

Endurance Athlete Nutrition Guide

Evidence-based fueling for training, racing, and recovery

Carbohydrate is the rate-limiting fuel for efforts above ~65% VO2 max. Protein drives repair. Fat oxidation determines aerobic efficiency. Timing links all three.

PRE-TRAINING (2-3 HOURS BEFORE)

- Carbohydrate load: 1-4 g/kg bodyweight
- Protein: 20-30 g moderate quality pasta, oats, rice, banana
- Fluid: 5-7 ml/kg bodyweight distress vs. high-fat protein
- Limit: high-fat, high-fiber foods
- Caffeine: 3-6 mg/kg 60 min pre-effort intensity work
- Evidence-backed ergogenic; ~200-400 mg for most adults

DURING TRAINING / RACING

- Carbohydrate: 30-60 g/hour for efforts 60-90 min
- Carbohydrate up to 90 g/hour for efforts >2.5 hrs
- Sodium: 2300-1000 mg/hour in heat or sweat-heavy athletes
- Fluid: drink to thirst, not on schedule
- No protein needed for efforts under 3 hours
- Protein during exercise does not improve acute performance

INTRA-WORKOUT TIMING REFERENCE

Effort Duration	CHO Target	Type
<60 min	None required	Water + electrolytes
60-90 min	30 g/hr	Single-source glucose
90-150 min	60 g/hr	Glucose + fructose blend
>150 min	60-90 g/hr	2:1 glucose:fructose

POST-TRAINING RECOVERY WINDOW

- Protein: 0.3–0.4 g/kg within 30–60 min
 - Carbohydrate: 1–1.2 g/kg in the first hour
 - Add leucine if meal is plant-based
 - Fluid replacement: 15–150% of weight lost
 - Sodium with rehydration fluid
 - Anti-inflammatory foods: tart cherry, turmeric
- Tart cherry: 2 studies show reduced DOMS and CK post-marathon

DAILY PROTEIN TARGETS BY GOAL

Goal	Target	Notes
Maintenance / general health	1.2–1.6 g/kg/day	Lower end for low-intensity training
Endurance performance	1.4–1.7 g/kg/day	Higher losses from oxidative fuel use
Simultaneous training + fat loss	1.8–2.4 g/kg/day	Preserves lean mass during deficit
Masters athletes (>50 yrs)	1.6–2.2 g/kg/day	Anabolic resistance requires higher dose

EVIDENCE-RANKED SUPPLEMENTS

Tier 1 — Strong evidence

- Creatine monohydrate
3–5 g/day · performance, recovery, cognitive benefit post-exercise
- Caffeine
3–6 mg/kg body weight · ergogenic for power and endurance
- Dietary nitrates (beet juice)
400 mg nitrate 2–3 hrs pre · reduces oxygen cost at sub-maximal intensity

Tier 2 — Moderate evidence

- Beta-alanine
3.2–6.4 g/day · buffers lactic acid · useful for 1–10 min maximal efforts
- Sodium bicarbonate
0.3 g/kg 60–90 min pre · extra-cellular pH buffer · GI tolerance varies
- Tart cherry concentrate
30 ml x2 daily · reduced DOMS and inflammation markers in 3+ studies

Sources: Jeukendrup (2014) Sports Med · Burke et al. (2011) J Sports Sci · Thomas et al. (2016) Academy of Nutrition and Dietetics Position Paper · Stearns et al. IJSNEM (2009) · IOC Consensus Statement on Sports Nutrition (2018)