Sports Nutrition

One of the most common questions I hear among new and even experienced athletes is what to consume for performance nutrition. When you look online, you will find every opinion on the subject. That, along with a plethora of different fuel options available on the market, it's no wonder athletes are confused.

The first thing I suggest is this: there is no one-size-fits-all approach to nutrition. Every person is different. The only way to find out what works for you personally is to try it yourself and take note of what happens. If the result is good, then you might be on the right path. If the result is bad, then look for other options. Simple as that. That said, there has been extensive research done on nutrition and athletes. It would be wrong of me to discount that information and not share what I have discovered in my own reading, consulting, studying and experimenting. In fact it was through this process that led me to my current, successful nutrition plan.

What to eat before, during & after competition?

Day Before Competition:
General Rule #1: Consume a moderate amount of low fiber carbohydrates the day before.

The question of what to eat before a race is very common. The most common response is “stick to what you are used to; don’t try anything new.” Although this is a good rule of thumb, I would have more to add. Again, there have been several studies that have tested this question and so we would be remiss to ignore them. Along with that, I have a specific nutrition plan before any endurance event (Ironman, marathon, etc.) that is different from what I do before a normal training day. Here are some general rules to keep in mind that might work for you.

Avoid eating any high fiber foods the night before and the morning of competition. One of the major complaints that endurance athletes have is gastrointestinal discomfort during a race. I have experienced the symptoms myself: nausea, vomiting, bloating, diarrhea, etc. One of the potential reasons for this is eating foods that have too much fiber. I would recommend avoiding carbohydrates with high fiber content within 12 hours of competition. Use this resource to help you determine what a simple, low fiber carbohydrate might be.

The day before my major event I will have salad for lunch but not for dinner. I have a pretty high digestive rate and can get by with eating a salad at

noon the day before. If you find that you digest foods slower, you may want to consider avoiding raw vegetables the day before competition. Another reason to avoid high fiber foods is that they slow down digestion. Although a good thing to have in our diet, it is not what you want to be eating the morning before a race. The worst thing you could do is eat a high fiber food two hours before your competition and still have it sitting in your gut after the gun starts. Once the race begins your blood flow is directed away from your gut. All that high-fiber food is going to sit in your digestive tract where it will remain and feed hungry anaerobic bacteria, eventually producing gas (methane) and bloating, cramping, and possibly diarrhea

2.) One common misconception is carbo-loading the night before an endurance event. The truth is, if you have been eating carbohydrates and resting the week of competition you should have already replaced your glycogen stores enough and there's no need to eat a pile of carbohydrates the night before. In fact, this can actually have negative effects on race day. Remember your body has a limit on the number of calories it can store as glycogen (about 2,000 in an average adult male, fewer in women). Slamming a plate of pasta and bread the night before to top off your already filled tank, isn't worth it. Additionally, your body will burn some of that carbohydrate stores while you sleep. This means that you are going to have to eat more carbohydrates in the morning anyway.

General Rule #2: Reduce your caloric intake the week before the race, but don't be alarmed if you put on a few pounds.

Another thing to keep in mind the week before competition is the amount of calories you consume. Most people want to continue eating the same number of calories the week before competition as they did during the training season. If you are tapering for the race, you will likely be working out much less and thus burning less calories. Don't make the mistake of eating too much and putting on unnecessary weight for the race. An additional pound or two can make a big difference over the course of an Ironman. Why else would bicycle engineers go through so much trouble to shave a few ounces off a bike?

That said, you should expect to put on 1-2lbs of water weight, depending on gender and body size during a taper week. This is a good thing because it means your cells have had time to fill with water. Most of the weight you will lose during competition will be in the form of water. It's not uncommon for the best triathletes to lose up to 8lbs of water during an Ironman. In fact, studies show the athletes who have performed the best in the Ironman World Championship are also those who lost the most water weight.

Morning of Competition:

Now that we have covered most of the important information regarding what to eat the day before a competition, let's talk about what to eat the morning of competition. Ideally, you will want to eat your largest meal of 200-300 calories at least two hours before the start of any exercise. That means you should start with your warmup and work back 2 hours from there.

It is possible to over hydrate. For example if you're urinating clear and every 15 minutes chances are you're consuming too much water. I recommend sipping water only when thirsty and rather than straight water, consume a diluted mixture of sports drink and water. The concentration of sugar and electrolytes will aid in absorption by changing the osmolality of the solution. An isotonic solution is better than hypotonic water. Don't ask why...it's just osmosis.

Here's what my typical morning nutrition plan looks like before an Ironman.
- 4:30am - Wake up
- 4:35am - 8oz of water/coffee
- 5:00am - 16oz vegan protein shake (protein powder, banana, peanut butter, almond milk)
- 5:00am to 6:30am - 16oz of diluted sports drink
- 6:30am - ½ homemade peanut butter protein bar and 8oz of GU Roctane Caffeine
- 6:45am - Race begins

Here's what my typical morning nutrition plan looks like before a marathon.
- 5:00am - Wake up
- 5:15am - 8oz of water/coffee
- 5:15am -200-300 calories of carbohydrates with peanut butter (oatmeal, toast, etc.)
- 6:00 - 7:00am - sipping on 16oz of water or diluted sports drink
- 7:30am - Race begins

<u>During Competition:</u>

General Rule #3: Eat 200-250 calories of food on the bike every hour with some of those calories coming from 20 grams of protein per hour.

The most common question among endurance athletes, especially Ironman triathletes, is what to eat during the race. Unlike a marathon which lasts anywhere from two to six hours, an Ironman can last from eight to 17 hours. Food is essential. You might be able to get by with just liquid sports drinks and gels in a marathon, but that won't work during an Ironman. If you have followed your nutrition and hydration plan well, you should start the swim with a full tank of glycogen. The swim provides no opportunities to eat or drink. We also know that the human body can store around 2,000-calories of glycogen. Most Ironman triathletes can expect to burn around 1,000-calories during the swim. That means that by the time you get on the bike, you have already lost some of your water reserves and half of your glycogen stores!

Once on the bike it's important to take in water and high glycemic calories to slow this rate of glycogen depletion. There's no way you can stop the rate of water and glycogen loss in an Ironman; you will empty your stores by the end of the race. The goal is to slow that depletion. The bike is where an athlete should consume most of his or her calories during the race. A good rule of thumb is to consume around 200-250-calories per hour during the bike portion. The optimum amount of carbohydrate intake on the bike is 1.5 g/kg BW/hour, which means that a 160 lbs. athlete should consume 110g carbs/hour (consuming more than this can lead to gastrointestinal distress).

The next question is what type of calories should you consume? Most people consume all carbohydrates when the body needs protein as well. When looking through scientific literature on the topic, I discovered 20 grams of protein per hour is ideal. Some people prefer to get their protein as a liquid form. I enjoy a break from all the liquid and I'm happy to eat a protein bar in small doses while biking.

Note - These numbers are averages. I find that I can do well off lower calories during an endurance event. In fact, some of my worst races have come when trying to force the calories down. For example, in my 2:19 marathon at Twin Cities I only consumed water and 8-12oz of a sports drink. That was it.

General Rule #4: Drink when you feel thirsty.

The next question is how much water to drink. The amount of water needed during an Ironman depends on a person's individual sweat rate, as well as the humidity and temperature during competition. It appears the best rule of thumb is to drink when you feel thirsty. Consuming too much water can lead to something called hyponatremia, which can lead to nausea, vomiting, confusion, headaches and even death. Consuming too little water can also lead to death. Ironically, both conditions have very similar symptoms despite very different causes.

If you drink according to thirst you need to be in tune with your body. You have to have an ongoing conversation with your body throughout the race. Pay attention to how you are feeling. Don't get so caught up in the race that you forget to drink. By then it will be too late. If this is not specific enough for you and you are still searching for a more definite response use your urination rate. My rule is if you are urinating more than once per hour you are probably drinking too much water, and if you haven't urinated in over two hours you might not be drinking enough.

General Rule #5: Eat and drink as much as you can tolerate on the run. Use caffeinated nutrition at your discretion.

When it comes to the run portion, consuming calories and water becomes more difficult. The impact of running can cause people to have digestive issues when eating. Also, the act of trying to eat and drink while running is challenging. Most people spill liquids on themselves or the ground. There doesn't seem to be a good rule on how much to eat or drink during the run. Basically, you cannot get enough. That's why the bike portion is so important. You want to top off your stores on the bike so that when you start the run you are not already in a depleted state. My rule is to eat and drink as much as you can tolerate on the run. I normally adhere to water and sports drinks for electrolytes on the run. I also take a few gels for caffeine. For races I or my athletes have used the following products with good results. (I am not sponsored by any).

Maurten Gel (100)
GU caffeinated gel
Infinite sports drink
Skratch Labs sports drink

General Rule #6: Immediately after a race, eat a mixture of high and low glycemic foods with some protein.

Use this resource to help you determine what a complex, high fiber carbohydrate might be. During the rest of the day and for the coming week, consume real foods, focusing on mostly low glycemic whole foods like fruits and vegetables along with lean meat and fish.

Post Competition:

The final question is what to eat after the competition. This question is not so easily answered as the type of food and timing varies. Glycogen absorption, as mentioned above, is optimal during a 30-minute window immediately after the race or workout. To improve recovery, aim to ingest a combination of carbohydrates, proteins and electrolytes within 30-minutes.

Interestingly, Generation UCAN Superstarch and Peter Attia, M.D. have suggested avoiding high glycemic carbohydrates immediately after a race. The reason is that high glycemic foods can elicit an insulin spike before and after, but not during exercise. After exercise, particularly hard training workouts or races, the body releases human growth hormone (hGH) to repair damaged tissue up to two hours afterward. Unfortunately, insulin and hGH have a negative

relationship; when insulin goes up hGH comes down. One would want to avoid an insulin spike within the two hours after a hard training workout or race. According to their theory, consuming a high glycemic carbohydrate that elicits an insulin response would stop the release of hGH and limit the amount of recovery that could have otherwise taken place.

I have not decided my personal philosophy. I think more research should be done on the topic of whether or not to eat high or low glycemic carbohydrates immediately after a hard workout or race. It is important to replace lost glycogen immediately afterward. So, at the very least, make sure you eat some carbohydrates after your race and probably a mixture of both. After a few hours have passed since you finished your race, it is important to get real food in your body. Likely, most of your calories on race day will have come in the form of sports drinks, gels, bars and the like (not real food). In the hours following your race, consume mostly low glycemic carbohydrates, such as whole fruits and vegetables along with some form of protein, ideally lean meat or fish to obtain branched chain amino acids (BCAAs). Over the course of the week following the race as your body recovers, it's essential you eat more carbohydrates then you might be used to if you normally follow a low-carb diet.

General Rule #7: Effects of electrolyte supplementation on performance enhancement during endurance events is varied.

If choosing to use "salt tablets" make sure you follow recommended dosage amounts to avoid hypernatremia. Our bodies utilize electrolytes like sodium, potassium, chloride, magnesium and more. You have probably come across products marketing electrolytes or use the term "salt" in their label like "salt tablets" or "SaltStick." You may have also seen these electrolytes written in their ionic form: Na^+, Cl^-, K^+, and Mg^{2+}. It doesn't really matter so much what we call them, I just want you to be aware of what we are talking about. What does matter is what role these electrolytes play in the body. Many products that market electrolytes, including Gatorade, claim their product reduces muscle cramps during exercise and competition.

It's believed a loss of electrolytes through sweat can result in muscle cramps because electrolytes are necessary for cell-to-cell communication. Our nervous system is responsible for the communication between tissues in our body, especially communication between the central nervous system (brain and spinal cord) and the peripheral nervous system (everything else). When the body runs out of electrolytes, communication is less efficient. Many people claim that this poor communication can lead to muscle spasms and cramping often experienced during endurance events, especially when weather conditions induce a lot of sweating.

I began taking salt tablets in 2011 during long endurance events like marathons and Ironman triathlons, but I no longer use them today. I have not experienced muscle cramping in marathons since discontinuing my usage of salt tablets. However, I have some athletes who swear by them. It could be a matter of personal preference, physiology or placebo. Let's see what science has to say.

Studies examining the body's electrolyte reserves suggest the body already has enough electrolytes for even the longest of endurance events. These same studies suggest that electrolyte supplementation during exercise doesn't have any impact on performance. The studies suggest supplementation during competition can quicken recovery by preventing electrolyte stores from being depleted too much. There are risks with electrolyte supplementation. Too many electrolytes in the body can lead to hypernatremia and negative symptoms. I once made the mistake during a marathon of ingesting too many salt tablets. I took the recommended amount of salt tablets for a hot, humid day when it was overcast, raining and cool. This caused cramping and diarrhea because the excessive salt in my body was now withdrawing too much water from my bloodstream and into my digestive tract. The only remedy was to drink a lot of water which almost instantly improved my symptoms. If you do decide to use salt tablets, pay attention to the dosages and adjust accordingly for the weather.

Resources: *1. "The Paleo Diet for Athletes" by Loren Cordain and Joe Friel 2. Race-day carbohydrate intakes of elite triathletes contesting olympic-distance triathlon events. 3. Nutritional considerations in triathlon. 4. Energy balance during an ironman triathlon in male and female triathletes. 5. Serum electrolytes in Ironman triathletes with exercise-associated muscle cramping. By: Adam Bohach*