



Carbohydrates Fuel Your Body

As the low-carb craze dissipates, many are still questioning the role that carbohydrates play in weight control. There are a lot of questions, a lot of theories, a lot of promises, and a lot of diet plans claiming to be the 'right' one. It will take more research to explain the complex interactions that occur among appetite, food intake, satiation and weight control. Research has indicated that low-carb diets may increase initial weight loss, but long-term results are similar to those from more balanced diets of equivalent calories. Dr. Salder from Oregon Health Sciences University found that any additional weight loss found in low-carb dieters was due to an increase in water loss, not fat loss. What we do know is that carbohydrates are the body's (and brain's) main fuel source. Foods from the dairy, vegetable, fruit, and grain group all contain significant amounts of carbohydrates and important vitamins and minerals essential to good health. Drastically cutting carbohydrates from the diet means eliminating important foods from each of these groups.

Although drastically cutting carbohydrates from the diet for weight loss is not supported by research as effective or healthy, it may make sense to choose your carbohydrates wisely. A basic nutrition review finds carbohydrates in a variety of foods. Grapes, apples, corn, green beans, carrots, juices, bread, candy, apple pie and ice cream sundaes all contain carbohydrates. The most common types of carbohydrates are sugars, starches and fibers. All carbohydrates are made from the basic building blocks of simple sugars. Simple sugars contain two linked sugar molecules. Complex carbohydrates (starches and fibers) contain 3 or more sugar molecules joined together. Healthful sources of carbohydrates include fruits, vegetables, whole grain and low fat dairy products. They deliver essential vitamins, minerals, fiber, and phytonutrients (beneficial disease-fighting compounds) in addition to providing fuel for the body.

Intake of added sugars has skyrocketed.

In 2003, the average American consumed 37 teaspoons or more of added sugar daily (this translates to 142# of sugar each year). Much of this sugar comes in the form of soft drinks or fruit drinks. Although studies are inconclusive regarding the effect that this high intake of added sugars is having on our obesity epidemic, most health authorities agree that because simple sugars added to foods and drinks provide calories and no other significant nutrients, they should be limited. Roux-en-Y bariatric surgery patients know that not all sugars are processed equally in the body. Foods and beverages with added sugars, even relatively small amounts, cause the post-Roux-en-Y body to react with flu-like symptoms while the sugars found naturally in fruits, dairy products and vegetables are well tolerated. *The bottom line--limit added sugars.*

Dietary fiber is found abundantly in fresh fruits and vegetables and whole grains. There are two main classes of fiber--soluble and insoluble. It is important to include good sources of both in your diet because they each have a role in keeping your body healthy. Soluble fiber dissolves in water and is found in fruits, vegetables, barley and oats.

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Soluble fiber binds to cholesterol and excretes it from the body. Insoluble fiber cannot be dissolved in water and is found in whole grain products. Insoluble fibers help to increase stool bulk. The American Heart Association recommends obtaining 25-30 grams of fiber from foods daily. The average American consumes only 14-15 grams daily. Choosing foods in their closest-to-nature state (least processed) significantly increases the fiber content. For example, 1 small tomato contains 20 calories and 1.4 grams of dietary fiber. Process that tomato into ½ cup of tomato sauce and it will provide 20 calories and only 0.5 grams of dietary fiber. In addition to losing out on the benefits of almost a gram of fiber, you will ingest an additional 727 mg of sodium by choosing the tomato sauce over the fresh tomato. This situation is repeated over and over throughout your day as you make food choices: an apple or applesauce; an orange or orange juice, a baked potato or French fries, whole grain cereal or cereal made with refined grains, hearty whole grain bread or white bread. Choosing foods that are closest to nature throughout your day will naturally add more fiber to your daily diet.

Whole-grain foods utilize the entire grain kernel and contain the bran, germ and endosperm components. Examples of whole grains are whole-wheat flour, cracked wheat (bulgur), oatmeal, whole cornmeal and brown rice. Refined grains have been processed to remove the bran and germ. This gives them a finer texture, but removes dietary fiber, iron and vitamins. Refined grains products include white rice, white bread, and white flour. Choose lower fat whole-grain breads, cereals, and crackers as closest to nature options.

Caloric density is another tool to help you choose healthy carbohydrates. Your body senses fullness or satiety after eating a certain weight of food no matter how many calories it contains. Calorie-dense foods--those containing 68 calories or more per ounce--are no more filling or satisfying than other foods. To calculate the caloric density of a food, divide the calories by the serving size in ounces. For example, a 3 oz serving of carrots provides 35 calories. The caloric density is $35 \div 3 = 12$. So carrots have a very low caloric density of 12. Within each food group are foods with higher or lower caloric densities. Choose most of your foods with a caloric density below 68. Limit foods with a high caloric density.

Another way to classify carbohydrates is the glycemic index. It measures the impact of a food or beverage that contains carbohydrates on blood sugar. White bread is classified as having a high glycemic index because it causes a fast, high spike in blood sugar. Foods that contain fiber, protein, or more complex carbohydrates take longer to digest, and tend to have a lower glycemic index because there is a slower, more moderate rise in blood sugar levels. Some studies support the link between a diet abundant in high glycemic foods and an increased risk for diabetes and heart disease. There also appears to be a link

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between low glycemic index food choices and increased blood sugar control for type 2 diabetics. A study reported in the February 2005 American Journal of Epidemiology found that those with lower body weights did not eat fewer total carbohydrates than the heavier study participants, but did choose foods with lower glycemic indexes.

The glycemic load is another indicator of the impact a food has on blood sugar. It takes into account both the glycemic index of a food and the amount of carbohydrates it contains. To find out more, the University of Sydney maintains a current database containing both the glycemic index and the glycemic load of foods at glycemicindex.com.

To keep blood sugar levels even (not too high or too low) and energy levels high:

- Replace refined grains with whole grains,
- Limit foods with added sugars,
- Choose fruits and vegetables in their closest-to-nature form with fibers intact,
- Add a little fat or protein to mostly carbohydrate snacks or meals (such as a slice of cheese with a few crackers),
- Eat six small meals and snacks throughout the day--keep portions small,
- Choose mostly calorie-free beverages.

Dietary Fiber Content of Common Foods

<i>Serving size</i>	<i>Total Fiber (grams)</i>	<i>Soluble Fiber (grams)</i>	<i>Insoluble Fiber (grams)</i>	
BREAKFAST CEREALS				
All-Bran	1/3 c (28 gm)	8.43	.59	7.84
Cornflakes	1 1/4 c (28 gm)	1.20	.14	1.06
40% Bran-type	3/4 c (28 gm)	5.46	.56	4.90
Oatmeal, regular, cooked	1 c (234 gm)	4.45	1.64	2.81
Puffed rice	1 c (28 gm)	.53	.14	.39
Shredded Wheat	2/3 c (28 gm)	3.16	.31	2.86
Wheat germ	1/4 c (56 gm)	7.84	.62	7.22
FRUITS				
Apple, no skin	1 med (138 gm)	2.07	.28	1.79

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Apple, with skin	1 med (138 gm)	2.76	.28	2.48
Banana	1 med (114 gm)	1.94	.57	1.37
Cantaloupe	1/4 (133 gm)	.93	.13	.80
Grapes	20 (100 gm)	1.00	.10	.90
Orange	1 med (131 gm)	2.49	.79	1.70
Pineapple, canned	1/2 c (125 gm)	.88	.13	.75
Raisins	1/4 c (36 gm)	1.51	.22	1.30
Strawberries	1 c (149 gm)	2.68	.60	2.09

VEGETABLES

Beans, green	1/2 c (67 gm)	1.27	.34	.94
Broccoli, raw	1/2 c (78 gm)	2.57	.23	2.34
Cabbage, raw	1 c (70 gm)	1.19	.07	1.12
Carrots, raw	1 med (72 gm)	1.80	.14	1.66
Corn, frozen, cooked	1/2 c (83 gm)	1.74	.08	1.66
Potato, no skin	1 med (156 gm)	2.03	.47	1.56
Potato, with skin	1 med (202 gm)	5.05	1.21	3.84
Turnip greens, frozen	1/2 c (82 gm)	2.05	.08	1.97

LEGUMES

Kidney beans, canned	1/2 c (128 gm)	6.66	1.41	5.25
Pork and beans, canned	1/2 c (128 gm)	5.63	1.79	3.84
Peas, green, frozen	1/2 c (80 gm)	2.80	.24	2.56

BREADS, PASTA

Bread, white	1 sl (25 gm)	.65	.15	.50
Bread, whole wheat	1 sl (28 gm)	2.59	.57	2.02
Rice, regular, cooked	1/2 c (102 gm)	.41	.10	.31
Spaghetti, cooked	1 c (140 gm)	2.10	.56	1.54

Adapted from Marlett, JA. Content and composition of dietary fiber in 117 frequently consumed foods. J Am Diet Assoc 92:175-186, 1992.

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