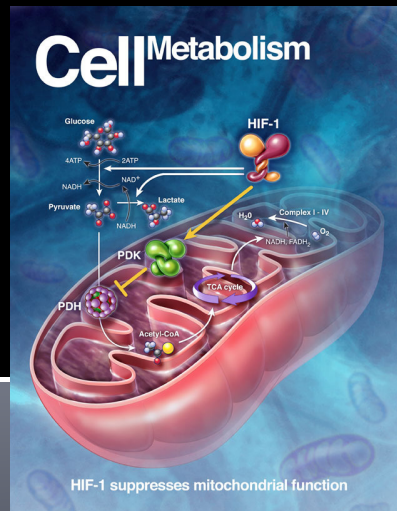


Unit 2 Chemical Constituents of Cells and Metabolism



Mrs. Michaelsen
Anatomy and Physiology

http://www.hopkinsmedicine.org/Press_releases/2006/Images/Cell_MetabolismArt.jpg

2.3 Chemical Constituents of Cells

A. Organic

B. All other compounds are considered

1. Water

- a. Most abundant compound in living things and
- b. An important *solvent* -
- c. Important in transporting materials in the body -
- d. Carries

2.3 Chemical Constituents of Cells

2. Oxygen
 - a. Needed to

3. Carbon Dioxide
 - a. Released as a

4. Inorganic Salts
 - a. Provide necessary ions –

 - b. Electrolytes play

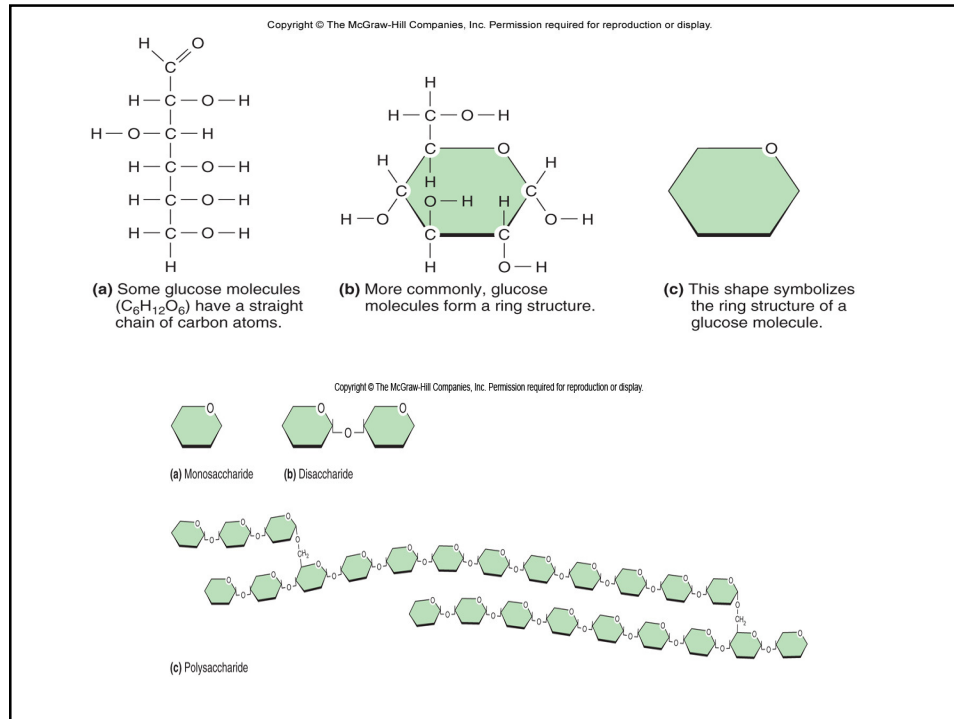
2.3 Chemical Constituents of Cells

C. Organic Substances:

1. Carbohydrates
 - a. Provide energy for cellular activities -

 - b. Made from

 - c. Humans synthesize the



2.3 Chemical Constituents of Cells

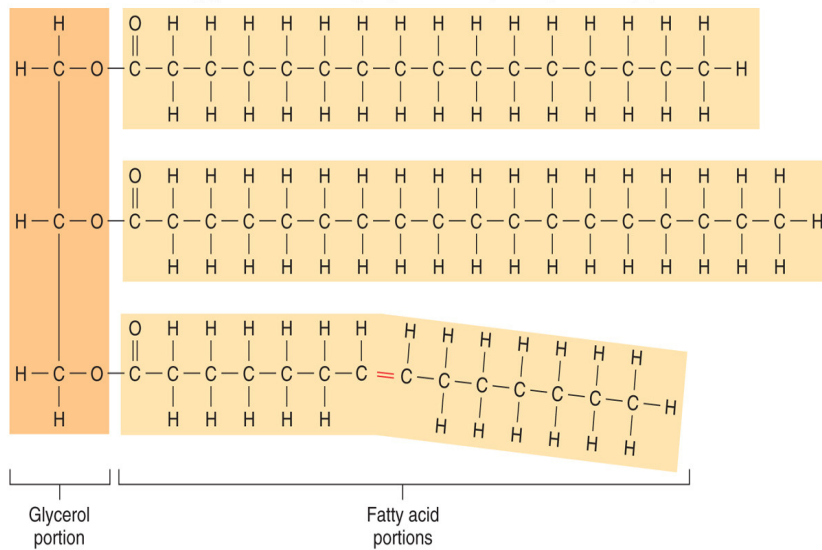
2. Lipids:

- a. Organic substances that are
- b. Fats supply energy for cellular function, and are built from
 - i. Fatty acids with

2.3 Chemical Constituents of Cells

c. Phospholipids:

d. Steroids:



2.3 Chemical Constituents of Cells

3. Proteins:

- a. Have a great variety of functions in the body--

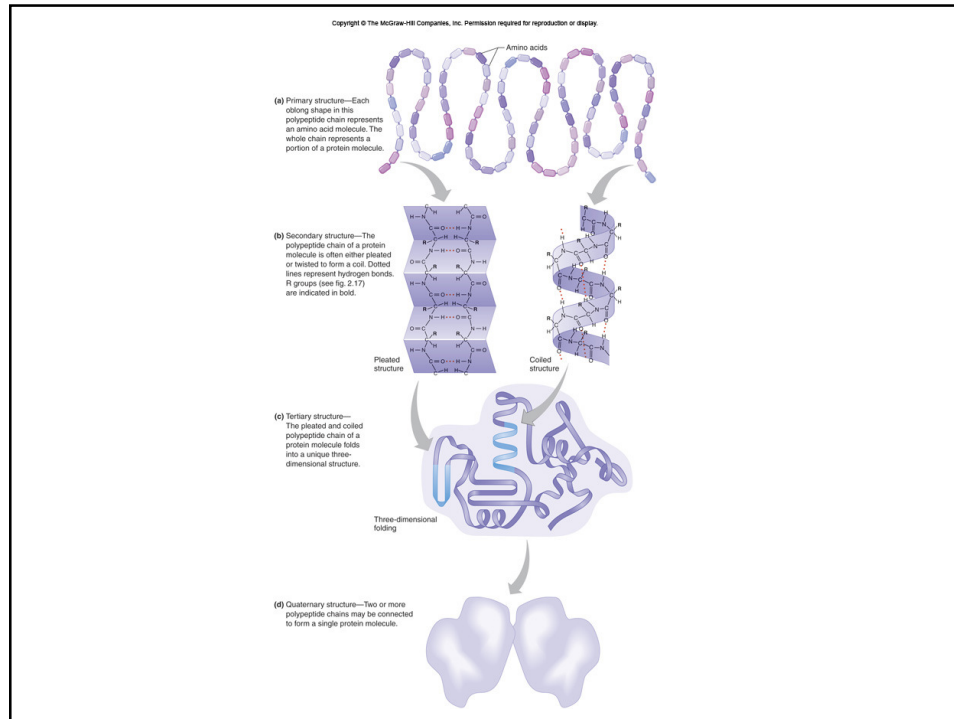
- b. Contain

- c. Building blocks are the amino acids, each of which has a

2.3 Chemical Constituents of Cells

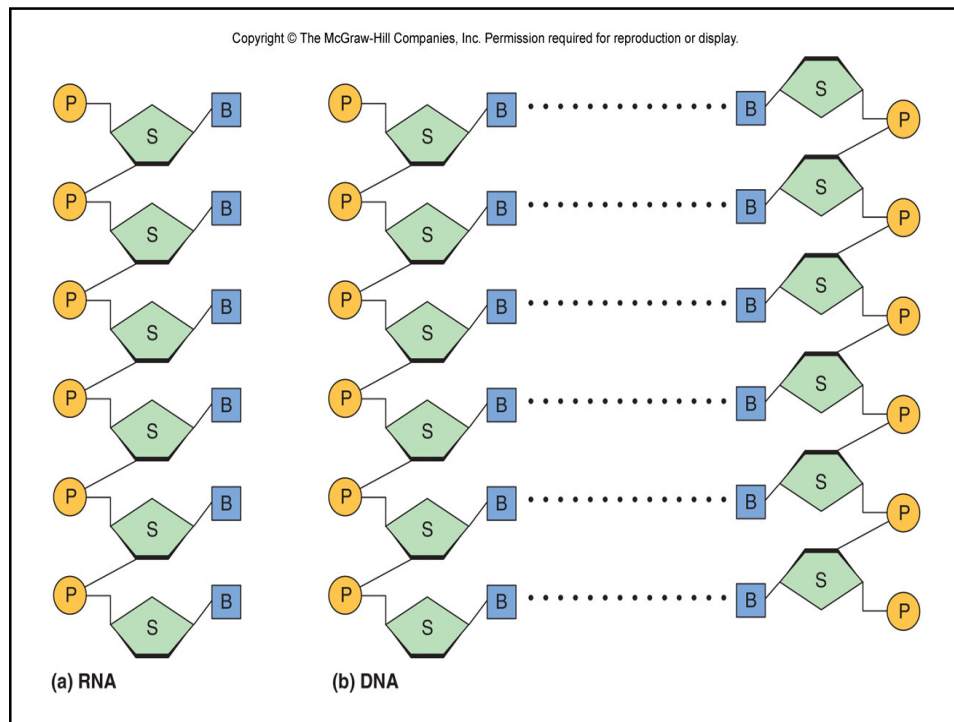
- d. Proteins have

- e. Protein shapes, which determine how proteins function,



2.3 Chemical Constituents of Cells

4. Nucleic Acids:
- Form
 - Contain carbon, hydrogen, oxygen, nitrogen, and phosphorus -
 - Two major types:
 - RNA (ribonucleic acid)
DNA (deoxyribonucleic acid)



4.2 Metabolic Reactions

A. Introduction

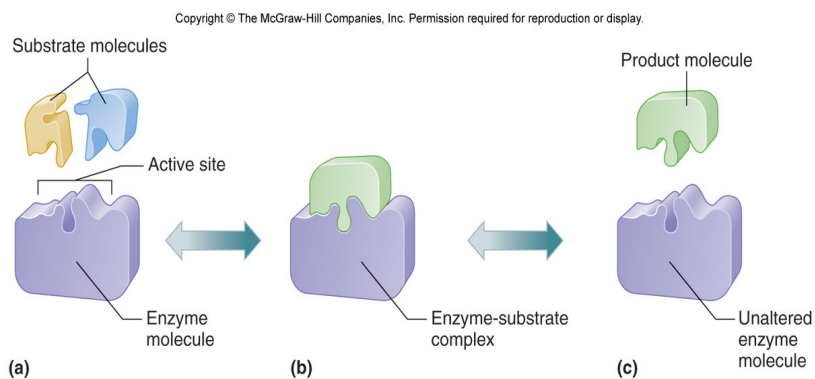
1. Metabolic reactions are of two types:
 - a. Anabolic reactions -
 - b. Catabolic reactions -
 - c. The reactions of metabolism are

4.3 Control of Metabolic Processes

- A. Enzymes control the
- B. Enzyme Action
1. Complex proteins that
 2. Work in small quantities and
 3. Each is specific,
 4. Active sites on the enzyme
 5. The speed of enzymatic reactions depends

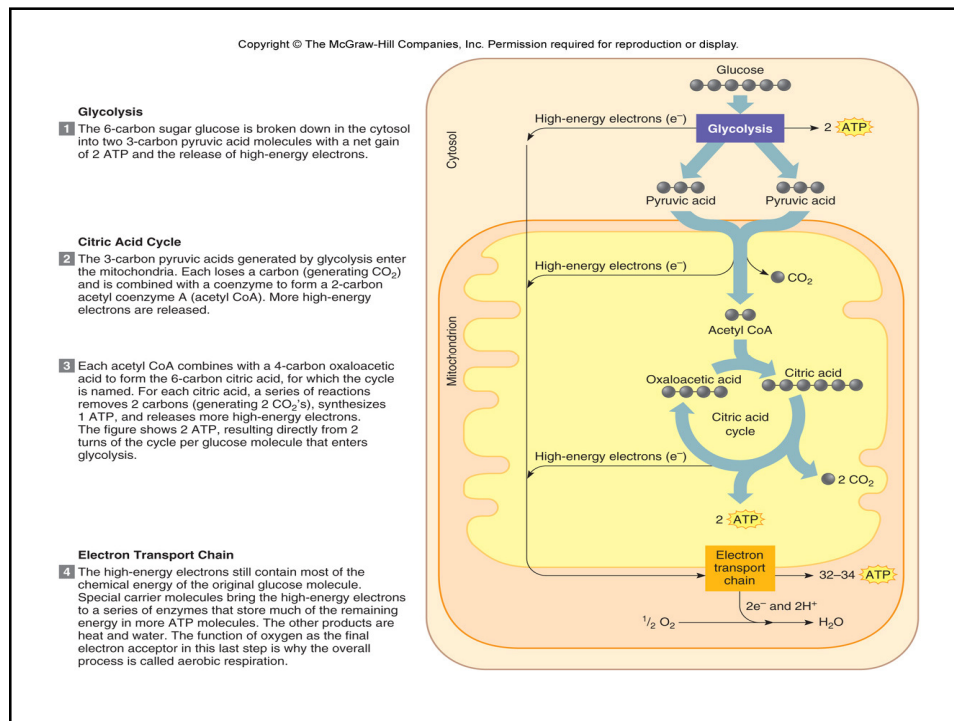
4.3 Control of Metabolic Processes

- C. Factors That Alter Enzymes
1. Enzymes (proteins) can be



4.4 Energy for Metabolic Reactions

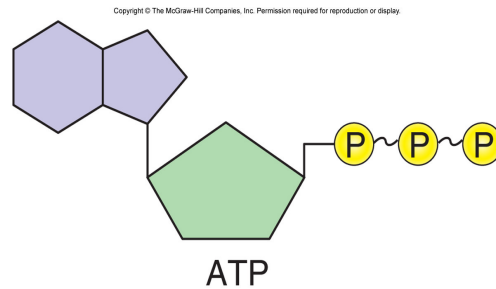
- A. Energy is the
- B. Common forms of energy include
- C. Release of Chemical Energy-
- Often occurs through
 - Burning
 - The end-products
 - This stored energy is called



4.4 Energy for Metabolic Reactions

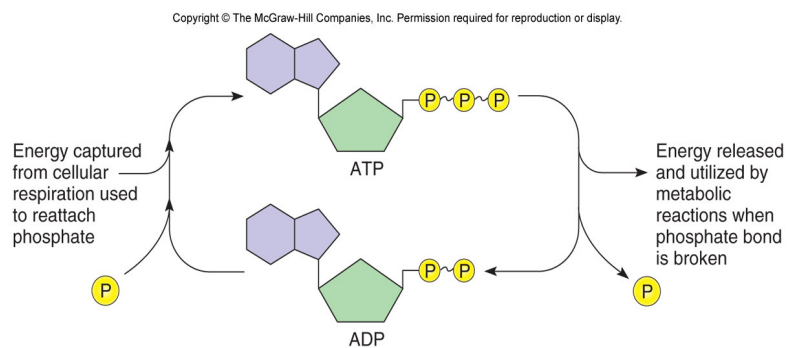
D. ATP Molecules

1. Up to
2. ATP molecules contain



4.4 Energy for Metabolic Reactions

3. Energy is stored
4. Energy is stored while



4.4 Energy for Metabolic Reactions

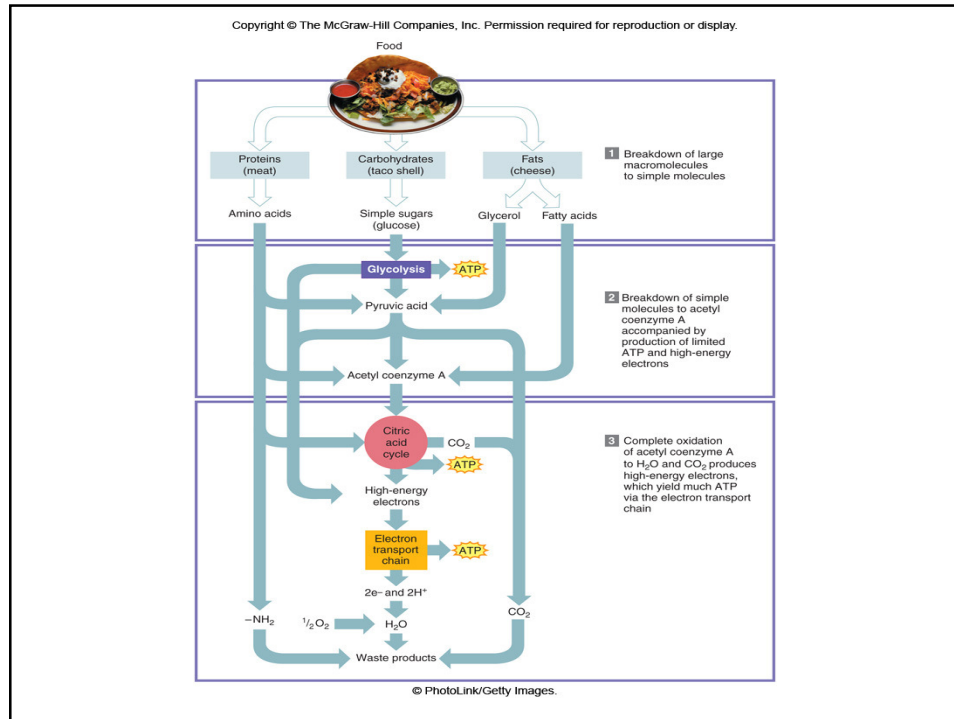
E. Anaerobic Respiration

1. The first part of cellular respiration is
2. The result is
3. Glycolysis occurs
4. Energy from ATP is used

4.4 Energy for Metabolic Reactions

F. Aerobic Respiration

1. Oxygen is needed
2. There is a much greater
3. The final products of



4.5 Metabolic Pathways

- A. The enzymes controlling
- B. A sequence of

4.5 Metabolic Pathways

- C. Regulation of Metabolic Pathways
 - 1. Determined by
 - 2. *A rate-limiting enzyme*