Fueling for Cycling

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What you eat before, during and after training / racing can really influence your performance both positively and negatively. Our goal is to determine what different choices you can make to positively affect your performance.

Nutrients that play a role in improving performance are:
Carbohydrates, Protein, Fat, Vitamins, Minerals and Water.

Carbohydrates: Well established that consuming carbohydrates during endurance exercise enhances performance by maintaining blood glucose levels.

Studies:

1) CHO consumed during cycling 70% of V02 max, zone 4 can delay fatigue by 30-60 min.
   Effect: Exercise longer and sprint harder at the end.

2) CHO feedings vs no feeding . Cyclist consuming carbohydrates lasted 33 more minutes before fatiguing (159 min vs 126 min).
   Effect: Ride longer and harder

Fuel Sources for Exercise:

Carbohydrates: 55-70% Total calories. Primary fuel during cycling. Adequate carbohydrate stores are critical for optimal athletic performance.

- **Muscle glycogen** is stored carbohydrates / energy in your muscles and liver. It is the major source of CHO in the body. It is your primary source of energy during exercise intensity greater than 65% of VO2 max or zones 3-4.
- **Muscle glycogen** contains 300-500 grams or 1,200 – 1,800 calories
- **Liver Glycogen** is stored carbohydrates / energy in your liver and is the main energy / glucose source at rest for your brain and central nervous system.
- **Liver Glycogen** contains 75-100 grams or 300-500 calories. Once you deplete your glycogen stores your intensity level and performance declines rapidly leading to a full blown bonk.
- **Blood Glucose** is your circulating sugar in your blood stream and only provides about 25 grams or 100 calories.
- **Fat Stores** can provide the majority of calories for even the leanest athlete. 1 pound of fat equals 3500 calories. 150 pound person with 10% body fat still has an excess of 52,000 calories or stored energy!!!!

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When and How are these Fuel Sources Used for Energy

Your Intensity and duration dictate the energy and fuel used during exercise.

Aerobic With oxygen, easy to carry on a conversation while exercising. Longer, lower intensity rides. Training ride, races lasting longer than 60 minutes.

Anaerobic Without oxygen, difficult and/or impossible to talk while exercising. High intensity work. Sprints, hill climbs, attacking

Duration of Activity	Muscle Energy Pathway	Activity
1-20 seconds (anaerobic)	ATP in Muscles	Surges and sprints Zones 6-7
20-45 seconds (anaerobic)	ATP & Muscle Glycogen	Surges and sprints Zones 6-7
45-120 seconds (anaerobic)	Muscle Glycogen	Bridging /Attacking Zones 4- 5-(6)
2-3 min. (both)	Muscle Glycogen & Lactic Acid	Bridging / Attacking Zones 3-4-5
> 30 min (aerobic)	Muscle Glycogen & Free Fatty Acids	Road Race / training ride. Low to moderate intensity

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General Carbohydrate Recommendations for Intermittent and Intense Training and Racing

When	Carbohydrate	Amount
Training Diet	8-10g/kg body weight	Adequate Energy 55-65% TC
70 kg (154 lbs) 70 x 2.2 70kg x 8g CHO/kg = 560g CHO 560 grams X 4 cal / gram (Carbohyrate) 2200 to 2500 calories coming from carbohydrates per day		
Pre Race Meal Keep from feeling hungry Helps restore glycogen Carbohydrate rich Foods you like and are familiar with Well tolerated to avoid GI distress Liquid vs Solid	> 200 g	3-4 hours b4 competition Complex vs. simple sugars
Before Race 1 Gu 25g Banana 30g PB & J sandwich 30g 1 cliff bar 45g Hammer gel 23g 1 gu plus 1 secret sauce	30-60 g	1 hour b4 competition Fluid generally better than solids
During Race (or training) Blood is Diverted from gut to muscles Criterium vs RR	30-60 g /h	DO NOT OVERFEED 1g / min Not on a Picnic Choose bar or gu or sauce Flask for Gel

Very, very important to refuel during a race or training ride if time exceeds 60 min. Goal is to replenish carbohydrates to provide energy and maintain normal blood sugar levels. Carbohydrates will increase your endurance and allow you to perform at a higher level, prevent race brain and help you to stay focused.

Carbohydrate Rich Foods

Grains	Dairy Products and Other Beverages	Beans and Starchy Vegetables
2 slices whole wheat bread ½ deli-style bagel 1 2-ounce English muffin 1 cup oatmeal 1 cup ready-to-eat breakfast cereal 1 package snack-type cheese crackers (6 to package) 2 fig cookie bars ½ cup rice ½ cup cooked pasta 5 cups popcorn ½ large soft pretzel 17 mini-pretzels 1 12" flour tortilla 1 oz tortilla chips and ¼ cup salsa	2 cups milk (low-fat or fat-free) 1 cup low-fat chocolate milk 1 4.5-oz container fruit-flavored yogurt 1½ 8-oz cartons sugar-free yogurt 1 cup vanilla-flavored soy milk 1 package instant hot chocolate (made with water)	½ cup black beans ½ cup baked beans ¾ cup kidney beans ½ cup lima beans 1 cup green peas ½ cup corn ¾ cup mashed potatoes ½ medium baked potato with skin

Energy Drinks, Bars, Gels	Mixed Dishes	Fruit and Juice
2 cups sport drinks (6%-8% carbohydrate-containing sport drinks) 1 energy bar (average of many energy bars) 1 energy gel ½ can Boost or Ensure ½ can Slim Fast	1 slice thin-crust pizza with meat or veggie toppings ½ slice thick crust pizza with meat or veggie toppings 1 small bean and rice burrito ½ cup black beans and rice 1½ cups canned chicken noodle soup ¾ cup tomato soup 1 cup cooked ramen noodles ½ 6" sub sandwich ½ cup macaroni and cheese	2 cups fresh strawberries 1 large orange ¾ cup orange juice ½ cup cranberry-apple juice 1 medium apple

1 serving (approximate) = 25 g carbohydrate