

UNDERSTANDING CARBOHYDRATES

Carbohydrates Drive the Body

Interchangeable words/ symbols: carbohydrates = CHO = carbs

While the term “carbs” is a familiar one today, more questions than answers arise from its use. Many people admit that a negative concept is associated with carb-containing foods. From body builders to well-meaning friends, the advice is to “cut the carbs” if you want to lose weight. But carbohydrates are contained in every plant that we eat for flavor, fluid and fortification.

Carbohydrates 101a

- Chemically, carbohydrates refer to organic compounds containing carbon, hydrogen and oxygen (CHO).
- CHOs are one of the three main energy nutrients, in addition to fat and protein, providing the body with calories.
- They are found in foods in simple form (sugars, fruit) and complex form (grains, vegetable) and are often called “starch” and “fiber” sources, as well as sugar sources.
- The smallest carbohydrate is a monosaccharide (1 sugar unit) such as glucose and fructose and has a sweet taste. All carbohydrates are made up of these sugar, or “saccharide” units.
- Carbs made up of 3 or more saccharide units are referred to as “complex” carbohydrates or “polysaccharides” and are contained in foods such as potatoes and grains.
- Starch is the main polysaccharide stored and used by plants for energy. Polysaccharides provide an excellent source of energy for our bodies, as well.
- Glycogen is the form of stored sugar in animals and people which is readily available for use when energy is needed. Glycogen is stored in liver and muscle tissues and is quickly converted to glucose molecules as needed.

Diabetes & Carbs

Diabetes is a disorder characterized by a prolonged, elevated blood sugar. It is typically caused by **either** the absence of the hormone insulin (made and secreted by the pancreas) **or** the body’s inability to use the available insulin to maintain a healthy blood sugar level.

When we consume a meal, starches are broken down and absorbed into the bloodstream. Our bodies **either** use that energy immediately and it is distributed to energy-requiring cells (similar to our checking accounts) **or** it is stored as glycogen in muscle and liver cells (think savings account). If our back-up energy stores of glycogen are filled, the body will convert excess glycogen into fatty acids which are then stored as fat. Some body fat is essential to survival, as it cushions our internal organs, regulates body temperature and supplies needed energy and fat-soluble vitamins. Having too much body fat can impede the body’s ability to function efficiently.

Insulin serves as a gatekeeper to allow movement of the glucose (sugar) circulating in our bloodstreams into the cells of our tissues where it can be used or safely stored. Adults with excessive body fat, especially fat that is concentrated in the abdominal area, carry a sobering risk of developing diabetes. The excess body fat interferes with the normal process of transferring surplus glucose from circulation into cells. The body usually tries to compensate by making more insulin available in the bloodstream. Abundant insulin can then trigger more energy to be stored as fat, complicating the effort to lose weight. That is why there is a lot of emphasis today on reducing excess body/ abdominal fat. Switching to whole grain carb foods, eating a balanced menu that is not excessive in calories, and making physical exercise a priority will go a long way toward addressing this situation. Reducing body weight by even 5-10 pounds can make our body’s insulin function more efficiently in maintaining normal blood sugar levels. Prolonged high blood sugar levels can cause irreversible damage to many of the body’s organs, including the eyes, kidneys, and vascular system. Maintaining near-normal blood glucose levels is vital to good health.

Becoming More Informed on Carb Contents in Foods

The key to good health is choosing the better forms and the right portions of carbohydrates. Just as with any person seeking better health, it is best to eat **whole grains and plenty of lower-starch vegetables while reducing simple sugar intake. It is also important to spread out your intake of carbs over the day** so that your body is fueled efficiently and not either starved or stuffed with this important nutrient. For more information pertaining to diet and diabetes, refer to the pamphlet "Is Diabetes In Your Future?".

WHAT'S A SERVING OF CARBS?

Many menu and diet plans refer to a "serving" of carb, and it's like a foreign language to the typical shopper. In the U.S., we are accustomed to portions being expressed in terms of teaspoons and parts of a cup measure. On nutrient labels, nutrients per serving are conveyed in metric measures of grams and milligrams.

The gram measure references weight. One gram is the weight of a small paper clip. A teaspoon of any dry powder (sugar, salt, flour) roughly weighs 5 grams, for illustration purposes.

One "serving" of carbohydrate contains 15 ± 3 grams of carbohydrate. The carbohydrate may be from sugars, starches (more complex chains of carbohydrate), dietary fiber, or a combination of them. Some common examples of one "carb" serving include:

- 1 medium fresh orange
- 3 c. of popcorn
- 1.5 c. of whole, fresh strawberries
- 1/2 c. of canned, juice pack peaches
- 1 slice whole grain bread (store-sliced thickness)
- 1, one ounce (28 g) bagelette
- 1 round toaster Eggo Nutrigrain waffle
- 2/3 c. Kellogg's Crispix cereal
- 2/3 c. unsweetened cooked oatmeal
- 2/3 c. General Mills Cheerios
- 1, 5-6" tortilla
- 1/2 of 6.5 diameter pita pocket
- 1/2 hamburger bun
- 1 ounce potato chips
- 1/3 c. cooked pasta
- 1/3 c. cooked brown rice
- 1/3 c. cooked long grain rice
- 1/3 c. bread or cornbread stuffing
- 1/4 c. Baked beans
- 1/3 c. refried beans, pinto beans or lentils
- 1/2 c. canned black-eyed peas
- 2/3 c. cooked soybeans

1/2 medium (2 "diameter) baked potato

1/2 c. canned whole kernel corn

How Much Should I Eat?

An estimated 50% of your daily calories should come from carbohydrates. Since the daily suggested calorie intake for most kids and the average college student is estimated to be 2000, 1000 of those calories would translate to 250 grams of carbs. But when we are talking health, all carbs are not equal. Americans eat too many simple carbs and too few of the fiber-containing, complex carbohydrates. Choosing the right kinds of carb-containing foods is key (<http://www.medicinenet.com/script/main/art.asp?articlekey=90373>).

Of the simple carbs eaten by many people, too many have their source in sugar-laden drinks and snacks. High fructose corn syrup (HFCS) is ubiquitous in pre-packaged foods. Instead, much of the simple sugars to be consumed should come from fresh fruits if we aim for more optimal health.

One Option of a 250 gram Carb Day

Breakfast:

17-20 red seedless grapes	15g
One (1 oz) whole wheat bagelette, toasted	31g
2 Tbsp natural, crunchy peanut butter	0-2g
8 ounces 1% fat milk	12g

Lunch:

Wrap of:

8" whole grain flour tortilla	26g
2 oz. diced turkey and ½ oz. shredded cheese	2g
½ c. diced raw tomato + shrd. Romaine or spinach	4g
½ c. steamed black beans	26g
1 med. naval orange	16g
8-16 oz. water	

Afternoon snack:

6 whole wheat crackers	19g
1 med. Apple	15g

Dinner:

3 1/2 oz. baked salmon filet	
1 c. cooked wild rice	35g
1 c. steamed green beans	6g
½ c. cooked carrot slices	6g
1 small whole wheat dinner roll	15g
2 tsp. soft margarine	
8-16 oz. water with lemon	

Evening Snack:

6 oz. Yoplait light yogurt (fruit flavor)	19g
1 oz. black walnuts	

Approximately 2015 calories and 250-252 grams estimated carbs

FAQs ON CARBS

- **Is the low carb diet plan the best way to lose weight?** It may help those who are obese accomplish up-front weight loss as they adopt new lifestyle and eating habits that will be more sustainable and healthy. A recent study published by the New England Journal of Medicine (<http://content.nejm.org/cgi/content/full/359/3/229>) reported better weight loss results from a low carb diet than from a low fat diet. The Dr. Atkins' diet approach called for only 20 grams of carbs total each day (equivalent to 6 oz. unsweetened orange juice) for 2 months, followed by not more than 120 total grams of carbs each day. The National Academy of Sciences advises that "everyone should eat a minimum of 130 grams carbohydrates each day." (<http://www.medicinenet.com/script/main/art.asp?articlekey=55692>). By making at least half of your carb foods whole grain and spreading their consumption out over the course of a day, there will likely be less insulin released into the bloodstream and less demand upon the body to store excess energy as fat. However, eating unlimited amounts of proteins and fats is inviting numerous health problems which are avoidable with a more balanced intake.
- **Are there negative side effects of sticking to a very low carb diet?** Consuming a very low carb diet of less than 50 grams/ day will result in constipation, headaches, funky/ fruity breath, mental dullness and a lack of pep. Long-term, eating a very low carb diet is inviting numerous mineral and vitamin deficiencies.
- **Is it true that one's appetite can diminish after being on a low carb diet?** Yes, due to the body's production of ketones, it is common to have a lower appetite, similar to the loss of appetite accompanying starvation.
- **Are people with diabetes supposed to avoid eating foods with carbohydrates?** No. We all, including those with diabetes, need carbohydrates. Selecting carb food sources lower in simple sugars and richer in dietary fibers, along with portion control, will assist a person with diabetes in establishing and maintaining healthy blood sugar levels.

Additional Reading & Resources:

- <http://www.hsph.harvard.edu/nutritionsource/what-should-you-eat/carbohydrates/>
- http://www.visionlearning.com/library/module_viewer.php?mid=61
- <http://www.medterms.com/script/main/art.asp?articlekey=15381>
- <http://www.health.gov/DietaryGuidelines/dga2005/document/html/chapter7.htm>
- <http://www.eatright.org>
- <http://www.mypyramid.org>
- <http://www.healthchecksyste.ms.com/bodyfat.htm>