

# *ACE's Essentials of Exercise Science for Fitness Professionals*

## Chapter 4: Nutrition



# Learning Objectives

- This chapter provides information on basic macronutrients and micronutrients, government resources, and established guidelines.
- Upon completion of this chapter, you will be able to:
  - List the macronutrient and micronutrient components and describe their functions in the body
  - Explain the basic physiology of digestion and absorption
  - Direct individuals to the *2010 Dietary Guidelines* and the MyPlate Food Guidance System and explain how to apply the information contained within these resources
  - Educate individuals on how to read food labels
  - Describe how to fuel the body for optimal performance
  - Explain nutritional considerations for special populations
  - List the scope of practice issues related to nutrition

# Introduction

- ACE professionals are able to provide nutrition guidance and recommendations within their scope of practice.
- Having a basic understanding of nutrition principles and their relationship to exercise will help professionals develop strategies to help individuals achieve their nutrition and fitness goals.
- There are three macronutrients that make up food and supply energy to the body:
  - Carbohydrates
  - Protein
  - Fat

# Carbohydrates

- The body's preferred energy source
- 4 kcal/gram
- Made up of chains of sugar (simple and complex)
  - Monosaccharides (a single glucose molecule)
  - Disaccharides (two glucose molecules)
  - Polysaccharides (three or more glucose molecules)



# Protein

- Has many functions, including the following:
  - Formation of the brain, nervous system, blood, muscles, skin, and hair
  - Transport mechanism for iron, vitamins, minerals, fats, and O<sub>2</sub>
  - Key to acid–base fluid balance
- Not the preferred energy source, but can be broken down in states of deprivation
- 4 kcal/gram
- Made up of amino acids joined together through peptide bonds
  - 8–10 essential amino acids must be consumed in the diet



# Fat

- Most energy dense of the macronutrients
- 9 kcal/gram
- Has many functions, including:
  - Insulation, cell structure, nerve transmission, vitamin absorption, and hormone production
- Stored in the body as triglycerides
- Intake should consist of mostly unsaturated fatty acids, emphasizing omega-3 fatty acids.
  - Omega-3 and omega-6 are (polyunsaturated) essential fatty acids that cannot be produced in the body.
- Saturated and trans fat lead to clogging of the arteries, increased risk for heart disease, and many other problems.



# Cholesterol

- Cholesterol has important functions, including:
  - Cell membrane function, making bile acids essential for fat absorption, metabolizing fat-soluble vitamins, and making vitamin D
- Produced in the body and consumed in the diet
- Too much causes numerous health problems
- High-density lipoprotein (HDL) is the “good cholesterol” that helps rid the body of excess cholesterol.
- Low-density lipoprotein (LDL) is the “bad cholesterol” that clogs arteries.

## Micronutrient Requirements and Recommendations: Vitamins

- Vitamins are organic, non-caloric micronutrients essential for normal physiological function.
- Must be consumed as part of food intake, except for vitamin K, biotin, and vitamin D
- 13 essential vitamins
  - Water-soluble: thiamin, riboflavin, niacin, pantothenic acid, folate, vitamin B6, vitamin B12, biotin, and vitamin C
  - Fat-soluble: vitamins A, D, E, and K
- Choline is a “quasi-vitamin” that plays a critical role in neurotransmitter and platelet function and may help prevent Alzheimer’s disease.



# Vitamin Facts

Vitamin Facts				
Vitamin	RDA/AI*		Best Sources	Functions
	Men <sup>†</sup>	Women <sup>†</sup>		
A (carotene)	900 µg	700 µg	Yellow or orange fruits and vegetables, green leafy vegetables, fortified oatmeal, liver, dairy products	Formation and maintenance of skin, hair, and mucous membranes; helps people see in dim light; bone and tooth growth
B1 (thiamine)	1.2 mg	1.1 mg	Fortified cereals and oatmeals, meats, rice and pasta, whole grains, liver	Helps the body release energy from carbohydrates during metabolism; growth and muscle tone
B2 (riboflavin)	1.3 mg	1.1 mg	Whole grains, green leafy vegetables, organ meats, milk, eggs	Helps the body release energy from protein, fat, and carbohydrates during metabolism
B6 (pyridoxine)	1.3 mg	1.3 mg	Fish, poultry, lean meats, bananas, prunes, dried beans, whole grains, avocados	Helps build body tissue and aids in metabolism of protein
B12	2.4 µg	2.4 µg	Meats, milk products, seafood (cobalamin)	Aids cell development, functioning of the nervous system, and the metabolism of protein and fat
Biotin	30 µg	30 µg	Cereal/grain products, yeast, legumes, liver	Involved in metabolism of protein, fats, and carbohydrates
Choline	550 mg	425 mg	Milk, liver, eggs, peanuts	A precursor of acetylcholine; essential for liver function
Folate (folacin, folic acid)	400 µg	400 µg <sup>‡</sup>	Green leafy vegetables, organ meats, dried peas, beans, lentils	Aids in genetic material development; involved in red blood cell production

# Vitamin Facts (cont.)

Niacin	<b>16 mg</b>	<b>14 mg</b>	Meat, poultry, fish, enriched cereals, peanuts, potatoes, dairy products, eggs	Involved in carbohydrate, protein, and fat metabolism
Pantothenic acid	5 mg	5 mg	Lean meats, whole grains, legumes, vegetables, fruits	Helps release energy from fats and vegetables
C (ascorbic acid)	<b>90 mg</b>	<b>75 mg</b>	Citrus fruits, berries, and vegetables—especially peppers	Essential for structure of bones, cartilage, muscle, and blood vessels; helps maintain capillaries and gums and aids in absorption of iron
D	5 µg	5 µg	Fortified milk, sunlight, fish, eggs, butter, fortified margarine	Aids in bone and tooth formation; helps maintain heart action and nervous system function
E	<b>15 mg</b>	<b>15 mg</b>	Fortified and multigrain cereals, nuts, wheat germ, vegetable oils, green leafy vegetables	Protects blood cells, body tissue, and essential fatty acids from destruction in the body
K	120 µg	90 µg	Green leafy vegetables, fruit, dairy, grain products	Essential for blood-clotting functions

\* Recommended Dietary Allowances are presented in bold type; Adequate Intakes are presented in non-bolded type.

† RDAs and AIs given are for men aged 31–50 and nonpregnant, nonbreastfeeding women aged 31–50; mg = milligrams; µg = micrograms

‡ This is the amount women of childbearing age should obtain from supplements or fortified foods.

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## Micronutrient Requirements and Recommendations: Minerals

- Minerals are critical for human life.
- Minerals can have low, medium, or high bioavailability.
- Mineral-to-mineral interactions
- Categorized into macrominerals (bulk elements) and microminerals (trace elements)

# Mineral Facts

Mineral Facts				
Mineral	RDA/AI*		Best Sources	Functions
	Men <sup>†</sup>	Women <sup>†</sup>		
Calcium	1,000 mg	1,000 mg	Milk and milk products	Strong bones, teeth, muscle tissue; regulates heart beat, muscle action, and nerve function; blood clotting
Chromium	35 µg	25 µg	Corn oil, clams, whole-grain cereals, brewer's yeast	Glucose metabolism (energy); increases effectiveness of insulin
Copper	<b>900 µg</b>	<b>900 µg</b>	Oysters, nuts, organ meats, legumes	Formation of red blood cells; bone growth and health; works with vitamin C to form elastin
Fluoride	4 mg	3 mg	Fluorinated water, teas, marine fish	Stimulates bone formation; inhibits or even reverses dental caries
Iodine	<b>150 µg</b>	<b>150 µg</b>	Seafood, iodized salt	Component of hormone thyroxine, which controls metabolism
Iron	<b>8 mg</b>	<b>18 mg</b>	Meats, especially organ meats, legumes	Hemoglobin formation; improves blood quality; increases resistance to stress and disease

# Mineral Facts (cont.)

Magnesium	<b>420 mg</b>	<b>320 mg</b>	Nuts, green vegetables, whole grains	Acid/alkaline balance; important in metabolism of carbohydrates, minerals, and sugar (glucose)
Manganese	2.3 mg	1.8 mg	Nuts, whole grains, vegetables, fruits	Enzyme activation; carbohydrate and fat production; sex hormone production; skeletal development
Molybdenum	<b>45 µg</b>	<b>45 µg</b>	Legumes, grain products, nuts	Functions as a cofactor for a limited number of enzymes in humans
Phosphorus	<b>700 mg</b>	<b>700 mg</b>	Fish, meat, poultry, eggs, grains	Bone development; important in protein, fat, and carbohydrate utilization
Potassium	4,700 mg	4,700 mg	Lean meat, vegetables, fruits	Fluid balance; controls activity of heart muscle, nervous system, and kidneys
Selenium	<b>55 µg</b>	<b>55 µg</b>	Seafood, organ meats, lean meats, grains	Protects body tissues against oxidative damage from radiation, pollution, and normal metabolic processing
Zinc	<b>11 mg</b>	<b>8 mg</b>	Lean meats, liver, eggs, seafood, whole grains	Involved in digestion and metabolism; important in development of reproductive system; aids in healing

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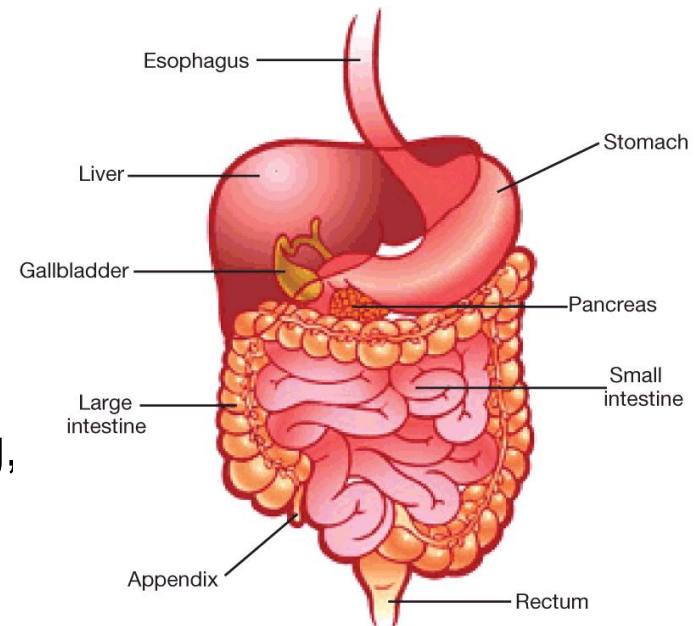
## Micronutrient Requirements and Recommendations: Water

- Water comprises approximately 50–70% of the human body.
- Plays an important role in:
  - Temperature regulation, protecting vital organs, nutrient absorption, providing a medium for biomechanical reactions, and maintaining a high blood volume for optimal athletic performance
- Water volume is influenced by food and drink intake, sweat, urine and feces excretion, metabolic production of small amounts of water, and respiratory loss of water.
- Plays a critical role during exercise
  - Dehydration: severe levels can lead to heat stroke
  - Hyponatremia: severely reduced blood sodium concentration; can lead to encephalopathy (brain swelling)



# The Basic Physiology of Digestion and Absorption

- Fitness professionals should have an understanding of how macronutrients are converted into a usable form.
- The gastrointestinal (GI) tract is responsible for digestion and absorption.
- Digestion
  - Mechanical: the process of chewing, swallowing, and propelling food through the GI tract
  - Chemical: the addition of enzymes that break down nutrients



# Digestion

- The digestive system is activated at the sight or smell of food.
  - When food enters the mouth, saliva breaks it down and moistens it, forming a bolus.
  - The bolus is swallowed and passes through the pharynx to the esophagus, which uses peristalsis to push it into the stomach.
  - The stomach mixes the food (and liquid) with its own juices, breaking it down into absorbable nutrients and energy.
  - It is then emptied into the small intestine (at different rates).
  - Stays in the small intestine for 2 to 4 hours, where food is digested into chyme, and nutrients and energy are absorbed into the blood
  - Blood goes to the liver for processing and distribution to the rest of the body.
  - Waste and indigestibles go to the large intestine, where water is reabsorbed and waste passes through the colon and is excreted through the anus.



# Absorption

- Carbohydrates, proteins, fats, vitamins, and minerals are all absorbed through the walls of the small intestine.
  - The walls are made of folds and villi (hairlike projections).
  - The mechanism of nutrient absorption depends on the nutrients' solubility, size, and relative concentration.
  - Ultimately, nutrients are distributed to muscles, organs, and other tissues.

# *2010 Dietary Guidelines Key Topic Areas*

- Balance calories to achieve and maintain healthy weight:
  - Prevent or reduce overweight by eating better and exercising more.
  - For those who are overweight or obese:
    - Eat fewer calories
    - Increasing physical activity
    - Decrease time spent in sedentary behaviors

# 2010 Dietary Guidelines (cont.)

- Foods and food components to reduce:
  - Reduce sodium intake to less than 2,300 mg/day for the general population and to less than 1,500 mg/day for higher-risk populations.
  - Consume fewer than 10% of calories from saturated fat and instead consume monounsaturated and polyunsaturated fats.
  - Consume less than 300 mg/day of dietary cholesterol.
  - Minimize consumption of trans fatty acids.
  - Reduce caloric intake from sugar and solid fats.
  - Consume alcohol in moderation.
    - One drink per day for women and two drinks per day for men

# 2010 Dietary Guidelines (cont.)

- Foods and nutrients to increase:
  - Eat more fruits and vegetables, especially dark-green and red and orange vegetables.
  - Consume at least half of all grains as whole grains.
  - Increase intake of fat-free or low-fat milk products.
  - Choose lean proteins and especially try to increase the amount of seafood eaten.
  - Replace high-fat proteins with leaner proteins.
  - Use oil instead of solid fat.
  - Try to consume more of the often insufficiently consumed nutrients in the American diet.
    - Includes potassium, fiber, calcium, and vitamin D

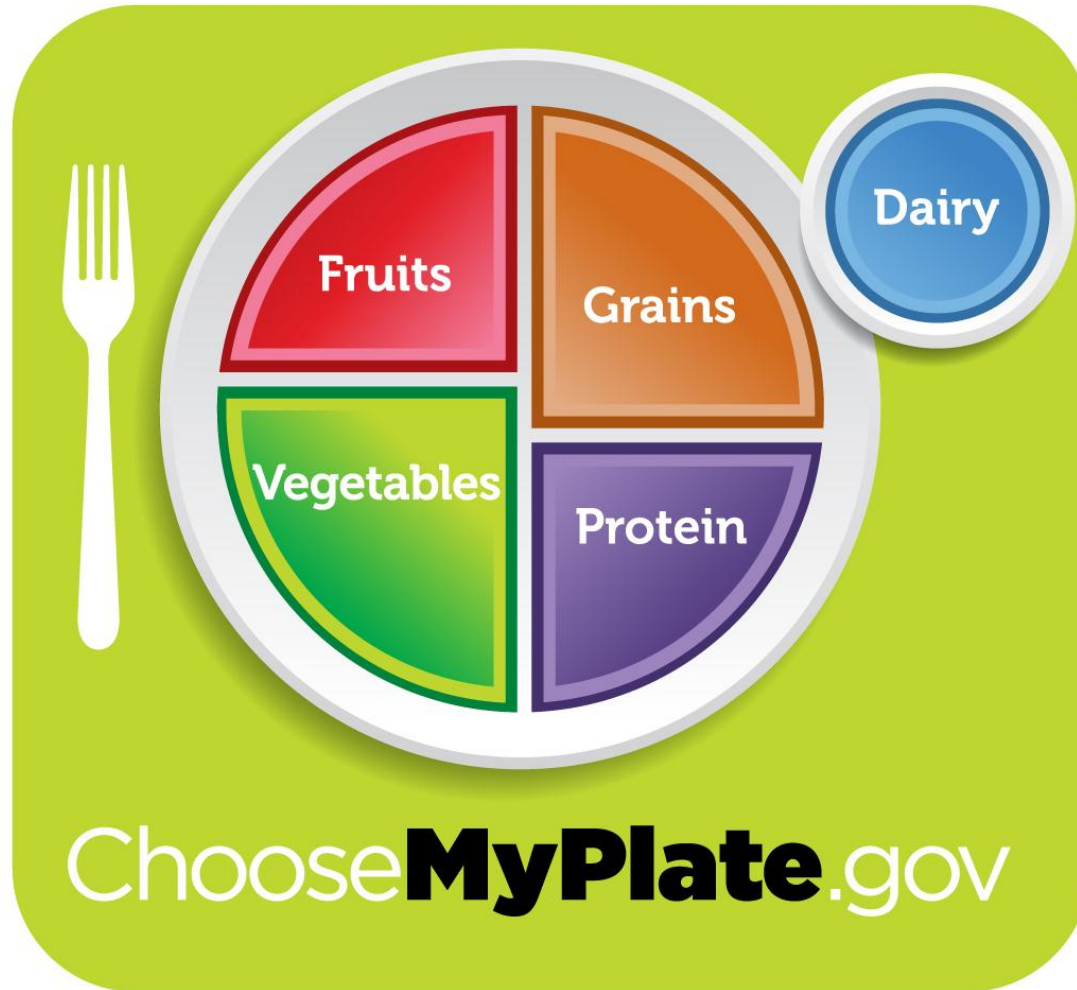
# 2010 Dietary Guidelines (cont.)

- Building healthy eating patterns:
  - A healthy eating pattern meets nutrient needs through consumption of nutrient-dense foods while staying within calorie limits.
  - Some examples of well-known and effective healthy eating patterns include:
    - Dietary Approaches to Stop Hypertension (DASH) eating plan
    - Mediterranean diet
    - A well-planned vegetarian diet
  - Follow food safety recommendations when preparing and eating foods so as to reduce the risk of foodborne illness.

# 2010 Dietary Guidelines (cont.)

- Helping Americans make healthy choices:
  - Food and activity behaviors should be viewed in the context of a social ecological model.
    - “An approach which emphasizes the development of coordinated partnerships, programs, and policies to support healthy eating and active living.”
  
- The *Dietary Guidelines* issue a call to action to:
  - Ensure that all Americans have access to nutritious foods and opportunities for physical activity
  - Facilitate individual behavior change through environmental strategies
  - Set the stage for lifelong healthy eating, physical activity, and weight-management behaviors

# MyPlate



# Dietary Reference Intakes

- DRI is a generic term used to refer to three types of reference values:
  - RDA (Recommended Dietary Allowance)
  - EAR (Estimated Average Requirement)
  - UL (Tolerable Upper Intake Level)
- AI (Adequate Intake) is used when a DRI cannot be based on an EAR.
  - AI represents a level that appears to be sufficient.



# Food Labels

- Understanding how to read food labels will help individuals make healthier and better food choices.

**Serving Size**  
Is your serving the same size as the one on the label? If you eat double the serving size listed, you need to double the nutrient and calorie values.

**Calories**  
Are you overweight? Cut back a little on calories!

**Total Carbohydrate**  
Carbohydrates are in foods like bread, potatoes, fruits, and vegetables.

**Dietary Fiber**  
Fruits, vegetables, whole-grain foods, beans, and peas are all good sources and can help reduce the risk of heart disease and cancer.

**Protein**  
Most Americans get more than they need. Where there is animal protein, there is also fat and cholesterol.

**Vitamins and Minerals**  
Your goal here is 100% of each for the day. Don't count on one food to do it all.

Nutrition Facts			
Serving Size ½ cup (114g)			
Servings Per Container 4			
Amount Per Serving			
<b>Calories</b> 90	Calories from Fat 30		
	% Daily Value*		
<b>Total Fat</b> 3g			<b>5%</b>
Saturated Fat 0g			0%
Trans Fat 0g			0%
<b>Cholesterol</b> 0mg			0%
<b>Sodium</b> 300mg			13%
<b>Total Carbohydrate</b> 13g			4%
Dietary Fiber 3g			12%
Sugars 3g			
<b>Protein</b> 3g			
Vitamin A 80%	•	Vitamin C 60%	
Calcium 4%	•	Iron 4%	
*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:			
	Calories	2,000	2,500
Total Fat	Less than	65g	80g
Sat Fat	Less than	20g	25g
Cholesterol	Less than	300mg	300mg
Sodium	Less than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Fiber		25g	30g
Calories per gram:			
Fat 9	•	Carbohydrate 4	• Protein 4

**Total Fat**  
Aim low: Most people need to cut back on fat! Too much fat may contribute to heart disease and cancer.

**Saturated Fat**  
Saturated fat is listed separately because it is the key player in raising blood cholesterol and your risk of heart disease.

**Trans Fat**  
Trans fat works a lot like saturated fat, except it is worse.

**Cholesterol**  
Too much cholesterol—a second cousin to fat—can lead to heart disease.

**Sodium**  
You call it “salt,” the label calls it “sodium.” Either way, it may add up to high blood pressure in some people.

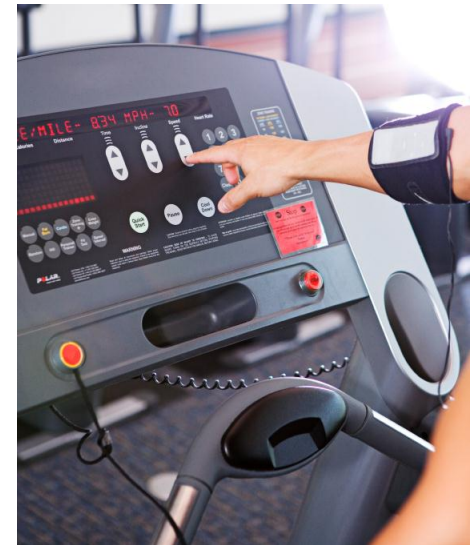
**Daily Value**  
Daily Values are listed for people who eat 2,000 or 2,500 calories each day. If you eat more, your personal daily value may be higher than what's listed on the label. If you eat less, your personal daily value may be lower.

(More nutrients may be listed on some labels)

mg = milligrams (1,000 mg = 1 g)  
g = grams (about 28 g = 1 ounce)

# Energy Balance and Weight Control

- Positive energy balance
  - Calories consumed > calories expended
- Negative energy balance
  - Calories consumed < calories expended
- Resting metabolic rate (RMR)
  - The number of calories needed to fuel ventilation, blood circulation, and temperature regulation
  - Can be determined via the Mifflin-St. Jeor equation
- A decrease of 500 kcal per day (3,500 kcal/week) would result in a loss of 1 pound each week.
  - A loss of 1 to 2 pounds per week is best.



# National Weight Control Registry

- The National Weight Control Registry is a database that tracks more than 5,000 people who have lost at least 30 pounds and maintained the loss for at least 1 year.
- Ten insights from the database about successful weight loss:
  - Control portions
  - Be mindful
  - Exercise
  - Check the scale
  - Eat breakfast
  - Monitor intake
  - Turn off the tube
  - Do not wait until tomorrow to get started—and no cheating
  - Know thy friend
  - Be optimistic



# Nutrition Needs for Active Adults

- Institute of Medicine's (IOM) 2005 Dietary Reference Intakes recommend:
  - 45–65% of calories come from carbohydrates
  - 10–35% of calories come from protein
  - 20–35% of calories come from fats
- Active individuals need ample amounts of carbohydrates and proteins through increased overall intake, not greater percentages.

# Carbohydrates and Sports Nutrition

- The American Dietetic Association (ADA) recommends that athletes consume 6 to 10 g/kg (3 to 5 g/lb) of body weight per day.
- The amount needed depends on:
  - Total daily energy expenditure
  - Type of exercise performed
  - Gender
  - Environmental conditions
- Carbohydrate loading may be beneficial to individuals training for endurance events lasting more than 90 minutes.

# Fueling for Exercise

- Before exercise
  - Have a small snack that is high in carbohydrate and low in fat and protein.
- During exercise
  - 30 to 60 grams of carbohydrates per hour to maintain blood glucose levels
- After exercise
  - Focus on carbohydrates and protein.



# Glycemic Index

- The GI ranks carbohydrates based in their blood glucose response:
  - High-GI foods break down rapidly and create a large glucose spike.
  - Low-GI foods are more slowly digested and create a smaller glucose increase.
- High-GI foods are good for refueling, whereas low-GI foods are better for heart health.
- Glycemic load = GI x grams of carbohydrates
  - Accounts for GI as well as portion size

Glycemic Index (GI) of Various Foods		
High GI $\geq 70$	Medium GI 56–69	Low GI $\leq 55$
White bread	Rye bread	Pumpnickel bread
Corn Flakes <sup>®</sup>	Shredded Wheat <sup>®</sup>	All Bran <sup>®</sup>
Graham crackers	Ice cream	Plain yogurt
Dried fruit	Blueberries	Strawberries
Instant white rice	Refined pasta	Oatmeal

# Choosing Healthy Protein

- Protein varies in quality, health benefit, dietary restrictions, cost, convenience, and taste.
- Protein quality
  - Evaluated by the protein digestibility corrected amino acid score (PDCAAS)
- Protein is not the only consideration.
  - Some foods are high in protein, but also in saturated fat, making them not the best choices (e.g., beef).
- Protein timing
  - Faster and slower digestion rates influence which types to consume for adequate availability post-workout.



# Protein Supplementation and Diets

- While some protein and amino-acid supplementation can be beneficial, it is not advised by the ADA, nor closely regulated by the FDA.
- It is outside the scope of practice for a fitness professional to recommend supplementation.
- When evaluating a high-protein diet, keep these considerations in mind:
  - Total protein intake should be proportionate.
  - Not all protein is created equal.
  - Carbohydrates should not be omitted or severely restricted.
  - Proteins should not contain excess total fat, saturated fat, or cholesterol.
  - The eating plan should be safe and provide adequate nutrients.
  - Protein intake should come from whole foods.

# Fat and Sports Nutrition

- The ADA recommends that athletes consume a comparable proportion of food from fat as the general population.
  - 20–25% of total calories
- Performance does not benefit from a low-fat (<15%) or high-fat (>30%) diet.

# Fluid Hydration for Optimal Performance

- Following fluid-intake recommendations and guidelines will help prevent dehydration and hyponatremia.

## Fluid-intake Recommendations During Exercise

2 hours prior to exercise, drink 500–600 mL (17–20 oz)

Every 10–20 minutes during exercise, drink 200–300 mL (7–10 oz) or, preferably, drink based on sweat losses

Following exercise, drink 450–675 mL for every 0.5 kg body weight lost (or 16–24 oz for every pound)

Adapted with permission from Casa, D.J. et al. (2000). National Athletic Trainers' Association: Position statement: Fluid replacement for athletes. *Journal of Athletic Training*, 35, 212–224.

# Fluid Hydration Guidelines

- Use thirst to determine fluid needs.
- Aim for a 1:1 ratio of fluid replacement to fluid lost in sweat.
- Know how much is being consumed.
- Drink fluids with sodium during prolonged exercise sessions.
- Drink carbohydrate-containing sports drinks to reduce fatigue.
- Pay attention to environmental conditions.



# Gastric Emptying

- Gastric emptying refers to the passage of food from the stomach to the small intestine for further digestion and absorption.
- During exercise, cramps, reflux, side-stitch, gas, or nausea can occur due to:
  - Reduced gastric emptying
  - Delayed transit time
  - Decreased blood flow

# Preparing the Gut for Competition

## Practical Tips to Prepare the Gut for Competition

- Get fit and acclimatized to heat.
- Stay hydrated.
- Practice drinking during training to improve race-day comfort.
- Avoid over-nutrition before and during exercise.
- Avoid high-energy, hypertonic food and drinks before (within 30–60 minutes) and after exercise. Limit protein and fat intake before exercise.
- Ingest a high-energy, high-carbohydrate diet.
- Avoid high-fiber foods before exercise.
- Limit nonsteroidal anti-inflammatory drugs (NSAIDs), alcohol, caffeine, antibiotics, and nutritional supplements before and during exercise. Experiment during training to identify triggers.
- Urinate and defecate prior to exercise.
- Consult a physician if gastrointestinal problems persist, especially abdominal pain, diarrhea, or bloody stool.

Brouns, F. & Beckers, E. (1993). Is the gut an athletic organ? *Sports Medicine*, 15, 242–257.

# Optimizing Heart Health

- Coronary heart disease develops from atherosclerosis and can lead to angina and myocardial infarction.
- Nutrition recommendations to optimize heart health:
  - Eat a diet rich in fruits and vegetables, whole grains, and high-fiber foods.
  - Consume fish (oily fish) at least twice per week.
  - Limit saturated fat to <10% (preferably <7%) of total caloric intake, cholesterol to <300 mg/day, alcohol to no more than one drink per day, and sodium to <2.3 g/day (1 tsp).
  - Keep trans fat intake as low as possible.

# Hypertension

- Prehypertension
  - BP >120/80 mmHg
- Hypertension
  - SBP  $\geq$ 140 mmHg, DBP  $\geq$ 90 mmHg, and/or being on hypertensive medication
- Hypertension is the leading cause of stroke in the U.S.
- Physical activity and nutrition are important in reducing blood pressure.
- The DASH eating plan, combined with decreased salt intake, can substantially reduce blood pressure.

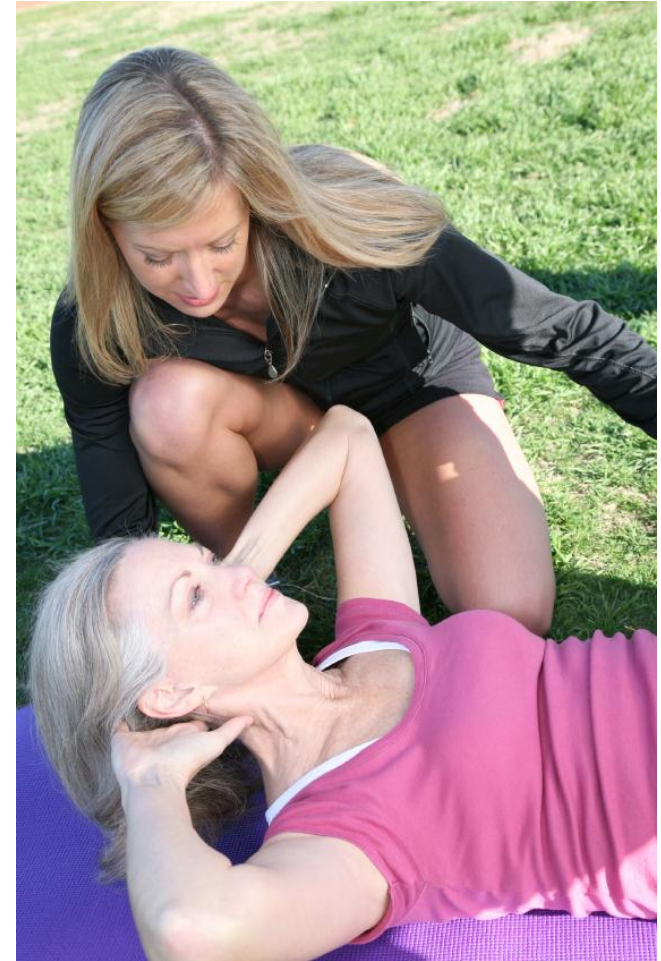


# Diabetes

- Results from abnormal regulation of blood glucose
  - Type 1: inability of the pancreas to secrete sufficient amounts of insulin
  - Type 2: cells have a decreased ability to respond to the action of insulin
- Dietary recommendations resemble the *2010 Dietary Guidelines* for healthy adults.
- Individuals should consume 5 to 6 equally sized meals throughout the day to maintain stable blood sugar levels.
- Individuals should receive comprehensive nutrition counseling from an appropriately trained and credentialed professional before beginning an exercise program.

# Osteoporosis

- Reduced density and weakening of bones
- Nutrition for prevention and treatment include adequate calcium and vitamin D intake.
- Weightbearing physical activity is important in maintaining bone density and reducing the risk of osteoporosis.
- Sedentary lifestyle and smoking increase the risk.



# Pregnancy and Lactation

- The ADA's key components of a healthy lifestyle during pregnancy:
  - Appropriate weight gain
  - Appropriate physical activity
  - Consumption of a variety of foods and calories in accordance with the *Dietary Guidelines*
  - Appropriate and timely vitamin and mineral supplementation

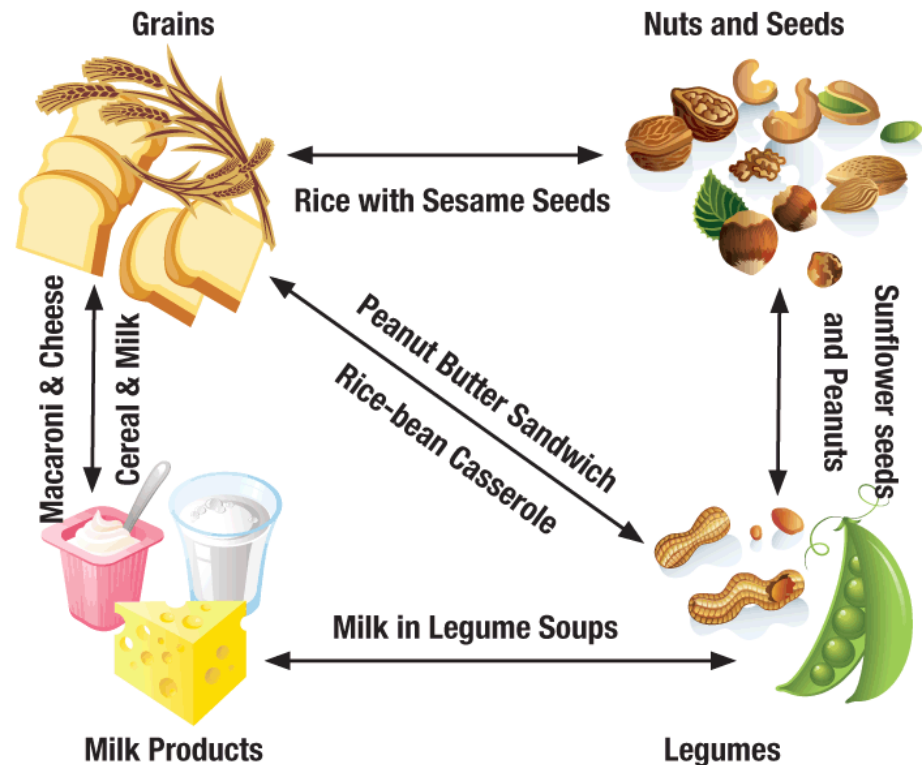


# Pregnancy and Lactation (cont.)

- Avoid alcohol, tobacco, and other harmful substances.
- Practice safe food handling.
  - Pregnant women and their fetuses are at high risk of developing foodborne illnesses.
- Breastfeeding requires an additional 500 calories per day.

# Vegetarian Diets

- Types of vegetarian diets include:
  - Lacto-ovo-vegetarians
  - Lacto-vegetarians
  - Vegans
  
- Healthful and nutritionally adequate when planned properly
  - If poorly planned, can provide insufficient amounts nutrients such as protein, iron, vitamin B12, vitamin D, and calcium



# Eating Disorders

- Fitness professionals may be involved in helping someone overcome an eating disorder such as anorexia nervosa, bulimia nervosa, or binge eating disorder.
- To help prevent the onset of an obsession with weight, body image, and exercise, the National Eating Disorders Association ([www.nationaleatingdisorders.org](http://www.nationaleatingdisorders.org)) offers a number of tips, including:
  - Take warning signs seriously.
  - De-emphasize weight for suspected eating disorder clients and participants.
  - Strive to promote a positive self-image and self-esteem in exercisers and athletes.
- When working with individuals recovering from an eating disorder who have been under a doctor's care, get medical clearance and recommendations from the doctor.

## Nutrition Considerations for Childhood, Adolescence, and Aging

- Challenges to eating a balanced healthy diet for children and adolescents include:
  - Eating breakfast less often, away from home more often, greater proportion of calories from snacks, more fried and nutrient-poor foods, greater portion sizes, excess sodium, decreased fruits and vegetables, fewer dairy products, and more sweetened beverages
  
- Older adults are at risk of inadequate caloric intake to supply adequate nutrients.
  - Factors include decreased appetite, dehydration, and side effects of medication
  - Some older adults are still overweight and obese due to decreased physical activity and metabolic rate.

# Scope of Practice

- Based on the legal scope of practice, fitness professionals should not *calculate, outline, counsel, or prescribe* individual nutrition or weight-management plans.
- Fitness professionals can use established guidelines (*2010 Dietary Guidelines*) to help individuals adopt healthful and appropriate nutrition habits, but may not provide a meal plan.
- It is also outside the fitness professional's scope of practice to recommend supplements without possessing the appropriate credentials.



# Summary

- Fitness professionals should be knowledgeable of basic health and nutrition information.
- Fitness professionals must understand their scope of practice and when to refer to a more qualified professional, such as a registered dietician.
- This chapter covered:
  - The three macronutrients: carbohydrates, protein, and fat
  - Micronutrient requirements and recommendations
  - Digestion and absorption
  - Federal dietary recommendations and guidelines
  - Food labels
  - Nutrition needs for active adults
  - Nutrition and hypertension, diabetes, osteoporosis, and pregnancy
  - Vegetarian and vegan diets
  - Scope of practice