Martin-Gatton
College of Agriculture,
Food and Environment

Supplements & Macro-nutrients

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Objectives

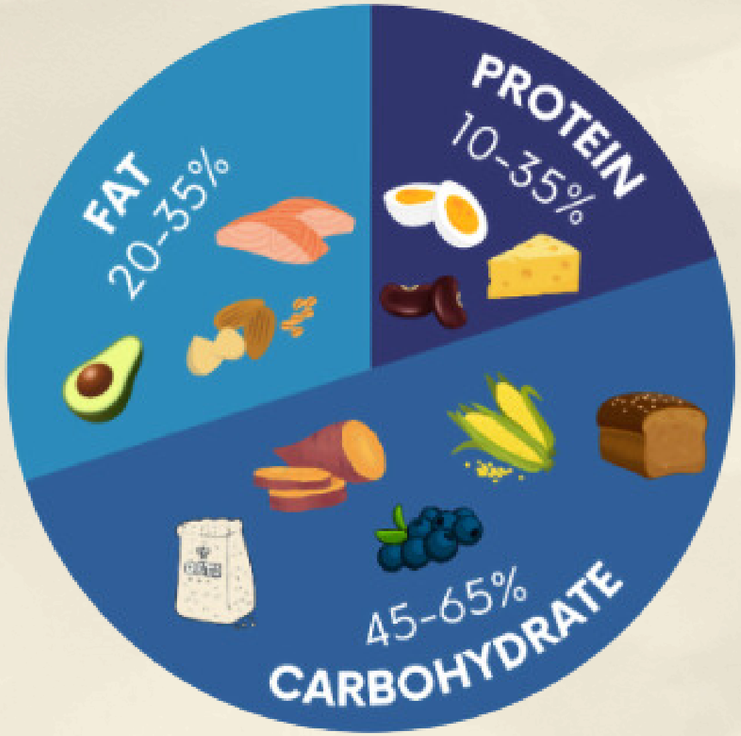
1. Identify the three types of macronutrients
2. Discuss the importance of each macronutrient
3. Explain how each contribute to a balanced diet
4. Name the essential vitamins and minerals
5. Identify when a supplement is needed

Macronutrients

Our bodies break down macronutrients into a usable form of energy for our cells. Each one plays a unique role in a balanced, nutritious diet.

Micronutrients

Vitamins and Minerals



10-35%	Proteins, Building blocks for our bodies
20-35%	Fats, Needed for essential functioning
45-65%	Carbohydrates, Body's preferred source of fuel

Carbohydrates

Three different types:

- Sugars, rapidly digested and absorbed in our bodies, offering a quick boost of energy
- Starches, digested over a longer time, offering a slow release of energy for our bodies
- Fiber, help us feel full for longer periods and offer many health benefits over time. Two main types of fiber are soluble and insoluble

Sugars	
Fruit	Apples, bananas, berries, oranges, watermelon, melons, mangoes
Dairy	Milk, yogurt, kefir, cheese

Starches	
Grains	Oats, quinoa, rice, barley, farro, bulgur, millet, whole-wheat foods
Vegetables	Corn, green peas, white potatoes, sweet potatoes, lima beans
Other	Beans, lentils, tortillas

Fiber	
Soluble	Beans, oats, Brussels sprouts, oranges, nuts, seeds, apples, bananas
Insoluble	Peppers, cucumbers, potatoes, carrots, whole grains, pears

Protein

Proteins consist of smaller units called amino acids. Our bodies produce some amino acids naturally, while others must come from our diets. Of the 20 amino acids in our bodies, nine are essential amino acids that we must consume in our diets.

- Essential amino acids cannot be produced by our bodies and must come from food sources.
- Nonessential amino acids are those our bodies make from essential amino acids or in the breakdown of proteins.
- Complete proteins contain all essential amino acids needed. Animal-based proteins are complete along with some plant-based sources of protein.
- Incomplete proteins are missing one or more essential amino acids. Most plant-based proteins are incomplete which means a variety of sources are needed to cover all essential amino acids

Fats

Fats allow our bodies to absorb and transport vitamins and is essential for growth and development, blood clotting, nervous system function, and healthy skin.

- Unsaturated fats are beneficial for our heart health and help lower LDL cholesterol. Found in plant-based sources such as plant oils, nuts, avocados, and in fatty fish such as salmon. Omega-3s cannot be made by our bodies so we must get them from our food. Omega-6s, can be partially made in our bodies and absorbed from our foods.
- Saturated fats if consumed in excess, can raise our LDL cholesterol levels These are present in fatty meats, and they are often in products derived from animal sources that are solid at room temperature, such as butter or lard. You also can find them in some plant-based sources like coconut oil, or in processed foods that contain any of these items. These fats can be harmful to our health, placing us at greater risk of heart disease or other health problems.

Omega-3s		Sources
ALA	Alpha-linolenic acid	Flaxseed, chia seeds, walnuts, soybean and canola oils
EPA	Eicosapentaenoic acid	Salmon, sardines, fish oils
DHA	Docosahexaenoic acid	Salmon, sardines, trout

Omega-6s		Sources
LA	Linoleic acid	Sunflower seeds, pumpkin seeds, soybean oil, corn oil, pine nuts, pecans
AA	Arachidonic acid	Meat, poultry, eggs

Vitamins & Minerals

Vitamins and minerals have different jobs that help keep the body healthy. Every nutrient has a different function in the body.

- There are 13 essential vitamins: vitamins A, C, D, E, K, and the B vitamins (thiamine, riboflavin, niacin, pantothenic acid, biotin, B6, B12, and folate).
- A number of minerals are essential for health, including calcium, phosphorus, potassium, sodium, chloride, magnesium, iron, zinc, iodine, sulfur, cobalt, copper, fluoride, manganese, and selenium.

The Reference Dietary Intake, or RDI, refers to the average daily nutrient intake, at safe levels.

NUTRIENT	DAILY VALUES
A	900 mcg
D	20 mcg
E	15 mg
K	120 mcg
C	90 mg
Niacin	16 mg
Thiamin (B_1)	1.2 mg
Riboflavin (B_2)	1.3 mg
B_6	1.7 mg
B_{12}	2.4 mcg
Folic Acid	400 mcg
Calcium	1,300 mg
Iron	18 mg
Sodium	2,000 mg

*United States Food and Drug Administration/Center for Food Safety and Applied Nutrition, 2023.
mg = milligrams
mcg = micrograms

VITAMIN	FUNCTION
Fat-Soluble	
A	Supports a healthy immune system; improves low-light vision; maintains and protects healthy skin and cell membranes
D	Builds and maintains strong bones and teeth
E	Protects and maintains cell membranes
K	Aids in blood clotting
Water-Soluble	
C	Supports a healthy immune system; increases wound healing
B_1 (Thiamin)	Involved in carbohydrate, fat, amino acid, glucose, and alcohol metabolism; involved in nerve-cell function
B_2 (Riboflavin)	Involved in carbohydrate and protein metabolism; maintains healthy skin and eyes
B_6	Involved in protein and lipid metabolism
B_{12}	Involved in maturation of red blood cells, neural function, and DNA synthesis
Folic Acid	Supports a healthy immune system; involved in red blood cell production; involved in normal fetal nervous system development
Niacin	Involved in carbohydrate and cell metabolism; assists in keeping the nervous system, digestive system, and skin healthy

MINERAL	FUNCTION
Calcium	Builds and maintains strong bones and teeth; assists nervous system and muscles to function properly
Copper	Involved in red blood cell production; involved in bone formation
Iron	Involved in hemoglobin and myoglobin formation
Magnesium	Supports a healthy immune system; maintains nerve and muscle function;
Potassium	Controls heart-muscle contractions; supports normal blood pressure; maintains cellular fluid balance
Selenium	Supports a healthy immune system; supports many enzymes in metabolism
Zinc	Supports a healthy immune system; involved in cellular metabolism

Supplements

While some individuals do need to complement their diets with supplements, evidence-based research indicates that we should all prioritize healthy eating and staying active. The following people may be at a greater risk of nutrient deficiencies, and supplements may help.

- Women (including teenage girls) of childbearing age
- Pregnant or lactating women
- Newborns, infants, and children under the age of two
- Lactose-intolerant individuals
- Those with a limited or restricted diet
- Older adults
- Individuals with chronic health conditions, such as heart disease, diabetes, cancer, HIV/AIDS, and some autoimmune diseases
- Individuals living with or in recovery for substance or alcohol use disorder
- Individuals recovering from surgery, burns, injury, or illness
- Strict vegetarians and vegans
- Individuals whose medications may interfere with the body's absorption and use of nutrients

Thank you!

Do You Have Any Questions?

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