Chapter 1
What Is Nutrition?

PowerPoint® Lecture Slide Presentation
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Nutrition:

• The science of how food nourishes the body.

Food:

• Any substance the body can take in and assimilate
  • Used to enable the body to stay alive and grow

• A source of nutrients
What Drives Our Food Choices?

We need to eat and drink to obtain:

- **Nutrients**: chemical compounds in foods to provide fuel for energy (measured in kilocalories), growth, maintenance and to regulate body processes
  - Six classes: carbohydrates, fats, protein, vitamins, minerals, water
- **Phytochemicals**: nonnutrient compounds that contribute to health and may play a role in fighting chronic diseases
Meet the Nutrients

- **Calorie** (scientific definition) - the amount of heat energy needed to raise the temperature of one kilogram of water by 1°C
- **Calorie**
  - Unit of energy
  - Kilocalorie = kcalorie = Calorie
  - Used to measure energy in food
A Lifetime of Nourishment

- The nutrients in food support growth, maintenance, and repair of the body.

- Deficiencies, excesses, and imbalances of nutrients bring on the diseases of malnutrition.
What Drives Our Food Choices?

We choose foods for many other reasons beyond the basic need to obtain nutrients:

- Taste and culture
- Social reasons and trends
- Advertising
- Cost, time and convenience
- Habits and emotions
Cultural and Social Meanings Attached to Foods

- **Omnivore**
  - A person who eats food of both plant and animal origin, including animal flesh

- **Vegetarian**
  - Lacto-ovo – animal products but no flesh
  - Vegan – neither animal products nor flesh
The Diet and Health Connection

- Nutrition profoundly affects health.
- Chronic diseases have a connection to a poor diet.
- Chronic diseases include:
  - Heart disease
  - Diabetes
  - Some cancers
  - Dental disease
  - Adult bone loss
Good nutrition plays a role in reducing the risk of four of the top ten leading causes of death in the United States, including the top three – heart disease, cancer, and stroke – as well as diabetes.
The Diet and Health Connection

• Chronic diseases
  • Cannot be prevented by a good diet alone
  • To some extent determined by genetics, activities, and lifestyle
Only two common lifestyle habits have a stronger influence on long-term health than dietary choices.

- Smoking & other tobacco use
- Excessive alcohol consumption
Essential nutrients must be obtained in the diet because the body does not make them.

<table>
<thead>
<tr>
<th>Nutrient Class</th>
<th>Essential nutrient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>Glucose</td>
</tr>
<tr>
<td>Fat</td>
<td>Linoleic acid linolenic acid</td>
</tr>
<tr>
<td>Protein</td>
<td>9 amino acids of 20</td>
</tr>
<tr>
<td>Vitamins</td>
<td>All 13</td>
</tr>
<tr>
<td>Minerals</td>
<td>25</td>
</tr>
<tr>
<td>Water</td>
<td>Yes</td>
</tr>
</tbody>
</table>
What Are the Essential Nutrients and Why Do You Need Them?

- The six classes of nutrients are all essential in the diet.
  - Example: alcohol provides calories but is not an essential nutrient (interferes w/growth)
- Macronutrients: energy-yielding nutrients needed in higher amounts
  - Carbohydrates, lipids (fats) and proteins
- Micronutrients needed in smaller amounts in diet but provide no energy to the body.
  - Vitamins and minerals
- Copious amounts of water needed daily (9 cups women and 13 cups for men)
What Are the Essential Nutrients and Why Do You Need Them?

- Carbohydrates, fats, and proteins
  - Provide energy
    - Carbohydrates and Protein provide 4 kcal/g
    - Fats provide 9 kcal/g
  - Are organic compounds (contain carbon atoms)
  - Also contain hydrogen and oxygen atoms
  - Proteins contain nitrogen atoms (unlike carbohydrates and fats)
Meet the Nutrients

**Table 1-4: Calorie Values of Energy Nutrients**

The energy a person consumes in a day's meals comes from these three energy-yielding nutrients; alcohol, if consumed, also contributes energy.

<table>
<thead>
<tr>
<th>ENERGY NUTRIENT</th>
<th>ENERGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbohydrate</td>
<td>4 cal/g</td>
</tr>
<tr>
<td>Fat (lipid)</td>
<td>9 cal/g</td>
</tr>
<tr>
<td>Protein</td>
<td>4 cal/g</td>
</tr>
</tbody>
</table>

**Note:** Alcohol contributes 7 calories/gram that the human body can use for energy. Alcohol is not classed as a nutrient, however, because it interferes with growth, maintenance, and repair of body tissues.
What Are the Essential Nutrients and Why Do You Need Them?

- **Carbohydrates** supply glucose, a major energy source.
- **Fats** are another major fuel source and also:
  - **Cushion organs**
  - **Insulate body** to maintain body temperature
- **Proteins** can provide energy but better suited for:
  - **Growth and maintenance of muscle, tissues, organs**
  - **Making hormones, enzymes, healthy immune system**
  - **Transporting** other nutrients
What Are the Essential Nutrients and Why Do You Need Them?

• **Vitamins and Minerals** are essential for metabolism.

• Many assist enzymes in speeding up chemical reactions in the body

• **Vitamins** are organic compounds.

• **Minerals** are inorganic (do not contain carbon and are not formed by living things)

• Key roles in body processes and structures
What Are the Essential Nutrients and Why Do You Need Them?

- **Water is vital** for many processes in your body.
- Part of fluid medium inside and outside of cells
- Helps chemical reactions, such as those involved in energy production
- Key role in *transporting nutrients and oxygen to cells* and removing waste products
- **Lubricant** for joints, eyes, mouth, intestinal tract
- Protective **cushion for organs**
How Should You Get These Important Nutrients?

The best way to meet your nutrient needs is with a well-balanced diet.

- Composed of a *variety of foods*, providing:
  - Essential nutrients from all six classes
  - Fiber and phytochemicals
  - Whole grains, fruits and vegetables are rich sources.

- **Nutrient Density** – a measure of nutrients per calorie. (Some foods deliver more nutrients for the same # of calories than others do).
Food Feature

![Graphs comparing nutritious breakfast and doughnut breakfast in terms of nutrient density](image)
Can I Live On Just Supplements?

- Food is better than supplements
  - The digestive system can break down and absorb nutrients most efficiently from whole foods
  - Eating provides physical, psychological, and social comfort for people as well

When you eat foods, you are receiving more than nutrients.
Calorie Count: Eat by the Numbers
Some foods offer beneficial non-nutrients called **phytochemicals**.

Confer taste, color, and possible health benefits.
All foods once looked like this...
...but now many foods look like this.
How Should You Get These Important Nutrients?

• You can meet some nutrient needs with a supplement.

• When nutrient needs are higher
  
  • Example: Pregnant women need an iron supplement to meet increased needs.

• When diet restrictions exist:
  
  • Example: Lactose-intolerant individuals (difficulty digesting milk products) may choose a calcium supplement to help meet needs.

• Well-balanced diet and supplements aren’t mutually exclusive; they can be partnered for good health.
How Does the Average American Diet Stack Up?

Average American diet is high in:

- Sodium
- Saturated fat
- Calories

Average American diet is low in:

- Vitamin E
- Calcium
- Fiber

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How Does the Average American Diet Stack Up?

Incidence of overweight and obesity is on the rise.

- **65%** of American adults are overweight, **34%** are considered obese and **15%** of children (ages 6 to 19) are overweight
- Take in too many calories
- Burn fewer calories due to sedentary lifestyles
- Resulting in increased rate of type 2 diabetes (especially children), heart disease, cancer, and stroke
- Recent studies show… only **42%** of Americans are at a healthy weight!
Sound Nutrition Research Begins with the Scientific Method

1. Observe and ask a question: Why does cod liver oil cure rickets?

2. Formulate a hypothesis: The vitamin A in cod liver oil is the curative factor.

3. Conduct an experiment: Feed rats with rickets cod liver oil that contains no vitamin A.

   - Hypothesis supported: Rats were not cured.
   - Hypothesis not supported: Rats were cured.

4. Revise or formulate a new hypothesis.
A Hypothesis Can Lead to a Scientific Consensus

- Hypothesis supported
- Publish findings
- Develop theory
- Establish consensus
Research Studies and Experiments Confirm Hypotheses

- **Experimental Research**: involves at least two groups of subjects
  - **Experimental group**: given a specific treatment
  - **Control group**: given a placebo ("sugar pill")
  - Double-blind placebo-controlled experiment is "gold standard".
    - Neither scientists nor subjects know which group is receiving which treatment.
    - All variables held the same and controlled for both groups
You Can Trust the Advice of Nutrition Experts

• **Registered Dietitian (RD):** completed at least a bachelor’s degree at an accredited U.S. college or university and a supervised practice, passed a national exam administered by the American Dietetic Association

• **Public Health Nutritionist:** has degree in nutrition but may not be an RD (if didn’t complete supervised practice, not eligible to take ADA exam)

• Professionals holding advanced degrees in nutrition

• **Licensed dietitian (LD):** licensed by state licensing agencies
Quackwatchers

Beware of health quackery and fraud:

• Promotion and selling of health products and services of questionable validity

• Sales people introduce health fears and make false nutrition claims and unrealistic promises and guarantees.

• http://quackwatch.org helps consumers identify quackery and fraud.