Nutrition for Endurance Athletes

The following is courtesy of Tracy Bonoffski - UNCC Dept. of Kinesiology. Tracy is available for nutritional counseling. She can be contacted at tbonoffs@uncc.edu.

Training:

Carbs: Which type? and When?

1. Should compromise the largest part of the diet
2. Supplies brain with fuel, need a dietary source
3. Exercise at low levels of carbohydrates can be detrimental

Typical Training Diet

2.5-4.5 g/lb Body Weight (6-10g/kg) -- 55-70% calories from carbs

Complex vs. Simple

- Carb Loading: Start 5-7 days out from event, 5-7g/kg BW first 2-3 days, 8-10g/kg BW days leading up to endurance event. Can cause weight gain, but cells will be fully saturated with carbs/water. Depending on the sport, this weight gain may not be desired.
- Carbs needed for body to burn fat during low intensity exercise. "Fat burns in the flame of carbohydrates".

Fat: How much? Good fat vs. Bad fat

- Essential for vitamin absorption
- fat used to spare carbohydrate, low intensity/longer duration
- 10-25% calories from fat
- **Unsaturated fats:**
- **DHA:** Fish such as sardines, salmon, fresh tuna, mackerel and trout
- **ALA:** Linseed oil, pumpkin seeds, hemp seeds, canola and walnuts
- **Omega 6:** Sunflower seeds, walnuts, evening primrose, safflower, and whole grain
- **Omega 9:** Olive , oil, cashew nuts

Protein: How much? Do athletes need extra?

-Amino Acid Supplementation? 1.2-1.4 g/kg BW

Pre-race Suggestions:

- Take a pre-race meal of 200-400 calories at least three hours before exercise. Eat 2-4 grams of carbohydrate (8-16 calories) per kilogram of body weight 2-4 hours before the start of the race and drink about 20 ounces of sports drink during this time also. Sip on around 10 ounces of a sports drink 10-20 minutes prior to the start. Some studies have shown small amounts of protein 10-20 grams have been beneficial at this meal.
- Avoid high fiber, simple sugars, and high fat in your pre-race meal.

During the race:

- Your body burns mostly fat to produce the energy to pedal a bike. However, it needs carbohydrate to burn that fat. Carbohydrate is stored in the muscles as glycogen. A well trained endurance athlete has about 2000 calories of glycogen stored in the body, between liver and intra-muscular stores. This is enough for about 2-2.5 hours of intense exercise. Once you burn through these stores, your body has to switch to a much less efficient means of producing energy. Your perceived exertion increases dramatically and you are suddenly unable to maintain the same pace. More importantly, your brain only works on the burning of glycogen, not fat. When the glycogen is gone, you will feel dizzy and disoriented. This is called Bonking. For those of us who have been there, we don't ever want to go back.
- In general, for shorter races, consume 30-60 grams of carbohydrate (120-240 calories) per hour. For longer races (more than 8 hours), you may be able to experiment with up to 90 grams (360 calories) per hour. Studies have shown that most people can digest 275-400+ calories per hour during an Ironman.
- Recent research has shown that ingestion of a 2:1 ratio of glucose to fructose during endurance exercise can boost the rate at which ingested carbohydrates are burned by as much as 55% as compared to an equivalent calorie level of glucose alone. Scientists think that reason for this is that glucose and fructose each have separate transport systems within the digestive tract, and so by providing some of each type of carbohydrate source, more total carbohydrates can be absorbed and make available to serve as muscle fuel. Choose sports bars/gels that offer a combination of glucose/fructose for a combination of glucose/maltodextrin.

- If you eat something that is calorie dense, such as a bar or gel, drink 6-8 ounces of water with it, ***NOT*** a sports drink. Water, in addition to being required for proper hydration, is also required for digestion. If you eat something with a lot of calories and don't drink water, it could sit in your stomach and cause bloating.
- Because fluid empties from the stomach very differently from athlete to athlete, experiment with fluid quantities during training also. In general, drink 1-2 bottles of fluid per hour (including carbohydrate and sodium) and divide this into about 3-8 big sips/gulps every 15-20 mins
- Good examples include PowerBar Performance System and Hammer Nutrition

Immediately after the Race:

- Fill up your fluid and carbohydrate "tanks" post-race by drinking about one bottle of sports drink for every pound of body weight that you lose and eat about 50-100 grams (200-400 calories) of carbohydrate. This can come in the form of liquid, solid or gel, whichever you prefer. Try to consume a ratio of 4g:1g (carb to protein) along with at least 500-700 milligrams of sodium. Try to keep the fat intake very low if consumed at all in this window directly after a race.
- **Examples:** big smoothie w/ strawberries, bananas, blueberries, OJ, soy milk, protein powder or Endurox R4

Hydration:

Pre-race:

- To ensure that you are fully-hydrated going into a competition, the American College of Sports Medicine (ACSM) recommends consuming fluids about 4 hours before the start of a race. For a 150 pound triathlete, drinking approximately 12-16 fl oz of fluid (i.e. a sport drink, water, or similar beverage) about 4 hours before the race will lead to urine production if you are will hydrated. If it doesn't, or the urine that you produce is dark in color, drink another 8-12 fl oz about 2 hours before the race. For a triathlon it's also fine to sip water or a sport drink during the hour before the race to top-off fluid levels.

During:

- Sodium replenishment: 300-600mg/hour
- Fluid replacement - 24 ounces/hour

- Acceptable ranges for electrolytes in a recovery drink:
- Sodium: 150-750mg
- Potassium: 200-1000g
- Calcium: 400-1200mg
- Magnesium: 200-800mg
- Chloride: 90-750mg