



# Endurance Athlete Nutrition Field Guide

All values are grams per kilogram of body weight (g/kg/day)

## Traffic Light Protocol for Fueling

Use these charts to select daily carbohydrate and protein targets based on the primary workout type of the day. All values are expressed as grams per kilogram of body weight per day (g/kg/day).

### Chart 1: Carbohydrate Level by Workout Type

Carbs fuel the work.

Carb Level	Carbs (g/kg/day)	Typical Workouts	Session Characteristics
LOW CARB	3–4	Rest, recovery, mobility, technique swim	Low intensity session generally under 60 minutes.
MEDIUM CARB *	5–6	Endurance ride/run, aerobic swim, easy brick, Tempo, threshold	Z2-Z3 session lasting approx. 60–120 min and higher intensity session up to 60 minutes.
HIGH CARB	6–8	Tempo, threshold, bricks, double sessions	Moderate–high session lasting more than 60 min or any session lasting more than 120 minutes.
CARB LOAD	8–12	Taper days, race simulation, day before race	Very low load with glycogen store recovery or enhancement focus

\*This will be most days for the regular triathlete.

### Chart 2: Protein Requirements by Workout Type

Protein repairs the work.

Protein Level	Protein (g/kg/day)	When to Use	Primary Benefit
LOW-MODERATE	1.4–1.6	Rest days, light recovery, easy aerobic	Maintain muscle & recovery
MODERATE*	1.6–1.8	Standard training, endurance, tempo	Repair & immune support
HIGH	1.8–2.2	Heavy strength, bricks w/ strength, high volume	Tissue repair & resilience

\*This will be most days for the regular triathlete.

## Female Athlete Overlay - Cycle Aware Fueling

Follicular Phase (Day 1-14):

- Higher carbohydrate tolerance
- Use upper carb range on ORANGE and RED days
- Intensity and strength often well tolerated



## Luteal Phase (Day 15-28):

- Slightly higher energy and protein needs
- Add +0.2-0.4 g/kg protein
- Maintain carbs even if appetite drops
- Increase hydration and sodium awareness

**Key Rule:** Never reduce carbs on hard or long days due to cycle phase.

## Rehydration Requirements

Context	Guideline
Daily baseline	~35-45 mL/kg/day
During exercise	0.4-0.8 L/hour (sweat rate dependent)
Post-exercise	1.25-1.5 L per kg of body weight lost

## Fuel for the Work Required (Training & Racing)

Duration	Carbohydrate Needs
<60 min	While additional fueling during these sessions is not required, it can be beneficial to assist in post activity carbohydrate needs and in “Training the Gut” for those athlete’s taking part in longer endurance activities.
60-90 min	30 g/hour (gel and sport drink)
>90 min	30-60 g/hour (gel or two and sport drink)
>2.5 hrs	1-1.5g/kg body weight for riding and .66-1g\kg body weight for running (determine your requirements and follow a specific fueling plan)  *For advanced athletes, consuming larger amounts may be possible. This is an advanced technique that is currently only being used by professional triathletes with varied results. It is highly recommended to if you wish to consume more than the traditional amount that you train doing this and confirm before race day this will work for yourself.

## Training the Gut (Fueling Adaption)

While sessions under **60 minutes** generally **do not require fueling for energy**, there are times when **intentionally consuming carbohydrates during training** is beneficial.

This is referred to as **training the gut**.



## *What “Training the Gut” Means*

Training the gut involves **practicing carbohydrate intake during training** so your digestive system becomes more efficient at:

- Absorbing carbohydrates
- Tolerating higher intake rates
- Reducing the risk of GI distress on race day

Just like muscles adapt to training stress, **the gut adapts to repeated fueling exposure.**

## *When Training the Gut Matters Most*

Training the gut is **primarily required** when preparing for events that:

- Last **longer than ~2.5 hours**
- Require **sustained carbohydrate intake per hour**
- Include long bikes, long runs, or race simulations

Examples:

- Ironman and Ironman 70.3
- Long-course triathlon
- Ultra-endurance running
- Long Spartan / OCR events

## *Track It: Your Gut Training Log*

When training your gut, keeping a simple log is extremely valuable. Record what you consumed, how much, when you took it, and how you felt during the session — including energy levels, focus, and any GI symptoms.

Trying new fueling strategies without written notes can lead to errors in recall and judgment, especially when multiple products or intake levels are involved. A brief log helps you identify what works, what doesn't, and where adjustments are needed before race day.

## References for Higher Carb Intake:

- [How Many Carbs Can You Really Handle? The Science Behind High-Carb Fuel – Aid Station](#)
- [Fueling Like a Pro: Inside the High-Carb Nutrition Plans of 2025 Ironman – TriLaunchpad](#)
- [How Ironman World Championship Pros Use High-Carb Fueling to Maximize Performance — Triathlete](#)
- [Ironman Sieger Casper Stornes macht es vor - 180 Gramm Kohlenhydrate pro Stunde – warum Ausdauersportler heute so viel mehr vertragen? - Michael Krell Triathlon Coaching](#)
- [Why Pros Do High Carb Better \(And How You Can Too\) - Triathlon Forum - Slowtwitch Forum](#)



## Recovery Requirements

Nutrient/Strategy	Guideline
Carbohydrate	1.2 g/kg within 30 min, repeat hourly for 3-4 hrs if rapid recovery needed
Protein	0.3 g/kg (20-40 g) within 30-60 min post-exercise
Carb + Protein	Enhances glycogen resynthesis & muscle repair
Fluids	Replace 150% of fluid lost within 4-6 hrs

## RED-S (Relative Energy Deficiency in Sport) Warning Signs

- **Physical:** Fatigue, recurrent injuries, stress fractures, menstrual issues (females), low libido (males)
- **Performance:** Declining endurance, poor recovery, decreased strength
- **Psychological:** Irritability, low mood, poor concentration
- **Health:** Hormonal disruption, weakened immunity, impaired bone health

**NOTE:** If you feel that you may have RED-S you should seek medical attention as soon as possible.



## Plate Portion Control

Training Load	Vegetables/Fruit	Protein	Whole Grains
Easy/Rest Day	½ plate	¼ plate	¼ plate
Moderate Day	⅓ plate	⅓ plate	⅓ plate
Heavy/Pre-Race Day	¼ plate	¼ plate	½ plate

## Key Micronutrients for Endurance Athletes

Micronutrient	Role	Deficiency Risk
Iron	Oxygen transport	Fatigue, low endurance, injuries
Calcium	Bone & muscle health	Stress fractures, poor muscle function
Vitamin D	Bone health, immunity	Weak bones, illness risk
Sodium	Fluid balance, muscle contraction	Cramping, hyponatremia
Magnesium	Energy production, recovery	Cramps, fatigue, poor recovery
Zinc	Immune function, repair	Illness, poor recovery



## Advanced Endurance Nutrition Strategies

### Periodized Nutrition

- Adjust fueling based on training cycle (base, build, peak, taper, off-season).
- Higher carb intake during peak/high-volume weeks; slightly lower in off-season.

### Race Day & Event Nutrition

- **Pre-race meal:** 3-4 hrs before, carb-rich, low fat, moderate protein.
- **During race:** follow fueling plan (carb intake/hour, electrolytes).
- **Post-race:** prioritize glycogen replenishment and hydration.

### Timing Guidelines

- **Pre-training:** 30-60 min before (easy carb + little protein).
- **During:** carbs/hour according to session length.
- **Post-training:** recovery snack within 30-60 min, balanced meal within 2 hrs.

### Mental Performance & Nutrition

- **Caffeine (optional):** proven ergogenic aid; time ~30-60 min pre-event.
- **Hydration:** Hydration supports focus and decision-making in long events.

### Injury & Immunity Support

- **Protein intake:** 2.0-2.4 g/kg/day during injury recovery.
- **Health and Injury Soft Tissue Injury Repair:** Collagen + Vitamin C before rehab for tendon/ligament support.
- **Immunity:** ensure adequate Vitamin C, D, zinc, and probiotics.

### Tracking & Monitoring

- **Sweat testing:** personalize hydration strategy.
- **Track body composition:** DEXA, skinfolds or weight trends to aid in **Base Metabolic Rate** determination.
- **Training + nutrition logs:** spot under-fueling patterns.

### Lifestyle Factors

- **Sleep:** pre-bed protein, magnesium-rich foods aid recovery.
- **Travel nutrition:** plan portable carb snacks, hydration on flights.
- **Limit alcohol:** impairs glycogen production.



## Carb-Loading Guide & Variants

### Carb-Loading Timeline (48h / 24h / Race Morning)

#### 48 Hours Before Race:

- **Carbs:** 7-9 g/kg
- **Protein:** 1.6-1.8 g/kg
- **Fat:** lower than normal
- **Focus:** begin glycogen saturation, reduce fiber
- **Training:** very light or rest

#### 24 Hours Before Race:

- **Carbs:** 9-12 g/kg
- **Protein:** 1.6-1.8 g/kg
- **Fat:** low
- **Focus:** maximize glycogen, prioritize hydration & sodium
- **Training:** rest or short shakeout

#### Race Morning:

- **Carbs:** 1-2 g/kg (2-4 hours pre-race)
- Low fiber, low fat, familiar foods
- Small sodium-containing fluids

## 70.3 vs Ironman Carb-Loading

#### IRONMAN 70.3:

- 24-36h carb-load window
- **Peak intake:** 7-9 g/kg
- Less aggressive fiber reduction
- Goal: start topped up, not bloated

#### IRONMAN (140.6):

- 36-48h carb-load window
- **Peak intake:** 9-12 g/kg
- Aggressive fiber reduction
- **Goal:** maximum glycogen storage for long bike/run

## Low-Fiber Carb-Load Food Swap List

Choose lower-fiber, easily digestible carbs.

Swap THIS For THIS:

- Brown rice for White rice
- Whole wheat pasta for White pasta
- Oats for Cream of rice
- Whole grain bread for White bread / bagel
- Beans / lentils for Potatoes (peeled)
- Vegetables for Fruit juice / applesauce
- High-fat sauces for Tomato sauce or low-fat options
- Nuts / seeds for Pretzels or rice cakes