

Hydration, Performance and Recovery

Dr. James DiNicolantonio

Pre-Exercise Fueling: Carbohydrates

1-4 hours prior

- 20-40 g protein (2-4 hours before)
 - Chicken, fish, eggs, yogurt, peanut butter
- 1-3 grams of **complex carbs**/kg bodyweight
 - 50-150 grams of carbohydrates
 - Optimal: Starting 3 hours out 1g/kg (50 grams carbs) every hour
- Careful with carbs < 60 minutes prior to activity
 - Small amounts (banana, apple sauce) 30 grams of carbs at most
- **Examples of complex carbs prior to performance**
 - Oatmeal with banana and honey
 - Whole wheat toast with jelly
 - Peanut butter and banana
 - Yogurt, granola, berries
 - Rice with eggs and chicken (more 2-3 hours prior)
 - Smoothie with milk, fruit and oats

Pre-Exercise Hydration + Pre-Cooling

Refrigerated salt solutions can help pre-cool the body and improve performance

- Prior to **practice** (hard training at least 1 hour long)
 - ~ 400 mg Na (1 scoop Re-Lyte kids) with ~ 8-14 oz of fluid (**ages 10-15**)
 - ~ 600-800 mg with 8-14 oz of fluid (**ages 16+**)
 - Usually start consuming ~ 60 minutes prior to exercise
 - Keep in refrigerator for at least 60 minutes before consuming or add ice to bring fluid to refrigeration temperature (~ 39F) quickly (1-3 minutes)
- Prior to **competition**
 - ~ 400-600 mg sodium in ~ 8-14 oz fluid (**ages 10-12**)
 - ~ 800 mg sodium in ~ 8-14 oz of fluid (**ages 13-15**)
 - ~ 1,000-1,200 mg in ~ 10-14 oz of fluid (**ages 16+**)
 - ~ 2,300-3,700 mg ~ 23-32 oz of fluid (**ages 18+**)
 - **Start 90-105 minutes prior to competition**

**Gatorade is only 160 mg of Na
per 12 oz = too low in sodium**

Still better than water but not optimal

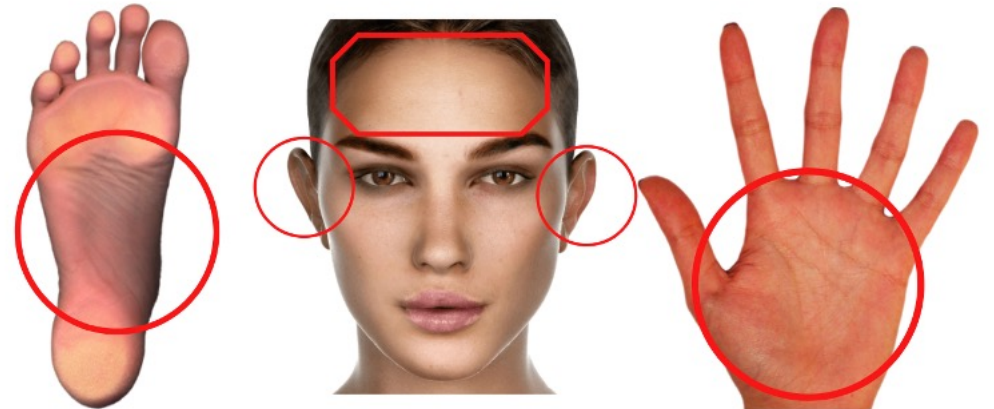
If you are consuming fairly large amounts of sodium in your food prior to exercise you don't need as much in these solutions

Intra-workout cooling (during competition/practice)

Glabrous skin cooling

- Forehead, cheeks, ears, palms of hands
- Cold wraps, gelpacks, cold water, spray cold water bottles + fan (evaporative cooling)
- Decreases rise in core body temperature
- Improves exercise performance

Glabrous Skin in Humans



Intra-workout carbs (carbs during exercise)

- Only if exercising > 60 minutes is this beneficial
- Easily digestible carbs
- Examples
 - Bananas
 - Applesauce pouches
 - Gatorade
 - Jelly sandwich

Recovery

- Active recovery
 - Walk for 5-10 minutes to remove build up of metabolic waste products out of the muscle
- Massage therapy
- Foam rollers
- Hot bath
 - within 1 hour after exercise
- Avoid ice baths
 - Decreases muscle/collagen gains
 - Only use if you have to compete the next day and want to prevent delayed onset muscle soreness

Recovery

Carbs and Protein within 1 hour after exercise

- Carbs
 - 1 g/kg bodyweight
- Protein
 - 20-30 grams
- Examples
 - Chocolate milk
 - Yogurt + fruit
 - Turkey/cheese sandwich
 - Rice/pasta with chicken

Recovery

- Heat acclimation (mainly for the summer)
- 4-5 sauna sessions per week x 3 weeks
 - Fully heat acclimated
 - Sweat sooner, cool off faster, tolerate heat better, perform better in heat
 - Start slow, go slow, hydrate with salt, electrolytes and water afterward
- No sauna sessions 2 days prior to matches