

## CARBOHYDRATE BASICS

Carbohydrate-rich foods like potatoes have been getting a bad rap lately. Many of today’s most popular fad diets recommend restricting all or specific carbohydrate-rich foods. This is unfortunate because carbohydrates have many important functions and eliminating them from the diet is neither necessary nor healthy.

### → KEY FACTS

THE BRAIN + RED BLOOD CELLS  
**REQUIRE**  
CARBOHYDRATES

CONSUME 130 GRAMS OF  
CARBOHYDRATES PER DAY  
**FOR CENTRAL**  
**NERVOUS**  
SYSTEM SUPPORT

**CHOOSE**  
CARBOHYDRATES HIGH IN  
“NUTRIENT DENSITY”

FRUITS + VEGETABLES ARE  
**EXCELLENT**  
CARBOHYDRATES

### FUNCTIONS OF CARBOHYDRATES

The primary function of carbohydrates is to provide energy to the cells of the body, particularly the brain. While most body tissues and organs prefer carbohydrate as their primary fuel source, some, like the brain, red and white blood cells, and certain parts of the kidney require it.<sup>1</sup> Carbohydrates are also an important fuel for the muscles during exercise, particularly intense and/or prolonged exercise, and as such are key to optimal athletic performance.<sup>2</sup>

In fact, carbohydrates are so crucial to the body that if you don’t consume adequate amounts in your diet, your body will have to make them—a process known as “gluconeogenesis” (literally translated “to make new glucose”). The most common gluconeogenic substrates are amino acids derived from both dietary sources of protein and body proteins such as muscle and vital organs.<sup>2</sup> Thus, while the body can survive without carbohydrates; it does so at the expense of the body’s protein pool and consequently does not function optimally.<sup>2</sup>

### CARBOHYDRATE CLASSIFICATION

Carbohydrates can be broadly classified as simple or complex, based on their chemical structure.

**Simple carbohydrates**, as their name implies, have a simple chemical structure consisting of one or two sugar molecules. Examples include the monosaccharides (single sugars)—glucose, fructose, galactose—and the disaccharides (two sugars)—sucrose, lactose, and maltose. Most fruits and dairy products contain an abundance of simple sugars. Soft drinks, ice cream, sweets and pastries also contain significant amounts of simple sugars.<sup>3</sup>

**Complex carbohydrates**, including starch, glycogen, fiber and resistant starch, have a more complex chemical structure, containing two or more sugar molecules linked together.<sup>3</sup>

Glycogen is the body’s storage form of glucose, while starch is a plant’s storage form of glucose. Foods rich in starch include grains, cereals and most vegetables, particularly beans, peas, corn and potatoes.<sup>3</sup>



Fiber is a unique type of complex carbohydrate. Our bodies lack the enzymes to digest and absorb fiber so, unlike other carbohydrates, fiber does not provide calories. Fiber is found naturally only in plant foods. Fiber-rich foods include beans and legumes, fruits, vegetables and whole grains.<sup>4</sup>

A type of complex carbohydrate that is gaining interest among nutrition scientists is resistant starch. Like fiber, resistant starch cannot be digested or absorbed in the small intestine, thus, it travels to the large intestine where it undergoes digestion in the colon (referred to as “colonic fermentation”).<sup>5</sup> Resistant starch shares similar physiological functions to fiber. Emerging evidence from animal studies and limited human research suggests that it may help improve gastrointestinal motility, maintain bowel regularity, favorably impact blood glucose and lipid levels, decrease energy density and enhance satiety when consumed with protein.<sup>5-7</sup> The future offers exciting opportunities to expand this growing field of research to see if the results will hold for larger samples of humans.

Of particular interest is the effect that resistant starch may have on the colonic environment (particularly its ability to stimulate the production of “good bacteria”).<sup>8</sup> Natural resistant starch is found in foods such as legumes, bananas (especially under-ripe, slightly green bananas), some unprocessed whole grains and certain vegetables such as peas and potatoes.<sup>7</sup> The amount of resistant starch found in potatoes is highly dependent upon preparation methods. Cooking and then cooling potatoes significantly increases resistant starch.<sup>9</sup>

## CARBOHYDRATE RECOMMENDATIONS

The current RDA for carbohydrates is 130 grams per day based on the amount needed to optimally support the central nervous system (i.e., the brain).<sup>1</sup> If you engage in physical activity, you need more carbohydrate. How much more depends on the intensity and duration of your exercise.<sup>10</sup> The Food and Nutrition Board of the Institute of Medicine (the government body that sets the RDA) has recommended an acceptable macronutrient distribution range (AMDR) for carbohydrates of 45-65% of total daily energy intake.<sup>1</sup>

## CARBOHYDRATES AND YOUR HEALTH

According to the 2015-2020 Dietary Guidelines for Americans, following a healthy eating pattern has been shown to reduce the risk of a number of chronic diseases including cardiovascular disease, Type 2 diabetes, certain cancers and some neurocognitive disorders. The 2015-2020 Dietary Guidelines state that for most individuals, following a healthy eating pattern would include an increase in total vegetable intake from all vegetable subgroups, in nutrient-dense forms and an increase in the variety of different vegetables consumed over time.<sup>11</sup>

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## CARBOHYDRATE CONTENT OF SELECT VEGETABLES

FOOD	CARBOHYDRATE (GRAMS) <sup>12</sup>
<b>Broccoli</b> (1 medium stalk; 5.3 oz)	8
<b>Carrot</b> (1 carrot 7” long; 2.8 oz)	7
<b>Cauliflower</b> (1.6 medium head; 3.5 oz)	5
<b>Green (snap) beans</b> (3/4 cup; 3.0 oz)	5
<b>Potato</b> (1 medium; 5.3 oz)	26
<b>Summer squash</b> (1/2 medium; 3.5 oz)	4
<b>Sweet corn</b> (1 medium ear; 3.2 oz)	18
<b>Sweet potato</b> (1 medium; 4.6 oz)	23
<b>Tomato</b> (1 medium; 5.3 oz)	5

Some people hold the misconception that they need to cut out carbohydrates to manage body weight. But scientific consensus asserts that excess calories are to blame for weight gain, not diet composition.<sup>11</sup> Instead of restricting carbohydrates from your diet, practice common sense when selecting carbohydrate-rich foods—choose nutrient dense whole grains, fruits and vegetables.

One medium-sized potato, for example, contains zero fat and cholesterol for a satisfying 110 calories. Eaten with the skin, the potato is an excellent source of vitamin C and a good source of potassium and vitamin B6.

1. Food and Nutrition Board, Institute of Medicine of the National Academies. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington, DC. The National Academies Press. 2002; pp 265.

2. Burke LM, Hawley JA, Wong SH, Jeukendrup AE. Carbohydrates for training and competition. J Sports Sci. 2011; 29(Suppl 1): S17-27

3. Food and Nutrition Board, Institute of Medicine of the National Academies. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington, DC. The National Academies Press. 2002; pp 275-276.

4. Food and Nutrition Board, Institute of Medicine of the National Academies. Dietary Reference Intakes for Energy, Carbohydrate, Fiber, fat, Fatty Acids, Cholesterol, Protein and Amino Acids. Washington, DC. The National Academies Press. 2002; pp 266-268.

5. Lattimer JM, Haub MD. Effects of dietary fiber and its components on metabolic health. Nutrients 2010, 2, 1266-1289; doi:10.3390/nu2121266

6. Birt DF, Boylston T, Hendrich S, Jane JL, Hollis J, Li L, McClelland J, Moore S, Phillips GJ, Rowling M, Schalinske K, Scott MP, Whitley EM. Resistant starch: promise for improving human health. Adv Nutr. 2015 Nov 6;4(6):587-601

7. Keenan MJ, Zhou J, Hegsted M, Pelkman C, Durham HA, Coulon DB, Martin RJ. Role of resistant starch in improving gut health, adiposity, and insulin resistance. Adv Nutr. 2015 Mar 13;6(2):198-205.

8. Murphy MM, Douglass JS, Birkett A. Resistant starch intakes in the United States. J Am Diet Assoc. 2008;108:67-78

9. Higgins JA, Brown IL. Resistant starch: a promising dietary agent for the prevention/treatment of inflammatory bowel disease and bowel cancer. Curr Opin Gastroenterol. 2013;29:190-194.

10. Raatz SK, et al. Resistant starch analysis of commonly consumed potatoes: Content varies by cooking method and service temperature but not by variety. Food Chem. 2016 Oct 1;208:297-300.

11. U.S. Department of Health and Human Services and U.S. Department of Agriculture. 2015 – 2020 Dietary Guidelines for Americans. 8th Edition. December 2015. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.

12. Department of Health and Human Services. Food and Drug Administration. Food Labeling: Guidelines for Voluntary Nutrition Labeling of Raw Fruits, Vegetables, and Fish; Correction. 21 CFR Part 101 [Docket No. 2001N-0548] (formerly 01N-0548) Federal Register / Vol. 71, No. 159 / Thursday, August 17, 2006 / [[Page 47439]]

Prep time: 20 minutes

Cook time: 40 minutes

Servings: 6

QUICK & HEALTHY

## GLUTEN-FREE POTATO LASAGNA

### INGREDIENTS

2 links Italian turkey sausage

1 1/2 cups chopped onion

1 cup fat-free ricotta cheese

1 teaspoon dried basil or  
Italian seasoning

1/2 teaspoon garlic powder

1 egg white

2 cups gluten-free  
marinara sauce, divided

1 1/4 pounds thinly sliced  
Yukon Gold potatoes divided

1 cup shredded part-skim  
mozzarella cheese, divided

### DIRECTIONS

Remove sausage from casing and crumble into a medium skillet with onion. Cook for 10 minutes or until both are browned, breaking up sausage with the back of a spoon.

Stir together ricotta, basil, garlic powder and egg white in a small bowl. Spread 1/2 cup marinara sauce in the bottom of a 9-inch square baking dish. Place 1/3 of the potatoes in the bottom of the dish, forming a solid layer with no gaps. Drop 1/2 the ricotta mixture in spoonfuls over the top and spread out just a little. Sprinkle with 1/3 of the mozzarella and 1/2 the sausage mixture. Add 1/2 cup more sauce then repeat potato, cheese and meat layers.

Top with the last layer of potatoes, remaining sauce and mozzarella. Cover with plastic wrap and make a small slit to vent. Microwave on HIGH for 30 minutes or until potatoes are tender.

*Nutritional analysis per serving: Calories: 300, Fat: 11g, Saturated Fat: 4.5g, Trans Fat: 0g, Cholesterol: 40mg, Sodium: 640mg, Potassium: 377mg, Carbohydrates: 27g, Fiber: 3g, Sugar: 7g, Protein: 18g, Vitamin A: 10%, Vitamin C: 50%, Calcium: 25%, Iron: 10%*



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