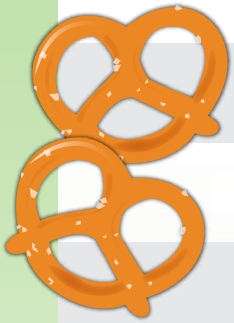
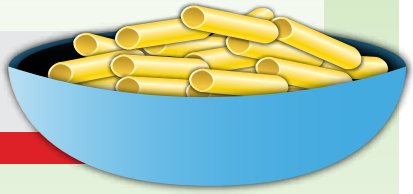
MACRONUTRIENT BASICS

by Lisa Chan, MS, RD, CSSD, LD

Carbohydrates provide FUEL

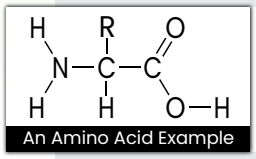


- Carbohydrates are the main fuel for an athlete's body and brain.
- Carbohydrates sustain exercise intensity, limit muscle breakdown and help the body stay hydrated.
- Some carbohydrates supply fast fuel: white bread, rice or pasta, pretzels, sports drinks and applesauce.
- Others build fuel reserves for later: oats, whole-grain bread, rice or pasta, and low-fat granola.
- Too little carbohydrate can reduce workout energy, strength, endurance and decision-making. This can impair performance and raise the risk of injury.
- Eating enough carbohydrate at the right times can greatly improve an athlete's training, performance and overall sporting success.



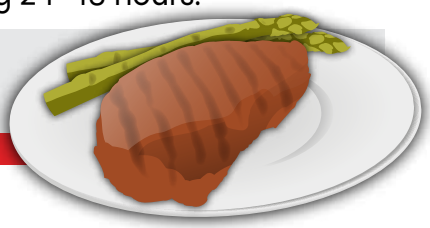
Protein builds STRUCTURE

- Protein helps the body work well. A healthy, well-nourished body is better equipped to perform at its highest level.
- Protein forms tissues, including muscles; enzymes that drive reactions, such as converting food into usable energy; hormones that carry messages; antibodies that support immunity; and many other body components.



An Amino Acid Example

- Proteins consist of building blocks known as **amino acids.**
  - Of the 20 amino acids, 9 are essential and must come from food.
    - Essential amino acids are vital for recovery and muscle growth.
- The body uses protein best when intake is spread across the day instead of 1 or 2 large meals.
  - Aim for 4-5 protein servings daily. Include protein - meat, poultry, seafood, dairy, eggs, tofu, nuts or similar foods - at each meal or snack.
- Protein is especially useful after exercise. **Recovery nutrition** matters within 45-60 minutes after a workout and throughout the following 24-48 hours.
- Protein digests more slowly than carbohydrate, helping you stay full for longer, which may support weight loss.



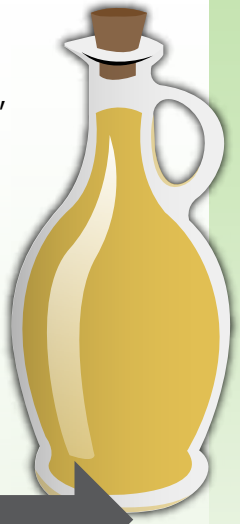
MACRONUTRIENT BASICS

Fat is VITAL

- Fat is a vital part of a high-quality diet that supports athletic performance.
- **Fat serves many purposes:** regulating temperature, supporting immunity, cushioning and protecting organs, carrying nerve signals, helping absorb vitamins and supplying energy for prolonged, low-intensity aerobic activity.

KINDS OF FAT:

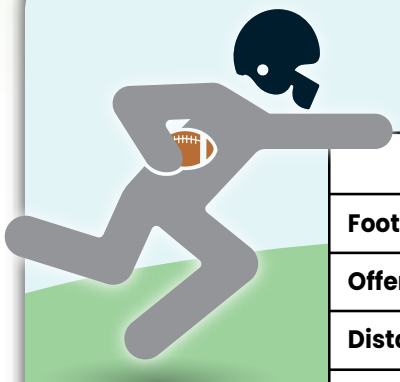
- **Unsaturated fats** occur in olive, canola and peanut oils, nuts, avocados, oily fish, eggs and seeds.
  - They may help lower cholesterol and blood pressure.
  - Omega-3 fatty acids are unsaturated fats associated with less inflammation and better brain health, with a possible reduction in concussion risk and/or symptoms.
- **Saturated fats** occur in dairy foods, fatty meat, chicken skin, margarine, deep-fried fast foods, commercially made pastries or pies, and biscuits.
  - Higher saturated fat intake may raise cholesterol, heart disease or stroke risk, and inflammation.



FAVOR UNSATURATED FATS OVER SATURATED FATS

When planning a performance diet, keep these points in mind:

- Insufficient fat can lower energy during aerobic exercise, weaken immunity, disrupt menstrual cycles in women and hinder the digestion of certain nutrients.
- Excess fat can displace other macronutrients, cause unwanted weight gain and contribute to health problems, including heart disease.



MACRONUTRIENT NEEDS BY SPORT

Needs depend on sport, position, competitive season, exercise intensity and duration, plus an athlete's height, weight, sex, age and body composition goals. The examples below show how requirements vary across sports.

	CHO	PRO	FAT
Football Wideout	6-10g/kg BW	1.4-2.0g/kg BW	Meet remaining energy needs with fat once CHO and protein needs are covered
Offensive Lineman	4-8g/kg BW	1.4-2.0g/kg BW	Meet remaining energy needs with fat once CHO and protein needs are covered
Distance Runner	6-12g/kg BW	1.2-2.0g/kg BW	Meet remaining energy needs with fat once CHO and protein needs are covered
Wrestler	5-8g/kg BW	1.2-2.0g/kg BW	Meet remaining energy needs with fat once CHO and protein needs are covered

Note: Football needs change across training camp, the competitive season and the off-season. Distance runners' needs shift with tapering, heavy training and shorter or longer distances. Wrestlers' needs depend on their season, how far they are above their weight class and how close they are to the minimum permitted body fat before certification.

Reference:
1. Stuart M. Phillips & Luc J.C. Van Loon (2011) Dietary protein for athletes: From requirements to optimum adaptation, *Journal of Sports Sciences*, 29:sup1, S29-S38