# Nutrition for Swimming

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Paige Kutler, MS, RD, LDN
SportsNutrition@jefferson.edu

# Foundations of Performance Nutrition

**Energy Balance**

**+**

**Food choices**

**+**

**Nutrient Timing**

# Energy Balance

## Energy In

*Food*

*Drinks*

vs.

## Energy Out

*Calories burned from:*

*Exercise*

*Rest*

*Daily Activities*

**Calories in > Calories out  Weight gain**

**Best for off-season muscle growth*

★ **Calories in = Calories out  Weight maintenance**

**Best for in-season performance*

**Calories in < Calories out  Weight loss**

**Best for short term, moderate cutting*

# How many calories do Swimmers need?

- **Swimming can burn, on average, around 400-800 kcal/hour**
  - **Depends on weight, gender, intensity, etc.**
  - **2 hour swim practice = 800-1600 kcal burned**

- **Example: 68 in, 150 lb, 16 y.o. male swimmer**

  - **Exercise: 1100 kcal burned**
  - **BMR: 1686 kcal burned** (Mifflin St. Jeor or body comp assessment)
  - **Daily activities: 400 kcal burned**

    **= 3200 kcal burned**

# Let's Compare

- **Example: 63 in, 130 lb, 45 y.o mom who walks for 30 min/day**
  - **Exercise: 150 kcal**
  - **BMR: 1230 kcal**
  - **Daily activities: 300 kcal**
    **= 1700 kcal**

**You need DOUBLE the calories of mom & dad, so your meals should not look exactly like theirs.**

# Food Choices

# Carbohydrates

- Body's primary energy source

- Pasta, rice, bread, oats, candy, crackers, chips, soda, fruits, vegetables

- 3-12 g/kg/day
- *Swimmers: 6-10 g/kg
  - 150 lbs / 2.2 = 68.2 kg
  - 400-680 g of carbs per day

- Simple carbohydrates
  - Easy to digest, low in fiber
  - Sports drinks, fruit, applesauce, pretzels

- Complex carbohydrates*
  - Longer to digest, contain fiber
  - Whole grain bread, oats, brown rice

# Protein

- Building and maintaining muscle (growth & repair)
- Meat, poultry, fish, eggs, tofu, dairy, nuts
- 1.2-2.0 g/kg/day
  - *Swimmers: 1.5-1.8 g/kg
  - 150 lbs / 2.2 = 68.2 kg
  - 102-123 g of protein per day
- Protein is best utilized and absorbed when consumed consistently throughout the day
  - Ex: protein needs are 120g
    - DO: Eat 5 meals/snacks each containing 25g of protein
    - DON'T: Eat 1 big meal containing a lot of protein

# Fat

- Secondary fuel source, promotes recovery, absorption of vitamins, hormone production, meet energy needs

- 20-35% of total calories  meet calorie needs

- Focus on healthy (unsaturated) fats
  - Omega-3 fatty acids
    - Enhanced recovery, reduced muscle soreness and inflammation, protective for brain health
  - Fish, avocado, nut/seeds, olive oil

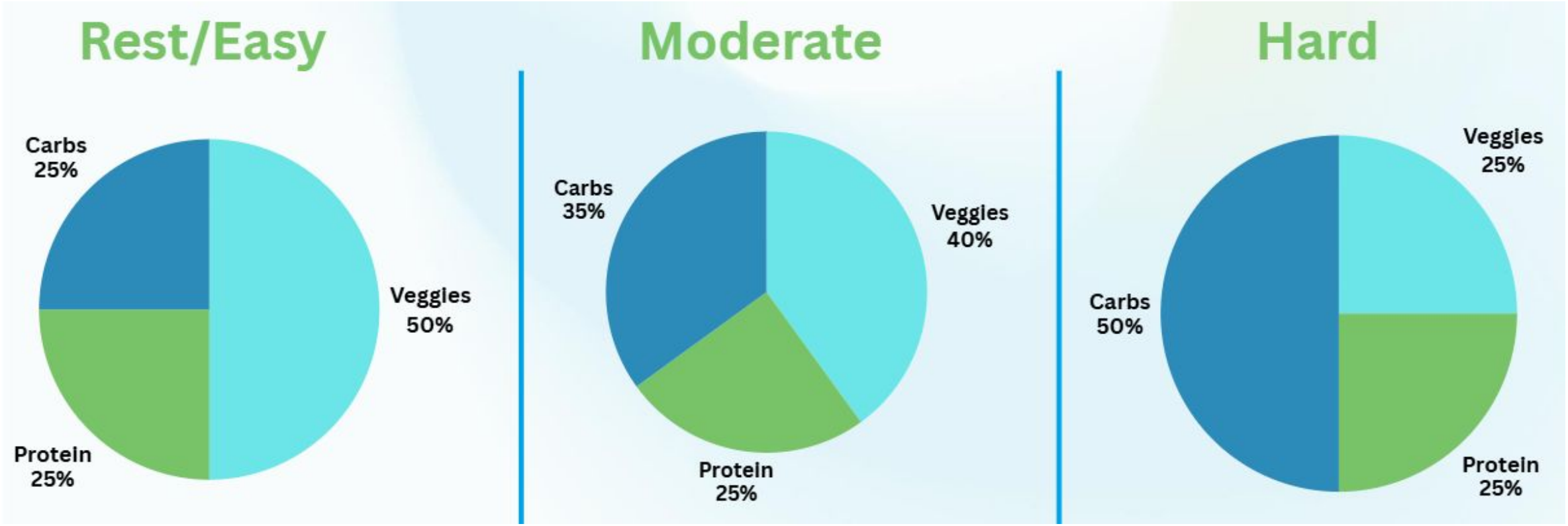
- Limit unhealthy (saturated) fats
  - Pro-inflammatory properties, increased fat mass, decreased heart health
  - Butter, high fat meat & cheese, baked goods

# Micronutrients

- **Vitamins & minerals**
- **5 colors/day**

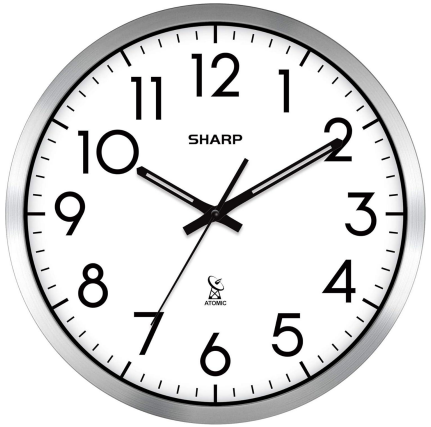
| Vitamin/Mineral | Food Sources | Reason of Importance | Symptom of deficiency |
|---|---|---|---|
| Vitamin C | Citrus, cruciferous vegetables | Protects against oxidative stress; immune function | Fatigue, easy bruising, slow wound healing |
| Vitamin D | Sun exposure; egg yolk, oily fish, fortified milk | Bone health & growth, muscle function | Depression, muscle weakness, stress fractures |
| Vitamin B12 | Fish, red meat, liver, eggs, poultry, milk, cheese | Red blood cell function | Fatigue, decreased energy, low appetite/weight loss |
| Magnesium | Spinach, nuts/seeds, avocado, tuna | Muscle and nerve function | Fatigue, muscle weakness/spasms |
| Iron | Red meat, chicken, spinach, nuts, seeds | Oxygen delivery | Fatigue, shortness of breath |
| Calcium | Milk, cheese, yogurt, soy, spinach, almonds | Bone health | Shin splints, stress fractures, bone aches |
| Zinc | Shellfish, chicken, beef, legumes, nuts, seeds | Immune function, wound healing | Impaired growth, impaired immune function |

# Performance Training Plates



# Nutrient Timing

**You've made the right food choices with a proper balance of macronutrients, but WHEN you eat also matters**



# Traditional timing

| Timing | Intake |
|---|---|
| 3-4 hours before | Full meal – High CHO, moderate PRO, low FAT |
| 1 hour before | Snack – High CHO, low PRO, low FAT |
| During/between | As needed – CHO only |
| 15-45 min after | Snack – CHO + PRO |
| Within 2 hours after | Full meal – CHO + PRO + FAT |

| Timing | Intake |
|---|---|
| 3-4 hours before | Oatmeal w/ berries, eggs, & orange juice |
| 1 hour before | Banana, granola bar, pretzels |
| During/between | Sports drink, applesauce, fruit strips |
| 15-45 min after | Chocolate milk, crackers with string cheese |
| Within 2 hours after | Salmon, potatoes, side salad, dinner roll |

# Pre-workout

- 3-4 hours pre-workout (meal)
  - Meal with whole grain carbohydrates, moderate protein, low-moderate fat
    - Turkey and cheese sandwich on whole grain bread, side carrots w/ hummus, apple, 2% milk
    - Whole grain crackers or pretzels, string cheese, grapes, turkey/beef stick, cottage cheese with honey
    - Yogurt parfait with granola and berries, hard boiled eggs, orange juice
    - PB&J on whole grain bread, smoothie, banana

# Pre-workout

- <1 hour pre-workout (snack) & During
  - Easily digestible carbs only
    - Sports drink
    - Piece of fruit (banana, orange)
    - Applesauce
    - Pretzels
    - Fruit strips
    - Dried fruit
    - Granola bar
    - Energy chews


# Post-workout

- **Mix of protein and carbs – ASAP**
  - **3-4:1 ratio**
- **Carbohydrates replenish depleted glycogen stores and provide body with energy to start the recovery process**
- **Amino acids (found in protein) are what actually repair the muscle tissue, allowing it to grow**
- **Healthy fats (& omega-3s)**

# Post-workout

- **Within 45 minutes post-workout**
  - **Carbs & Protein**
    - **Crackers with peanut butter**
    - **Trail mix**
    - **Granola bar (30-40 g carbs and 8-10 g protein)**
    - **Crackers w/ low fat cheese**
    - **Cereal w/ 2% milk**
    - **Yogurt w/ ¼ c granola and fruit**
    - **Fruit smoothie**
    - **Chocolate milk**
    - **Hard boiled eggs with carb**
    - **Turkey roll-up**
    - **Beef/turkey stick with carb**
    - **Chickpea/edamame snacks**

# Post-workout

- **Full meal**
  - **Carbs + Protein + Healthy Fats**
    - **Salmon + Potatoes + Side salad + Dinner roll**
    - **Chicken Burrito Bowl**
    - **Ground beef + Spaghetti + Veggies**
    - **Pizza + Salad with Chicken**
    - **Turkey Hoagie +  Sunchips + Milk**

# Early morning practice/meet? No problem.

- **Your meal the night before will be CRUCIAL**
  - **Load up on your carbohydrate portion**
    - **Pasta**
    - **Rice**
    - **Add dinner rolls/bread**

- **In the morning, have some easily digestible carbohydrates**

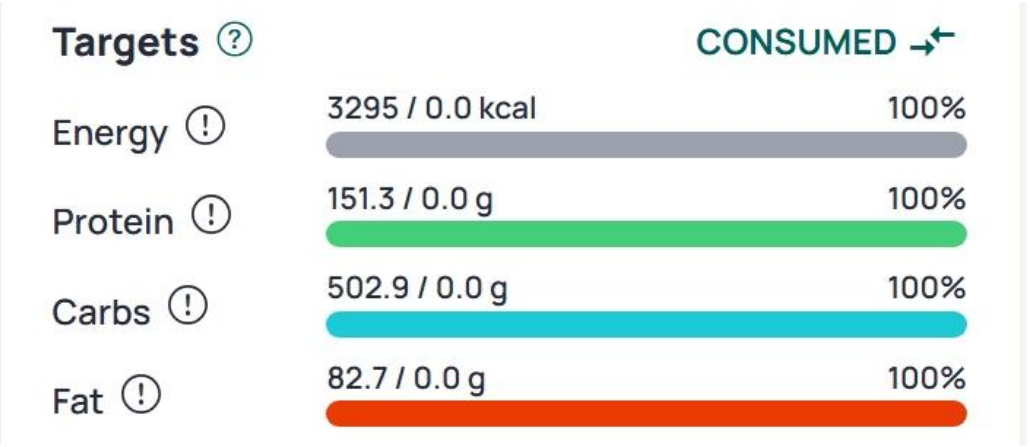
# You CAN do it!

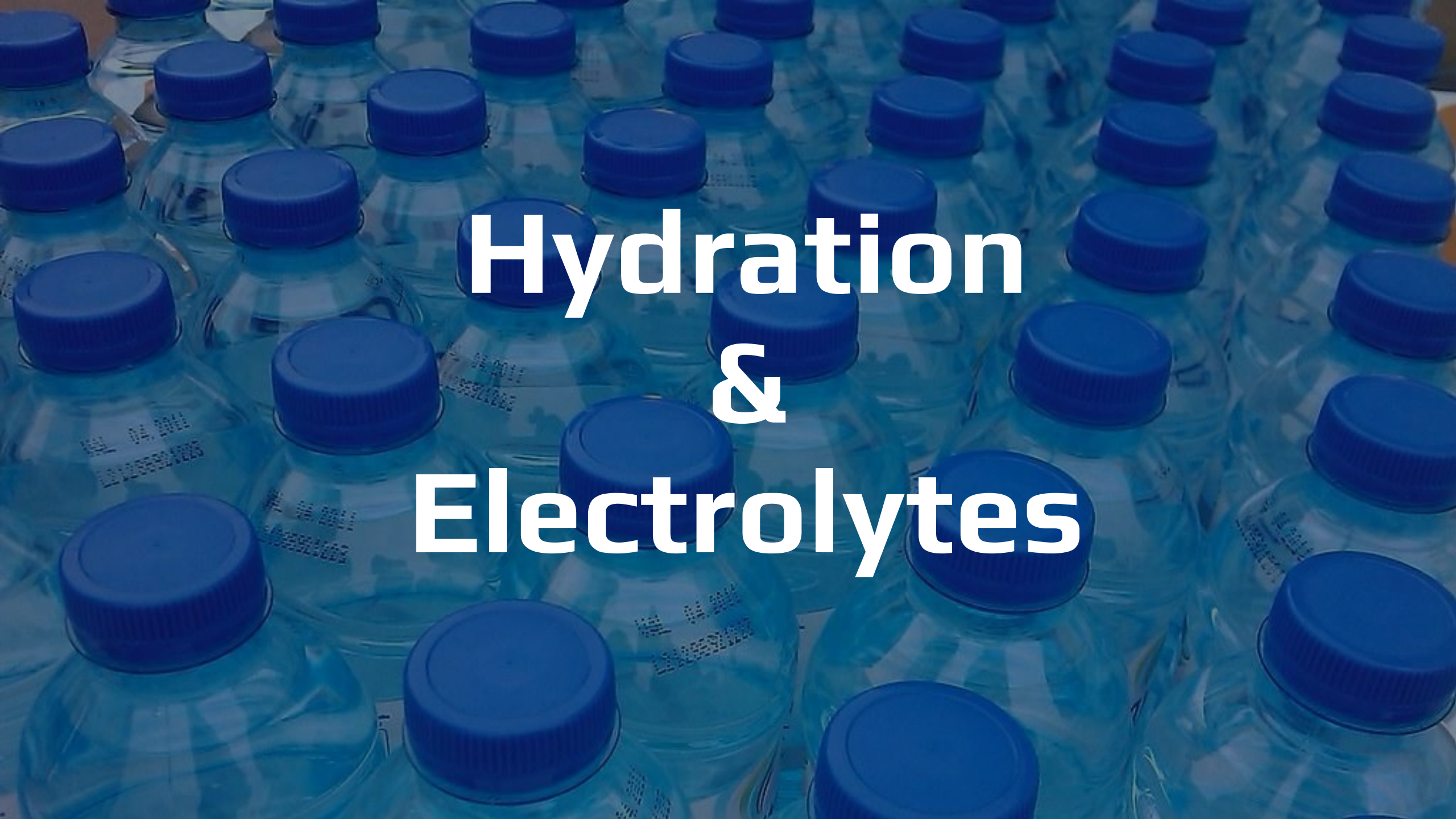
- **68 in, 150 lb, 16 y.o. male swimmer who needs 3200 kcal/day to maintain his weight**
  - **Carbs: 500g**
  - **Protein: 120g**

- **7am lift, school 8-4pm, swim 4:30-6:00pm, home at 6:30pm**
  - **How do I fit all of my calories in?**

# You CAN do it!

| Time | Food | Calories, Protein, Carbs |
|---|---|---|
| 6:15 am | Applesauce & Cheerios | 276 kcal, 5 PRO, 60 carb |
| 8:00 am | Chocolate milk, banana, string cheese, crackers | 498 kcal, 19 PRO, 83 carb |
| 11:30 am | Turkey & cheese wrap, pretzel sticks, hummus, veggies, almonds | 715 kcal, 34 PRO, 100 carb |
| 2:30 pm | Yogurt, granola, berries | 362 kcal, 21 PRO, 60 carb |
| During Swim | 20 oz Gatorade | 140 kcal, 0 PRO, 36 carb |
| 6:30 pm | Salmon, rice, green beans, side salad with dressing, dinner roll | 1057 kcal, 60 PRO, 127 carb |
| 8:00 pm | Popcorn, glass of 2% milk | 250 kcal, 12 PRO, 24 carb |



# Hydration & Electrolytes

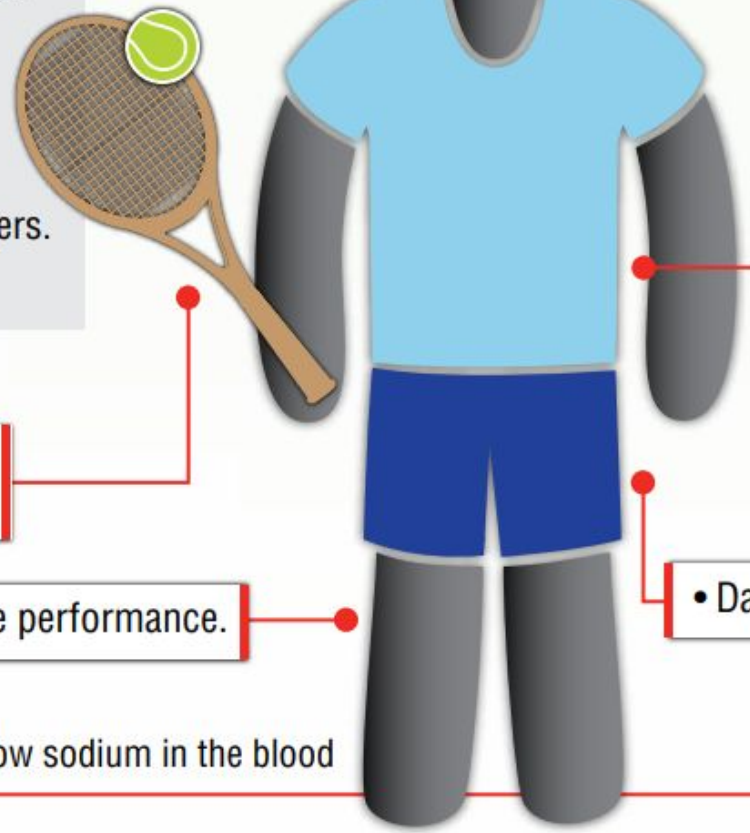
# POSSIBLE INDICATORS OF UNDER-HYDRATION:

- Headache post-training, with high sweat rate or low fluid intake pre and during training - hypohydration.
  - *Headaches post-training with **high water intake** during long training sessions may be an indication of **exercise associated hyponatraemia (EAH).**

- Dizziness/light-headedness.
- Fatigue.
- Moodiness/irritability.
- Thirsty = drink.

Possible Causes of Under-Hydration:

- High volume of sweat, intense workouts, long workouts.
- Heavy workouts in cold weather with multiple layers.
- Hot & humid conditions.



- Poor appetite and elevated metabolism >1hour post exercise = dehydration.
- Nausea.
- Cramps – *May also be caused by neuromuscular issues and/or electrolyte depletion – research still equivocal on one specific cause.

- Heat intolerance during exercise-hypohydration.

- Dark, low volume of urine = dehydration.

- Decreased endurance performance.

*Exercise associated hyponatraemia - low sodium in the blood

# How much should you drink in a day?

Baseline: ½ body weight (lbs) in ounces of fluid

Ex: 140 lbs  **70 oz** water at BASELINE (no activity)

Exercise requires additional fluid intake

# HYDRATE
## EARLY AND OFTEN

**Dehydration can negatively impact performance and cause early fatigue.** Follow these tips to stay hydrated and replenish fluids and electrolytes lost from sweat:

- Focus on fluid intake all day, every day, not just around workouts.
- Always carry a water bottle.
- Weigh yourself before and after exercise to know how much fluid to replace.
- Track hydration by checking urine color - the lighter the better hydrated.

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*For advice on customizing a nutrition plan, consult a sports dietitian.*

## BEFORE EXERCISE

- Begin exercise well-hydrated
- Drink 16-20 oz. of water or sports beverage at least four hours before exercise
- Drink 8-12 oz. of water 10-15 min. before exercise

## DURING EXERCISE

- Drink water or sports beverage every 15-20 min. during exercise
  - 3-8 oz. of water (2-3 large gulps) for exercise ‹60 min.
  - 3-8 oz. of sports beverage for exercise ›60 min.

## AFTER EXERCISE

- Rehydrate
- 16-24 oz. of fluid for every pound lost within 2 hours of exercise
  - ➤ Chocolate milk is a great option to help rehydrate and refuel after a workout

# Example

- 140 lb athlete with a 2 hour swim practice
  - 70 oz at baseline
    +
  - 20 oz within 2 hours before practice
    +
  - 20 oz Gatorade throughout practice
    +
  - 20 oz water within 2 hours post-practice

  - = 130 oz (~1 gallon) total

# WHAT'S IN YOUR SWEAT?

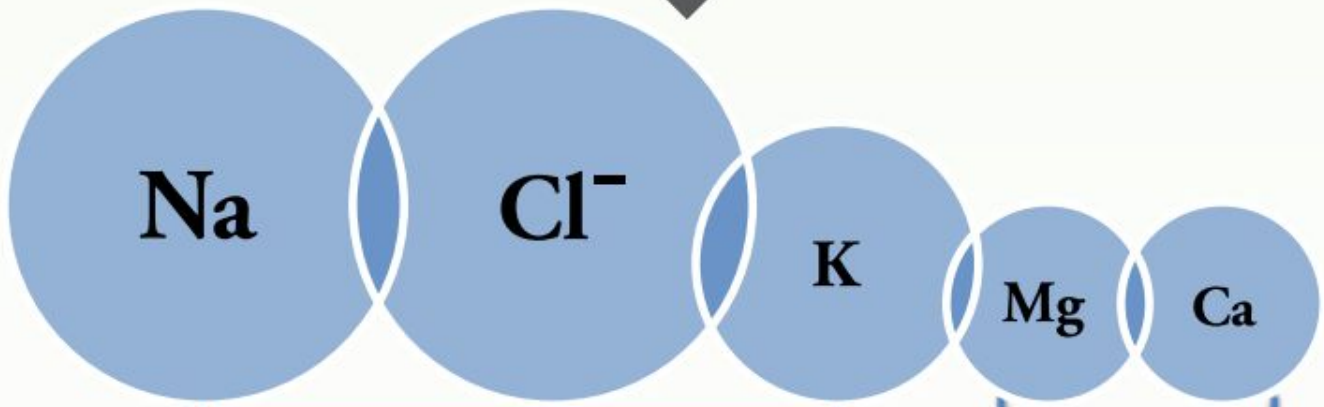
by Taylor Sherman, EP-C, ACSM; Claire Siekaniec, MSc, RD, CSSD; Shelby Johnson, RD


The average athlete loses 1-3L sweat/hour. **Sweat** is primarily made up of water, but it also contains **electrolytes** that have essential roles in the body. **Sodium** and **chloride** are the most abundant electrolytes in sweat with **potassium, magnesium,** and **calcium** present in lower amounts.

Athlete Example: A runner who loses 3 liters of fluid in 1 hour is losing 1,380-5,520mg of salt.

**Sweat Composition**

| Mineral | mg/L |
|---|---|
| Sodium | 460-1840 |
| Chloride | 710-2840 |
| Potassium | 160-390 |
| Magnesium | 0-36 |
| Calcium | 0-120 |




Sodium, chloride, and potassium work together to help regulate and maintain fluid balance.

Magnesium and calcium are essential for optimal muscle function and play an important role in energy metabolism.

- **Losing as little as 2% of your body weight during a workout can result in decreased aerobic performance.**
  - **For a 200lb athlete, that is 4lbs of sweat lost during a workout.**

# ELECTROLYTE COMPARISON CHART

Created By: Taylor Sepiconka, MS, RD, LDN

| DRINKS | Certification | Serving Size & Mix Volume | Calories(kcals) | Carbs(g) | Sugar(g) | Sodium(mg) | Potassium(mg) |
|---|---|---|---|---|---|---|---|
| PRIME  |  | 16.9 fl oz bottle | 20 | 6 | 2 | 10 | 700 |
| BODYARMOR  |  | 16 fl oz bottle | 120 | 29 | 29 | 30 | 680 |
| G2  |  | 20 fl oz bottle | 50 | 13 | 12 | 270 | 80 |
| GATORADE  |  | 20 fl oz bottle | 140 | 36 | 34 | 270 | 80 |
| POWERADE  |  | 20 fl oz bottle | 130 | 34 | 34 | 400 | 130 |
| Electrolit  |  | 21 fl oz bottle | 130 | 31 | 31 | 430 | 487 |
| PICKLE JUICE  |  | 2.5 fl oz bottle | 0 | 0 | 0 | 470 | 47 |
| GATORLYTE  |  | 20 fl oz bottle | 50 | 14 | 12 | 490 | 350 |
| ENDURANCE  |  | 24 fl oz bottle | 180 | 44 | 26 | 620 | 280 |
| Pedialyte  |  | 33.8 fl oz bottle | 70 | 19 | 13 | 1080 | 780 |

# ELECTROLYTE COMPARISON CHART

Created By: Taylor Sepressky, MS, RD, LDN

| PACKETS | Certification | Serving Size & Mix Volume | Calories(kcals) | Carbs(g) | Sugar(g) | Sodium(mg) | Potassium(mg) |
|---|---|---|---|---|---|---|---|
| PRIME  |  | 0.34oz packet → mix in 16oz | 25 | 6 | 2 | 40 | 700 |
| MOMENTOUS  |  | 1.14oz packet → mix in 16oz | 120 | 28 | 27 | 300 | 160 |
| DripDrop  |  | 0.35oz packet → mix in 8oz | 35 | 9 | 7 | 330 | 185 |
| skratch  |  | .13oz packet → mix in 12-16oz | 80 | 19 | 19 | 400 | 50 |
| GATORLYTE  |  | 0.53oz packet → mix in 16oz | 45 | 12 | 10 | 420 | 300 |
| LIQUID I.V.  |  | 0.56oz packet → mix in 16oz | 50 | 13 | 11 | 520 | 370 |
| ENDURANCE  |  | 1.72oz packet → mix in 24oz | 180 | 46 | 28 | 620 | 280 |
| myhy  |  | .75oz packet → mix in 16-20oz | 60 | 12 | 12 | 640 | 130 |
| BUBS  |  | 0.4oz packet → mix in 12-16oz | 40 | 10 | 7 | 670 | 243 |
| DripDrop  |  | 0.74oz packet → mix in 16oz | 70 | 18 | 14 | 670 | 380 |
| FLUID  |  | 0.7oz packet → mix in 16oz | 60 | 15 | 12 | 816 | 370 |
| LMNT  |  | 0.2oz packet → mix in 16-32oz | 5 | 1 | 0 | 1000 | 200 |
| THE RIGHT STUFF  |  | 0.8oz packet → mix in 16oz | 0 | 3 | 0 | 1780 | 0 |

# How to make
# Quick & Easy Meals

# Step 1: Choose a protein source

- **Rotisserie chicken (fast)**
- **Prepped chicken breast**
- **Prepped lean ground beef/chicken/turkey**
- **Frozen cooked shrimp (fast but more expensive)**
- **Tuna (in can or packet)**
- **Eggs**
- **Turkey breast lunchmeat**
- **Tofu/chickpeas/beans**



# Step 2: Add a carb source

- Microwave rice
- Microwave pasta
- Whole grain bread/pita/english muffin
- Whole grain tortillas
- Microwave potatoes
- Oats





# Step 3: Microwave some veggies or open a can



# 1:1 Sports Nutrition Services

- Virtual or in-person
  - 2775 Schoenersville Rd, Bethlehem PA 18017
- Tuesdays & Thursdays
  - Thursday evening appointments available
- Referral from doctor for “LVPG Sports Nutrition”

**SportsNutrition@jefferson.edu**

# Questions?

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