

Eating Your Way to a Better Performance **by Cameron L. Martz, ACSM H/FI**

Golden Rule of the Endurance Athlete:

Never try anything for the first time during an event. This holds for equipment, clothing, pace, food, drink, the goofy tune that runs through your head, and many other things that I will remember the next time I try something new in a race and screw up. Enough said.

What should I eat during my marathon/century/triathlon?

Everyone is different. Anyone who tells you exactly what you should eat should be greeted with skepticism. What works for your friend may or may not work for you. That includes calorie source, quantity, and timing. However, every athlete benefits from some sort of calorie intake during physical exertion greater than 90 minutes.

Why is this?

Glycogen is your most readily available source of fuel for your muscles. It's actually stored within the muscle fibers themselves as well as in the liver. However, your glycogen stores are only enough for about 90 minutes' worth of strenuous activity. After that, your body depends on your fat stores and on what you eat. Though some authorities claim that you can train your body to utilize your fat stores more efficiently, it has been scientifically proven that ANY calorie intake results in a measured improvement in performance as measured by time-to-exhaustion and residual strength near exhaustion (Coggan & Coyle, 1991). More on this later.

How can I eat my way to a better performance?

1. *Carbo loading the days before the event.* This does not mean you should increase the total calories you consume. As you taper your training for an event, your daily caloric needs diminish, anyway. Rather, carbo loading is about getting a greater percentage of your normal caloric intake from carbohydrates, thus reducing the percentage of protein and fat. Carbo loading helps to saturate your muscles and liver with glycogen. Too many calories during this time will just result in an increase in your fat stores, which is generally undesirable.
2. *Your pre-event meal.* You should eat a small, yet substantial, meal about 2-3 hours before your event. This meal should include primarily low glycemic index carbohydrates (glycemic index represents the magnitude of the increase in blood glucose that occurs after the ingestion of a given food). Including some protein and fat with the meal may actually help your body use the carbs for fuel (Guezennec, 1995).

Avoid ingesting any high glycemic index carbs within an hour of the start of your event, as this has been shown to result in a performance-limiting insulin reflex (Foster, et. al., 1979). Basically, your body produces insulin to moderate your blood sugar from the high glycemic index food. Among other things, insulin suppresses your ability to utilize glycogen from your liver as well as your ability to metabolize fat. Thus, you start your event without your best sources of energy being available to you.

3. *Calories you ingest during the event.* Luckily, intense exercise inhibits insulin production (though it takes some time to recover from the insulin reflex mentioned above). So, the glycemic index of the calories you get during the event is not as important as it is before the event. What is important, though, is that after about an hour, you no longer can rely upon your glycogen stores for fuel. You begin to metabolize fat at a much faster rate. However, you can supplement your fat metabolism through ingestion of additional calories. In fact, according to Coggan and Coyle (1991), "carbohydrate ingestion clearly improves performance in events lasting longer than 90 minutes and in which fatigue is associated with reduced bodily stores of carbohydrate..."

For events lasting between 2-5 hours, most athletes will best be served by ingesting about 300-500 calories from carbohydrates per hour (Coggan & Coyle, 1991; Murray, et. al., 1991). However, there is great variation between individuals in the rate of gastric emptying, which is basically the rate at which you can absorb ingested calories (Maughan & Rehrer, 1993). So, you should experiment during training to find out how much you can digest without feeling too bloated.

For events lasting greater than 5 hours, hyponatremia (low serum sodium) becomes a concern. An athlete can easily sweat between 1-2 liters per hour, losing 2-3 grams of sodium per liter of sweat (Coyle, 1994). No amount of water will keep a hyponatremic athlete hydrated, and Gatorade and other electrolyte replacement drinks do not contain enough sodium to stay ahead of the depletion. Thus, some calories should be ingested from salty foods, such as pretzels or low-fat Ritz crackers. This should start with your first bite of food and continue throughout the event.

Note: Salt tablets are usually undesirable as a source of sodium, as they are too concentrated and can cause gastric distress.

Also for events lasting greater than 5 hours, an athlete may benefit from a moderate intake of protein and fat. The best source of protein and fat comes from whatever you want to eat during an ultra-distance event. Some people eat turkey sandwiches with cheese, for example. Others fill a water bottle with their favorite protein shake. Paula Newby

Fraser, the Queen of Ironman Triathlon, eats Snickers bars for fat calories (and no, they don't sponsor her).

OK. So how do I wash down all of this food I'm cramming into my mouth?

Hydration is the only thing more important than food, though most people drink out of common sense even if they don't eat during a race. As previously mentioned, an athlete can sweat between 1-2 liters of water every hour. Though most cyclists can consume 1200mL of water per hour without discomfort, most runners generally drink only 300-500mL per hour. In either case, most endurance athletes gradually dehydrate throughout the course of an event. The amount of water an athlete drinks has been proven to have a direct effect on performance (Adolph, 1943; Bean & Eichna, 1943; Coyle & Montain, 1992a). Generally, the more water an athlete can comfortably ingest, the longer he or she delays the detrimental effects of dehydration. Now would be a good time to review the Golden Rule of the Endurance Athlete, for proper hydration has an expected side effect that you should be prepared to handle during your event. (To pee, or not to pee. That is the question. Actually, how am I going to pee during the event? That is the real question.)

Water serves several vital functions that directly affect the performance of an endurance athlete:

1. *Water is required for thermoregulation.* Cold water in, hot water out. As the water you drink rises to match your core temperature (somewhere around 98.6 degrees Fahrenheit), it absorbs the heat generated by your flexing muscles and joints. As you sweat or urinate, you are expelling that heat energy along with the other waste products of your metabolism. Your core temperature only needs to rise a few degrees during an endurance event before you will become confused, chilled, dizzy, nauseous, convulsive, or comatose.
2. *Water is required for proper blood volume.* As your level of hydration decreases, your blood literally thickens, becoming more difficult to pump into all of your teeny capillaries. According to Coyle (1994), "every liter (2.2lbs) of water lost will cause heart rate to be elevated by about eight beats per minute, cardiac output to decline by 1 liter per minute, and core temperature to rise by 0.3 degrees Centigrade..." These things are bad. More water is good.
3. *Water is required to metabolize fat.* I won't go into the details of the chemical reaction. Just take my word for it. No water means no fat metabolism. No fat metabolism means you and the proverbial "wall" will be on a first-name basis no matter how much you eat during a race.

Proper hydration starts during the days leading up to your event. Just like an athlete benefits from carbo loading, an athlete will benefit from water loading. Basically, drink water (not diet soda, which contains a ton of diuretics) all day long. If your urine is not clear, then you're not fully hydrated. This rule of thumb is so popular that you may find other athletes discussing the color of their urine after they return from the restroom during the pre-race dinner. Now, you will be able to join the conversation with pride, rather than fearing that someone will notice that you peed only once that day and that your urine was so yellow it glowed in the dark.

Beer Me!

There's always a wise guy who sets out a table on his lawn with cups of beer for the passing athletes. Don't do it. Even a little alcohol can ruin your day very soon after ingestion. I've seen it happen, and it's not pretty. Yes, people do really turn green as martians.

No Pain, No Gain

An increasingly common sight at endurance events is the availability of ibuprofen tablets at aid stations along the course or in event packets. "Vitamin I," as some like to call it, can work wonders for your aches and pains in the days following the event. However, the ingestion of any NSAID (non-steroidal anti-inflammatory drug) during an endurance event can cause irreparable organ damage as well as contribute to hyponatremia. NSAIDs include ibuprofen (e.g., Advil), aspirin (e.g., Bayer), and naproxen sodium (e.g., Alleve). While acetaminophen (e.g., Tylenol) is not an NSAID, it also can be toxic to a struggling athlete. In the words of one physician, any athlete who takes these medications during an endurance event might as well hang a sign on their back saying "Please kill my kidneys."

Think of it this way-- if you are struggling so much that you truly believe a pain killer is the only way you will finish the event, then an over-the-counter medication won't put a dent in your discomfort and you should drop out. Otherwise, suck it up and keep moving. Nobody does these things because they're easy.

Yeehaw! I finished! Now what?

You need to replenish your glycogen stores to begin your recovery from the event. Your body is most receptive in this regard within 30-60 minutes of stopping your exercise. After this window of opportunity passes, your ability to restore glycogen to your muscles and liver diminishes very rapidly. In fact, it can take several days to accomplish what you could have accomplished in the hour following your event.

High glycemic index calories are best, but you should be fundamentally concerned about getting something, anything, into your stomach almost immediately after crossing the finish line.

Also, keep drinking water until you urinate at least twice after the event. This will ensure that you are rehydrating to the maximum level possible.