Nutrition 101 – Fundamentals of Nutrition

Fatinah Darwish, RD

Nutrition & Physical Activity Program
Division of Chronic Disease & Injury Prevention
Los Angeles Department of Public Health
Objectives

• Learn how food is digested and absorbed through the body
• Understand nutrients and be able to name at least one food source of carbohydrates, protein, fats, vitamins and minerals.
• Distinguish the difference between saturated and unsaturated fats.
• Identify the adverse health effects related to trans fats.
• Learn about the important functions of vitamins, minerals and water.
Definition of Terms

**Food**
- Any substance that the body uses to stay alive and grow; the carrier of nourishment

**Nutrition**
- Study of nutrients in foods and the body

**Nutrients**
- Components of food necessary for the body to function.
- Nutrients provide energy; help maintain or repair the body; and support growth.

Definition of Terms

Nutrients

Macronutrients
- Carbohydrate
- Protein
- Fat

Micronutrients
- Vitamins
- Minerals
The Digestive Process
Digestive Process
Mouth

- In each bite, teeth and saliva break down food to smaller pieces
- Swallowing triggers peristaltic waves to move the bite-size food pieces down the esophagus and into the stomach
Stomach

- Food is mixed with acidic fluids and enzymes
- Small amount of fat is digested
- Protein changes its structure

Photo source: http://www.mayoclinic.org/digestive-system/sls-20076373?s=4
- Hormones are released and enzymes are stimulated to further break down nutrients into fragments
- Macronutrients, vitamins, minerals, trace elements and fluid is absorbed
• Absorbs the remaining fragments, electrolytes and fluid
• Some fiber is absorbed but most of it passes through the colon and eliminated from the body
• Temporary storage for waste products
Nutrients
Types of Nutrients

- Carbohydrates
- Protein
- Fat
- Vitamins
- Minerals
- Water
Carbohydrate Food Sources

- Grains, breads
- Starchy Vegetables
- Fruits
- Legumes, beans
- Dairy Products
- Added Sugars
The Carbohydrate Continuum
Carbohydrates in the Body

Carbohydrates → Glucose (sugar) → ENERGY
Types of Carbohydrates

**Simple Carbohydrates**

- Structurally simple
- Easier to digest
- Enters bloodstream quickly
- Examples:
  - Sugar in fruits, honey, and some vegetables (fructose)
  - Milk sugar (lactose)
  - Table sugar (sucrose)
  - Processed and refined sugar (sugar sweetened beverages, candy)

**Complex Carbohydrates**

- Structurally more complex
- Longer to digest
- Enters bloodstream more slowly
- Examples:
  - Starches (bread, cereal, rice and pasta)
  - Fiber

Fiber

Defined

- Substance found in plants
- Body cannot digest dietary fiber

Functions

- Adds bulk to diet and reduces constipation
- Promotes satiety

Food Sources

- **Insoluble fiber**: whole-grains, brown rice, bulgur, most vegetables, fruits
- **Soluble fiber**: oatmeal, oat bran, nuts, seeds, dry beans and peas, most fruits


Protein

**Defined**

- Structure is made up of a chain of amino acids
- There are 2 amino acid categories
  - Essential (need from food)
  - Non-essential (your body can make)

**Functions**

- Builds, maintains and repairs muscles and tissues
Protein Food Sources

- Poultry
- Meat
- Seafood
- Legumes, beans
- Dairy Products
- Nuts
- Eggs
- Soy Products

Types of Protein

Complete

- Examples:
  - Animal sources
    - Meat, fish, poultry
    - Eggs
    - Milk and milk products
  - Plant sources
    - Soy
    - Quinoa

Incomplete

- Examples:
  - Grains
  - Nuts
  - Legumes, beans, peas

Note: combine incomplete protein sources to make a complete protein. Ex: whole wheat bread and PB.


Mahan LK, Escott-Stump, S. Krause’s Food and Nutrition Therapy. Canada: Saunders Elsevier; 2008
Fats

Defined

- Essential nutrient for digestion, absorption and transportation of fat-soluble vitamins
- Two types:
  - Saturated
  - Unsaturated

Functions

- Preserves body heat and maintains temperature
- Protects organs
- Adds texture to foods
Fat Food Sources

- Poultry
- Meat
- Seafood
- Oils
- Dairy Products
- Nuts
- Butter, margarine
- Pastries, cookies

Types of Fat

**Saturated**
- Solid at room temperature
- Examples:
  - Mainly found in animal foods (meat, poultry, butter)
  - Some plant foods (coconut oil, palm oil)
- Raises blood cholesterol

**Unsaturated**
-Liquid at room temperature
- Found in plant foods (olive, peanut and canola oils, avocados, peanut butter)
- Omega-3 fatty acids, such as fatty fish, flaxseed and walnuts
- Improves blood cholesterol


What are the Types of Fat? MOVE VA [http://www.move.va.gov/download/NewHandouts/Nutrition/N09_WhatAreTheTypesOfFat.pdf](http://www.move.va.gov/download/NewHandouts/Nutrition/N09_WhatAreTheTypesOfFat.pdf)
Trans Fats

• “Synthetic” or mostly man-made fat is created through a process called **hydrogenation**
• Known as “**hydrogenated**” or “**partially hydrogenated**”
  – Converts vegetable oils into solids
  – Increases shelf life and stability
  – Examples:
    • Shortening, stick margarine
    • Crackers, cookies, baked goods
    • Fried foods


Trans fats

• Significant adverse health effects related to trans fats
  – Good cholesterol
  – Bad cholesterol & risk for coronary heart disease (CHD)

“As a consumer, the most important thing to know about trans fats is that it raises low-density lipoprotein (LDL or ‘bad’) cholesterol. An elevated LDL blood cholesterol level raises your risk of developing heart disease. Heart disease is the leading killer of both men and women in the U.S.” – Food and Drug Administration

Cholesterol

Defined

• Waxy, fat-like substances found in all cells
• Travels through the bloodstream in “packages”
  • HDL (good cholesterol)
  • LDL (bad cholesterol)
• High blood cholesterol may lead to coronary heart disease

Functions

• Needed to make hormones and convert substances for digestion


Heart Disease

Cholesterol

• Dietary cholesterol is found in only animal products

• **Saturated fats** and **dietary cholesterol** can increase your blood cholesterol levels.

• Other factors that can increase blood cholesterol:
  – Overweight/Obesity
  – Lack of physical activity
  – Age, gender
  – Genes


Vitamins
What is a Vitamin?

Non-caloric substance needed by the body to perform normal physiological functions, such as maintenance, growth and development

Mahan LK, Escott-Stump, S. *Krause’s Food and Nutrition Therapy*. Canada: Saunders Elsevier; 2008
Types of Vitamins

**Fat-Soluble Vitamins**
- Vitamin A
- Vitamin D
- Vitamin E
- Vitamin K

**Water-Soluble Vitamins**
- B vitamins
- Vitamin C
Vitamin A

Functions

• Vision, reproduction, and cellular communication

• Supports cell growth and maintains normal functions of heart, lungs, and kidney

Mahan LK, Escott-Stump, S. *Krause’s Food and Nutrition Therapy*. Canada: Saunders Elsevier; 2008
Photo source: http://www.healthytimesblog.com/2011/06/infographic-your-5-daily-nutrients/
Vitamin A

Food Sources

• Found in animal products (liver, meat and dairy products)
• Dark leafy greens and yellow-orange vegetables and fruits
  • Carrots, sweet potatoes, cantaloupe
  • Spinach

Consuming 1 whole sweet potato will meet your vitamin A needs for the day!

Mahan LK, Escott-Stump, S. Krause’s Food and Nutrition Therapy. Canada: Saunders Elsevier; 2008
Vitamin D is a hormone that controls calcium levels in the blood; crucial for bone and muscle development, and in the prevention of osteoporosis.

Sources

• Made by the skin when exposed to ultraviolet (UV) B rays.
• No set guidelines on amount of sun exposure
• Researchers suggest 5-30 minutes between 10 am – 3 pm at least twice a week to the face, arms, legs or back without sunscreen
Vitamin D

Food Sources

- Naturally present (vitamin D₃): cod liver oil, egg yolks, salmon, tuna
- Fortified foods (vitamin D₂): milk, yogurt, orange juice

2 egg yolks + 1 cup of fortified orange juice + 3 ounces of salmon meets daily vitamin D requirements


Photo source: http://canyoufreeze.com/cooked-salmon/
Vitamin E

Functions

- **Antioxidant** – protects the body from free radical damage which can harm cells, tissues and organs

Food Sources

- Wheat germ, sunflower and safflower oils
- Almonds, sunflower seeds, hazelnuts, peanuts
- Spinach, broccoli
- Fortified cereals

1 ounce of almonds meets half of your daily vitamin E needs.
Vitamin K

Functions

• **Main role** – blood clotting formation
• May assist in bone health

Food Sources

• Dark green leafy vegetables: kale, spinach, collards, broccoli, Swiss chard
• Organ meats (liver), chicken, beef, egg yolks

½ cup of cooked spinach exceeds 5 times your recommended vitamin K needs!
B vitamins

Functions

- Main functions are energy production and metabolism of carbohydrates, protein and fats

Types

- $B_1$ (thiamine), $B_2$ (riboflavin), $B_3$ (niacin), $B_5$ (pantothenic acid), $B_6$, $B_7$, $B_{12}$
- Folate (folic acid)
B Vitamins

Food Sources

- B vitamins: Yeast, whole-grains, green leafy vegetables, dairy products, animal products (liver, beef, chicken), egg yolks and avocados
- Folate sources: liver, spinach, asparagus, Brussel sprouts, and fortified grains.

3 ounces of light tuna, canned in water meets daily vitamin $B_{12}$ needs.


Vitamin C

Functions

- Antioxidant (ascorbic acid)
- Collagen formation (wound healing)
- Immune function

Food Sources

- **Fruits**: strawberries, cantaloupe, mango, oranges, and tomatoes
- **Vegetables**: broccoli, spinach, winter squash, cabbage and bell peppers

½ cup of raw, red bell peppers meets your daily vitamin C needs.

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Minerals
What is a Mineral?

Nutrients that are essential for human function that includes building bones, making hormones and regulating your heart.

Calcium

Functions

• Maintains strong bones and teeth
• Helps muscles and blood vessels contract
• Supports hormone secretion and communication between cells

Food Sources

• **Non-dairy:** salmon, sardines, broccoli, collards, spinach, and sesame seeds
• **Dairy:** cheese, milk and yogurt

3 servings of dairy or 2 cups of cooked spinach + 4 oz tofu + 1 cup of fortified orange juice will meet daily calcium needs.
Iron

Functions

• Necessary for growth, development and making hormones and connective tissues.

Food Sources

• Animal: lean meats, poultry and seafood
• Non-animal: dried beans, spinach, nuts fortified breads and cereals

½ cup of white beans + 2 cups of cooked spinach meets daily iron needs for most individuals.
Potassium

Functions

• Skeletal and smooth muscle contractions
• Maintains fluid balance
• May reduce blood pressure

Food Sources

• **Fruits:** apricots, bananas, cantaloupe, oranges, kiwi
• **Vegetables:** spinach, collard greens, sweet potatoes, winter squash
• **Dairy:** milk, yogurt and cheese
• **Non-animal:** beans, lentils, and nuts

Consuming 2 cups of cooked spinach meets 35% of your daily potassium needs.
Functions:
• Transports nutrients throughout the body
• Aids in digestion, absorption and excretion
• Maintains body temperature
4 WAYS TO DRINK MORE WATER

* drink water with each meal
* carry a water bottle with you throughout the day
* when you’re craving sweets, drink a big glass of water
* add fruit to your water pitcher for an added bonus
Balanced Diet

- Lean Protein
- Vegetables
- Dairy Products
- Water
- Fruits
- Whole-grains
Thank You

Photo source: http://www.zazzle.com/vegetable+thank+you+cards