



## Exercise glucose within 10 min

**Why you get physically sick over time and even go up in body fat eventually from exercise:**

- **Athletic ketosis:** A low-carb diet is perfectly healthy as long as the brain is able to receive the glucose made by the liver. Exercise will rob that little bit of glucose, forcing the brain to use almost exclusively ketones, which is fine for some but not all neurons. The imbalance of neuron function in the brain from exclusive ketone use suppresses brain function including psychological state (symptoms of clinical depression) and low hormone production. This is usually called “overtraining” even though it is caused by a lack of muscle glucose recovery.
- **Carbs are dangerous:** Most of the carbohydrate calories consumed in modern society are processed (bread, pasta, crackers, rice, juice, energy bars, cereals), which digest much faster than in their original form. Most people have not even seen wheat berries, oat berries, un-cracked wild rice, or heirloom / wild (smaller and bitter) fruits. To compensate for the fast digestion that is inherent in even processed whole-grains, vegetables are needed to mix with the carb so they empty from the stomach slower. Alternatively, meals can be low in carb, in which case veggies are for obtaining nutrients, fullness, and health. However, low-carb does not recover glucose lost in muscle during exercise, and muscle will keep blood sugar chronically low until it recovers the majority of its losses, lowering your energy, sleep quality, and suppressing your central nervous system.
- **Immediate carb re-fueling is essential:** The rate that muscle absorbs glucose increase dramatically during intense muscle contraction, and then reduces rapidly within an hour, but by more than half within a half hour. The carbs we eat digest too fast at that point, forcing us to include vegetables with them. A hard workout can easily deplete a few hundred Calories of glucose or more, which in a meal would require more vegetables than is sustainable to eat day after day. Putting 100-300 (average 200) Cal glucose within 10 min after training eliminates the need to put much carb into meals, thereby reducing vegetable requirements down to what is manageable. Missing this immediate glucose re-fueling forces you into one of two bad situations. Either your blood sugar will be too low (chronic fatigue, low sleep quality, suppressed central nervous system) or you eat a lot of carbs in your meals to fix the problem but get fatter (with increased disease risk) in the process because it takes too much vegetables to slow down the minimum amount of carb calories it takes to fix the problem. You end up in the horribly ironic situation that you have to increase body fat and disease in order to keep yourself healthy during hard exercise.
- **Solution:** Give yourself 5 min to drink 8-16 oz water and relax / cool down / stretch right after exercise. The water will help you process the calories that are coming, and relaxing will reduce the fight/flight response to exercise, which will re-direct blood flow to your intestines. Then, between 5-10 min, consume 100-300 (average 200) Cal glucose. If you are typically nauseous right after exercise, use glucose as maltodextrin (see below). If you can handle “food” use any starch. Starch is tubers (yams, potato) or cereal (rice, corn or other grains e.g. quinoa, wheat, or oats). You could therefore use a medium yam, rice cakes, bread, crackers, pretzels, oatmeal, granola, a granola bar, or even pastry / muffin / cookies that are more flour than sucrose (table sugar) i.e. sweet bread that is low in sweetness (see next bullet point).
- **Do not use fruit** or sweets (both of which are sucrose) as your main recovery source right after exercise: Sucrose is only half glucose, so muscle only fuels half as much, and the rest of this sugar goes mainly to fat production in the liver if consumed in a significant amount (the amount people usually eat e.g. a large pastry or tall glass of juice). So fruit juice, a banana, or candy is NOT what you should eat right after exercise. Including some with your starch right after exercise is fine, but the important target is the glucose i.e. the starch itself.
- **Maltodextrin (“malto”)** is a white powder usually made from corn with no flavor. It is short chains of glucose, which reduces stomach upset compared to consuming pure glucose (not in chains). It is sold in home-brew supply shops as a powder, is the main ingredient in many gels/syrups such as Gu / Powergel / Carboom / E-gel / Hammergel, and the main ingredient in the only sports powders / drinks you should consider such as CarboHit / CarboGain / ComplexCarbs / Sustained Energy / Recoverite. Maltodextrin should be the first thing listed in the ingredients. To get 75-100 Cal of malto per hour of exercise, or right after exercise, look at the ingredient list of whatever you purchased, or use 1/4 cup or a bit more of the pure powder from the home-brew supply shop.