



PERIODIZATION AND TIMING OF MACRONUTRIENTS

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Nutritional Timing is critical in optimizing an athlete's training, performance and recovery. Strategic "Carbohydrate Matching" maximizes the benefits of performance fueling by providing optimal macronutrients at the ideal time; this promotes energy availability to enable "Perpetual Anabolism".

PERPETUAL ANABOLISM:

Providing the body nutrients to rebuild lean tissue facilitates a state of constant/continual repair of muscle, organs, connective tissue, bone, immune system, hormones and glycogen.



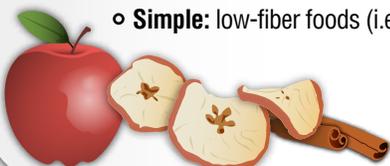
FUNDAMENTALS OF PERPETUAL ANABOLISM:

1. Energy on demand: Providing energy **substrate** (from food) to an athlete **while exercising** allows the substrate to be used as the fuel source, preserving the body's energy **stores** - "Carbohydrate Matching" provides optimal fuel to an athlete just before and after it is needed by the body.

- **Energy stores** include muscle glycogen, muscle protein and body fat and can be broken down for energy when substrate is not available for utilization.
 - **Glycogen** - the body's storage form of carbohydrate and is the most efficient form of stored energy for an exercising body.

1. Glycogen storage - Increasing stores improves tissue repair and energy recovery, while low glycogen replenishment increases fatigue and injury risk.

- **Include 30-60g carbs 30-60 min pre-workout (see below).**
 - A combination of carbohydrate types may be appropriate.
 - **Complex:** high-fiber foods (i.e. whole grains).
 - **Simple:** low-fiber foods (i.e. sports drinks, dried fruit).



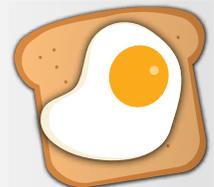
2. Targeted Protein Intake

• Optimal Protein Fueling

- Moderate quantities (20-30g) of high-quality protein should be consumed every 3 hours when awake to stimulate tissue repair.
- Aim for 3-5 separate doses of high-quality protein.

• Fueling Around Sleep – Before and After:

- 25-40g protein within 1 hour of bed stimulates tissue repair (anabolic) rather than degrading (catabolic) while sleeping.
- Including both protein for tissue repair and carbs for energy substrate to start your day "breaks" the overnight "fast" (i.e. breakfast) and drives the body to an anabolic state.



3. Exercise Recovery

- Stimulate an optimal anabolic response to training.
- Add 20-30g protein consumed with 40-80g of carbs within 30-45 minutes of exercise completion.



PERIODIZATION AND TIMING OF MACRONUTRIENTS

CARBOHYDRATE MATCHING:

Athletes require energy substrate to fire the muscles, and carbohydrate is the substrate the body burns best. Providing carbs on demand before and during exercise, and to stimulate recovery, can both optimize training and mitigate any energy deficit created through training.

CARBOHYDRATE MATCHING RECOMMENDATIONS:

1 Pre-Workout

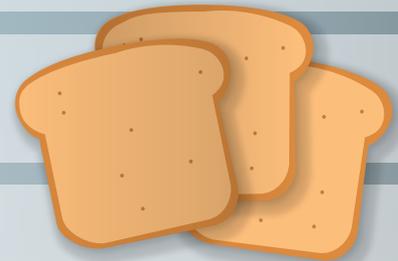
30-60g (blend of complexity as tolerable) carbs 30-60 min pre-workout

2 Mid-Workout

- <45 mins = not necessary.
- 45-75 mins = sports drink or sport food as tolerated.
- Endurance training 90 – 150 mins = 30-60g per hour.

3 Post-Workout

(Anaerobic) 40g <---> 80g (Aerobic)



CASE EXAMPLE:

A 150lb college student-athlete:

- **Nutritional goals:** Optimizing physical and mental energy, maximizing in-season strength and minimizing injury risk.
 - Body weight and composition should not be of primary concern for this **in-season** athlete so maintain focus on **perpetual anabolism** and **carb matching**.

In-season practice schedule: 8am lift, 3pm hard team practice with conditioning.

Male:

Estimated baseline energy expenditure = 2030 kcals
Estimated exercise energy expenditure = 1770 kcals
Estimated total energy expenditure = 3800 kcals

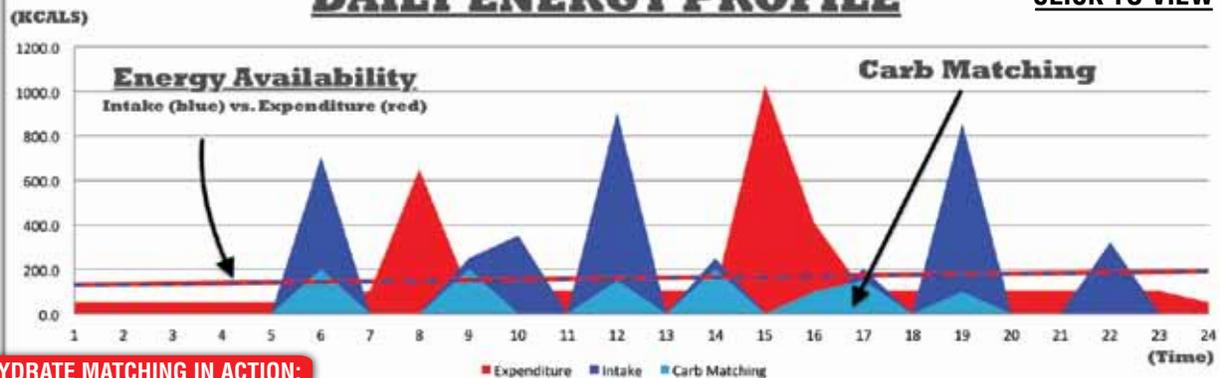
Female:

Estimated baseline energy expenditure = 1830 kcals
Estimated exercise energy expenditure = 1770 kcals
Estimated total energy expenditure = 3600 kcals



DAILY ENERGY PROFILE

[CLICK TO VIEW](#)



CARBOHYDRATE MATCHING IN ACTION:

Carbohydrate matching helps support energy availability and perpetual metabolism - the light blue curve indicates the portion of the intake that is added specifically to meet the day's training demands, a.k.a. Carbohydrate Matching!

The blue and red lines indicate the balance of energy (intake versus expenditure) over the entire day - this sample fueling profile is completely balanced resulting in high energy availability for the athlete's training and recovery.