; 1 cup berries and melons; or as shown
(15 grams carbohydrate, 60 calories)

Apple	Melons (cantaloupe, honeydew)
Apricot (2)	Nectarine
Berries, all	Papaya (½)
Cherries (12)	Peach
Figs, fresh (2)	Pear
Grapefruit (½)	Plum (2)
Grapes (12)	Orange
Kiwi fruit (2)	Star fruit (2)
Mandarin orange, tangerine (2)	Watermelon (1¼ cups cubed)

Dairy

Serving size as shown
(12 grams carbohydrate, 90 to 120 calories)

Buttermilk, plain, nonfat or 1% milk (8 ounces or 1 cup)	Soy yogurt, plain, low-fat (4 ounces or ½ cup)
Soy milk, plain, low-fat (8 ounces or 1 cup)	Yogurt, plain, low-fat or fat-free (8 ounces or 1 cup)

Whole Grains

Serving size = ½ cup cooked grains or as shown
(15 grams carbohydrate, 80 to 100 calories)

Bread: whole wheat, rye (1 slice)	Rice: Basmati, white, or brown (⅓ cup)
Crackers: whole grain rye such as Ryvita, WASA (3 crackers)	Whole barley, whole oats, oatmeal
Grains: wild rice, millet, quinoa, amaranth, buckwheat groats, teff	Whole wheat, spelt, or kamut berries (⅓ cup)
Pasta: 100% whole wheat, soy, or brown rice	Whole wheat low-carb tortilla or pita bread (½)

Questions?

Your questions are important. Call your doctor or healthcare provider if you have questions or concerns.

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Published PFES: 01/2004, 03/2010, 07/2018
Clinician Review: 07/2018
Reprints on Health Online: https://healthonline.washington.edu

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