

# GUIDE TO CARBOHYDRATES

In recent years, few nutrients have inspired as much controversy as carbohydrates. Low-carb? High-carb? Which carbs are good and which are bad? I'll try to answer some of these questions in today's know-how article.

## WHAT ARE CARBOHYDRATES?



Carbohydrates are a **macronutrient used for energy**. Like fat and protein, they are one of the primary properties of food. Most plant-based foods contain carbohydrates.

Carbohydrates come as **starch, sugar, and cellulose (fibre)**. Any fruit, vegetable, or grain will be comprised of these things. Naturally, some foods contain mostly starches while others have more sugar. This is the difference between the potato and the banana.

There are two types of carbohydrates. **Simple carbohydrates** contain one or two sugars (fruit, milk, candy); while **complex carbohydrates** have three or more sugars (beans, peas, parsnips).

## HOW DOES THE BODY USE CARBOHYDRATES?

As well as fat, carbohydrates are the primary source of energy for the body. Our bodies digest the food we eat by mixing it with fluids (acids and enzymes) in the mouth and the stomach. When the **food is digested**, the carbohydrates (sugars and starches in the plants) break down into **glucose**. Starches digest entirely to glucose, while sugars digest to equal parts **glucose and fructose**. These nutrients affect our bodies in slightly different ways.

Glucose is "the good carb": used to **construct essential molecules**, provide **fuel to the central nervous system** and the brain, and **energy to the muscles**. Fructose, if **consumed in excess**, can be quite toxic and has little nutritional and functional value for the body.

While glucose from starches goes straight to work when it hits the bloodstream, our 'friend' fructose travels to the liver, where it is converted into glucose. As mentioned,

glucose is good, but it's the damage that fructose itself can cause along the way that's worrying. Too much fructose can promote gut permeability, fatty liver disease and metabolic syndrome, disrupt gut flora, and has been linked to cancer, kidney stones, and obesity.

**Don't panic!** No need to cut out the fruit. We need **some** fructose, but it should ideally be kept to under 25-30 grams per day.

To put it in context, **one banana** is about 23-25 grams carbohydrates; of which 12-15 grams are sugars; of which 7 grams are fructose. **A cup of strawberries** is about 11 grams carbohydrates; of which 7 grams are sugars; of which 3-4 grams are fructose. **One tablespoon of honey** is 17 grams carbohydrates, which is all sugar; of which 8.5 grams are fructose. In comparison: **120 grams of broccoli** contains 8 grams of carbohydrates; of which 2 grams are sugars; of which only 1 gram is fructose.

## HERE IS WHAT HAPPENS WHEN YOU EAT CARBS



The body processes the food and breaks the carbohydrates down to glucose. Glucose circulates through the bloodstream and is used by **the body's cells and for energy**. It's available for use immediately and is also stored as **glycogen** for later use. The body can store up to 2,000 calories of carbohydrates (that's 250 grams) as glycogen, which is important if you're carb-loading before an endurance event such as long-distance running. Even if you are not doing intense physical activity, carbohydrates are used in everyday energy exertion, whether it's walking or working. A balanced diet will result in **balanced glycogen stores**.

**Simple carbs** like fruit and sugar provide a quick energy boost because they hit the bloodstream very quickly. This is great for athletic performance, when the glycogen levels are low or depleted. However, for sustained energy and stable blood sugar levels, we want to avoid quick energy boosts.

**Complex carbohydrates** (i.e. vegetables with more starch and fibre) are used by the body in a different way. They provide sustained energy and are released into the bloodstream more slowly.

It's important to note that the **body is also good at burning fat for fuel**, but only in the absence of carbohydrates. Even then, the body will still need some glucose, which it can manufacture from... wait for it... protein. So even on a very low-carbohydrate diet, you will still have some glucose circulating in the body from the protein you consume.

## WHAT HAPPENS WHEN WE EAT TOO MANY?

When we keep consuming carbohydrate-rich foods without depleting our glycogen stores, that excess glucose is converted into fat. If you don't use the fat for fuel, then it gets stored in your body. That's right – that muffin top and the visceral fat around your organs is actually all that unused energy, whether it comes from glucose or from fat.

## REDUCING YOUR CARBOHYDRATE INTAKE

When you eliminate grains alone, your carbohydrate intake will naturally drop. For example, if you've been accustomed to eating cereal or toast for breakfast, a sandwich for lunch, and rice or pasta for dinner – which can add up to 200-250 grams of carbohydrates per day – then of course you'll be cutting that intake by half once you switch to a cleaner, low-carb based eating plan.



The truth is there is **no one-size-fits-all approach to carbohydrates**. Some individuals fare well on a very low-carb diet. Others feel better including dense sources of carbohydrates such as potatoes, sweet potatoes, and bananas. While I encourage everyone to experiment with their carbohydrate levels, you can gauge an appropriate amount for the average person based on gender, past experience, activity levels and goals.

**For example:** individuals with diabetes or SIBO should experiment with lower carbohydrate intake; around 50-75 grams per day or less. On the other hand, mothers who are nursing and those who suffer from adrenal fatigue will often do better with a moderate intake of 100-150 grams of carbohydrates per day. In general, women tend to do better with more carbohydrates than men.

During our Low-Carb Challenge, I suggest a moderate intake of **around 100 grams** of carbohydrates per day, however, you can go lower on less active days.

Here is a handy table from functional medicine practitioner Dr. Chris Kresser.

CARB APPROACH	% CARBS	CARB (GRAMS) FOR MEN (2600 kcal diet)	CARB (GRAMS) FOR WOMEN (2000 kcal diet)	MOST SUITABLE FOR
VERY LOW CARB /KETO	< 10 %	< 65 g	< 50 g	<ul style="list-style-type: none"> <li>• Neurological issue (Epilepsy, Alzheimer's etc.)</li> <li>• Severe blood sugar problems</li> </ul>
LOW CARB	10-15 %	65-100 g	50-80 g	<ul style="list-style-type: none"> <li>• Weight loss</li> <li>• Blood sugar regulation</li> <li>• Mood disturbances</li> <li>• Digestive problems</li> </ul>
MODERATE CARB	15-30 %	100-200 g	80-150 g	<ul style="list-style-type: none"> <li>• Generally healthy</li> <li>• Maintain weight loss</li> <li>• Adrenal fatigue</li> <li>• Hypothyroidism</li> <li>• Familial Hypercholesterolemia</li> </ul>
HIGH CARB	> 30 %	> 200 g	> 150 g	<ul style="list-style-type: none"> <li>• Athletes and highly active people</li> <li>• Trying to gain weight/muscle</li> <li>• Fast metabolism</li> <li>• Pregnant/breastfeeding women</li> </ul>

## CARBOHYDRATES FOR ATHLETES

You might be asking, "Are there exceptions?" While determining the right carbohydrate intake, consider this. If you're an athlete, you've probably heard that eating carbohydrates is good for your performance. To an extent, this is true. If you're only training at high intensity 3 times a week, a moderate carbohydrate intake will suffice.

**The technicalities of the issue?** Glycogen stores. If you hit the gym with depleted glycogen stores (i.e. no carbs in the system), your performance might suffer. The good news? Eating enough before and after a workout is generally good enough. Naturally, working out in a fasted state such as first thing in the morning will be a qualifying factor in reaching (or not reaching) your strength and endurance feats.



Working out while on a low-carb diet in a responsible manner doesn't present any problems in terms of being lean and fit, but it could prevent you from reaching strength goals; and for many people, this doesn't work long-term.

Eating carbohydrates after a workout **helps to replenish glycogen stores**, so that they don't get depleted. It's recommended to consume some carbohydrates (and protein) within an hour or two of training, to reduce the risk of inflammation, weakening immunity, and prolonged soreness or injury.

Endurance athletes and those wishing to maximize strength gains should consider both the amount of carbohydrates and the timing of consumption. Studies have shown that distance runners perform better and faster while consistently following a higher-carb diet. On the other hand, low-carbohydrate intake has minimal effects on short-term, high-intensity training.

If you often feel exhausted during or after a workout, fail to make strength gains, or can no longer perform to your best ability on a lower carbohydrate diet, make a conscious effort to eat more (150-200g) every day, and place the bulk of the carbs before and after your workout to ensure that glycogen stores are always stocked up.

**KEY TAKE AWAY.** Don't be afraid of carbohydrates, but be aware of how much you consume, when, and from what sources. Have some carbohydrates with protein and fat, ideally before or after a workout, and from nutrient dense sources like vegetable and fruit, rather than pasta and bread.

# WHEN AND HOW TO EAT CARBS

While I touched on timings for athletes' carbohydrate consumption, it can be beneficial for everyone to be more mindful of carbohydrate timings and pairings.

We often crave carbs for reasons other than hunger. Lack of sleep and stress can release certain hormones to make you crave carbohydrates. If you're not consuming enough protein, and fat, you will be craving carbohydrates. In fact, given a large bowl of chips, your body will tell your brain to keep eating not because you're hungry, but because it hasn't satisfied its need for protein. Eating meals dense in protein and fat will inevitably be more satiating than a meal made up of mostly carbohydrates. It's best to pair your carbs with protein and some fats. While it's simple to snack mindlessly on fruit, your body isn't so keen on all that fructose without a buffer.

Let's go over some good times to chow down on something sweet or starchy.

- **After a workout.** Your muscles need fuel to recover properly. It's best to get that nutrition within three hours of a sweat session. Using carbohydrates when your body is equipped to use insulin (to help muscle growth) can help you stay strong and avoid injury.
- **Before a workout.** Carbs are an easy source of energy for the body to use during a tough workout whether it's endurance or strength training. Carbs help preserve muscle when paired with protein. Finally, they stimulate the release of insulin, which is why you should always pair your carbs with adequate sources of protein and/or fat.
- **Throughout a physically active job.** If you're on your feet for 8+ hours a day, a small amount of carbs will help to sustain energy. Frequent or prolonged physical activity means that your body is constantly searching for easy energy (i.e. glucose), so include some starch in your meals.
- **While breastfeeding.** While nursing, it's important that your milk is abundant, and a low-carb intake can diminish the supply. In addition, you might lose weight on a low-carb diet more rapidly than is optimal while nursing. Eating moderate carbohydrates likely won't cause any issues, but it's good to eat fruits and starches after birth to avoid any further stress on the body.
- **When you're underweight or have a low body fat percentage.** Naturally lean built individuals and athletes, or people who are seeking to gain weight, should consume moderate to high carbohydrates. Insulin sensitivity is often not an issue for those with healthy metabolisms, and more carbs can be beneficial for certain body types.

## BEST SOURCES OF CARBOHYDRATES

Vegetables and fruit will be the main bulk of your carb intake because of their stunning nutritional profiles. Without having to be enriched (like bread and pasta), veggies are naturally packed with vitamins, minerals, and fibre for vibrant health, satiety, and easy digestion. Let's cover some healthy, energy-dense carbohydrate sources.



### Sweet potatoes

A serving of sweet potatoes can offer up 377% of your vitamin A intake, plenty of soluble and insoluble fibre, and they're a lower glycaemic-index choice in comparison to white potatoes.

### Potatoes

White potatoes get a bad rap but they're actually a great fuel source packed with nutrients. They contain more potassium than sweet potatoes, just as much magnesium, and loads of fibre.

Being part of the nightshade family (together with eggplant, peppers and tomatoes), potatoes do contain some toxic substances, which can cause an inflammatory response in certain people.

The good news is that most of those are located in the skin of the potato, and can be drastically reduced by simply peeling the potato before cooking.

Cooling cooked potato increases its resistant starch, a form of beneficial fibre, and reduces the glycaemic index by 30%. In addition, consuming potato with healthy fats, vegetable fibre, and something acidic will further reduce the GI index. Even if you reheat the potato after cooling, you will still get the benefits of slower glucose absorption.



### Plantains

One medium plantain offers up half the daily recommendation of vitamin C, a fair amount of magnesium, vitamin A and B6, and they're lower in fructose than their produce twin – the banana.



## Pumpkin/Winter squash

There are so many varieties of pumpkin and winter squash, each with its own impressive list of nutrients. Butternut squash is similar to sweet potato, but it's lower in calories and contains even more vitamin A. Pumpkin can be enjoyed all year round, especially if get it frozen or in a can, and a single serving offers up 3-5 grams of fibre, making it both satiating and great for digestion.



## Cassava root

Tapioca starch or flour is made from this root vegetable. It's a great and fairly nutritious, flour substitute. It's quite versatile and can be used in both baking and thickening of sauces. It has the highest protein content of all the staple starches, and it contains loads of minerals including magnesium, zinc, copper, and iron.



## Beetroot

Sweet and starchy, these guys are full of phytonutrients, antioxidants and folate – which help the brain and the nervous system. Folate is most commonly found in legumes, which are also a source of carbohydrates and protein; but will be avoided during the plan.



## Other vegetables

Carrots, onions, Jerusalem artichoke, parsnips and eggplant (or aubergine for our British friends) are also moderate-to-high sources of nutritionally dense carbohydrates. And let's not forget about those luscious, antioxidant rich berries, kiwifruits, pears, and green apples. Bananas are great for a quick carbohydrate fix after a workout.