# TIMING & PERIODIZATION OF MACRONUTRIENTS

Macronutrient timing and periodization means adjusting carbs, protein, and fat at planned times to optimize an athlete's training, performance, and recovery. In practice, you fuel for the work needed to produce specific adaptations. Plans may span a day (microcycle), weeks (mesocycle), or months (macrocycle).

## DAILY TIMING (MICROCYCLE)

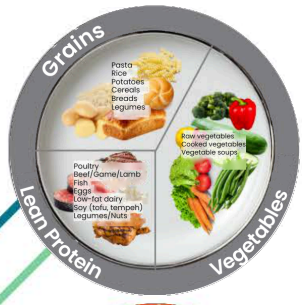
Within-day energy balance compares energy from food and drinks with energy spent on activity and metabolism across one day. Both how much you eat and when you eat, especially around exercise, matter. This balance supports athletic performance and helps prevent low energy availability or relative energy deficiency in sports (RED-S).

Adjust eating around exercise to support energy balance. The body mainly uses carbs and fats for fuel; the mix depends on the intensity of each training session and the dietary fuels available. Matching intake to training demands can help achieve the desired training adaptations.

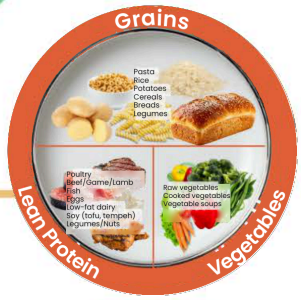
- Pre-exercise meal (3-4 hours before): fuel for the work ahead. Choose the USOPC moderate training plate for an easy or medium day, and the hard training plate when the session will be more intense.

**PRACTICE INTENSITY**

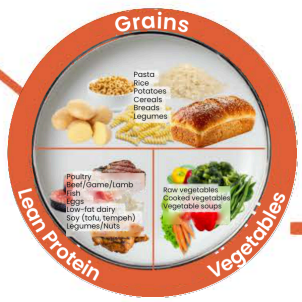
- EASY
- MODERATE
- HARD
- RACE PACE




Choose a moderate training plate BEFORE an easy or medium practice:
- 1/3 of the plate: carbs
- 1/4: lean protein
- 1/3: color - fruit or vegetables




Choose a hard training plate BEFORE hard practice:
- 1/2 of the plate: carbs
- 1/4: lean protein
- 1/3: color - fruit or vegetables




Choose a hard training plate PLUS BEFORE a race:
- 1/2 of the plate: carbs
- 1/4: lean protein
- 1/3: color - fruit or vegetables
- PLUS a carb side: juice, fruit, or a roll



Information from ASPDA members Molly E. Miller, MS, RD, and Clint Wattenberg, MS, RD.
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Adjust eating around exercise to support energy balance. The body mainly uses carbs and fats for fuel; the mix depends on the intensity of each training session and the dietary fuels available. Matching intake to training demands can help achieve the desired training adaptations.

- Pre-exercise meal (3-4 hours before): fuel for the work ahead. Choose the USOPC moderate training plate for an easy or medium day, and the hard training plate when the session will be more intense.
- Pre-workout snack: top up glycogen stores with 30-60 g of carbs 30-60 minutes beforehand, depending on the intensity and duration of exercise.
- Match your fuel to exercise intensity.
  - Gauge intensity with the Rating of Perceived Exertion (RPE) scale or the Talk Test.

## FUELING AROUND TRAINING SESSIONS OF DIFFERENT INTENSITIES

### BEFORE LOW INTENSITY

Choose balanced fuel with carbs plus fats/protein.

- Talk test: you can speak and sing easily.
- Perceived exertion (RPE): 1-4/10




### BEFORE MEDIUM INTENSITY

Choose carb-based fuel with some fat/protein, such as peanut butter or yogurt.

- Talk test: you can talk, but cannot sing.
- RPE: 4-5/10




### BEFORE HIGH INTENSITY

Choose fuel with carbs as the main energy source.

- Talk test: you can say only a few words before pausing for breath.
- RPE: >6/10




- During exercise: keep blood glucose stable throughout the session.
  - Under 45 min: carbs are not needed.
  - 45-75 min: use a sports drink or sports food as tolerated.
  - Endurance training (90-150 min): 30-60 g of carbs per hour.
- Recovery fuel: start recovery right after training with carbs and protein for anabolism (building), especially when you have several sessions in one day.
  - Eat 1-1.2 g/kg of body weight in carbs within 30 minutes. Use more carbs after higher-intensity or longer-duration exercise.
  - Eat 0.25-0.4 g/kg of body weight in protein within 30 minutes after training.
- Post-training meal: restore glycogen stores and continue anabolic processes (muscle protein synthesis and glycogenesis).
  - Recover from the work you completed. Choose a performance plate that matches how intense your workout was.

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## WEEKLY PERIODIZATION (MESOCYCLE)

Adjust daily carb intake to training intensity with the USOPC Training Plates to meet energy demands. Instead of eating the same way every day, use the easy training plate on lighter days and the hard training plate on more intense days. Matching daily intake to overall training demands helps support energy availability while maintaining body composition.

### EASY TRAINING / WEIGHT CONTROL




### MODERATE TRAINING




### HARD TRAINING / RACE DAY




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# TIMING & PERIODIZATION OF MACRONUTRIENTS

## YOUR SPORT SEASON (MACROCYCLE)

Adapt fueling to the time of year:

- **Pre-season (preparation):** choose fuel that supports the goals of your training, which may include development of energy systems, improvements in sport-specific skills, and possible changes to body composition.
- Adjusting sources of pre-exercise fuel to match the planned intensity can promote **metabolic flexibility**, your body's capacity to switch between different fuels during different activities. For example, strategically reducing carbs before low- to moderate-intensity training, such as skills and drills or technical and tactical sessions, can cause cellular metabolic adaptations. These include increased signaling for beta-oxidation, which lets the body use fat for fuel at progressively higher workloads, and mitochondrial biogenesis, the formation of additional mitochondria. Over time, these metabolic adaptations expand aerobic capacity, can reduce anaerobic metabolic waste, and allow glycogen to be conserved for higher-intensity efforts. If metabolic flexibility adaptations are important to you:
    - Choose pre-exercise fuel to match the expected intensity and duration of the upcoming exercise or training session.
    - Sleep low: train with limited carb availability after an overnight fast, without fully replacing glycogen stores, by limiting carbs before low- to moderate-intensity work (<70 g of carbs). Before high-intensity training, always have a high-carb meal and snack for support; otherwise, anaerobic adaptations and capacity will weaken over time.
    - Use this as a short-term strategy, avoid it during heavy training loads, and recognize that it is unsuitable for some athletes.
- **In season / competition training:** the usual priority is to optimize performance in both competition and training, while managing energy availability to optimize recovery. Use carb-focused fuel before all moderate- to high-intensity activity bouts, and eat consistently across the day to maintain neutral energy availability.

- **Championship taper:** eat moderate to high amounts of carbs to support performance while matching the reduced training load.
- **Offseason:** recover from the season's physical and mental strain. Balance eating patterns with mindful eating, and adjust carbs to training demands to support energy availability. The offseason, and possibly pre-season, can allow body composition changes when optimizing performance and recovery are not the main priorities.

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