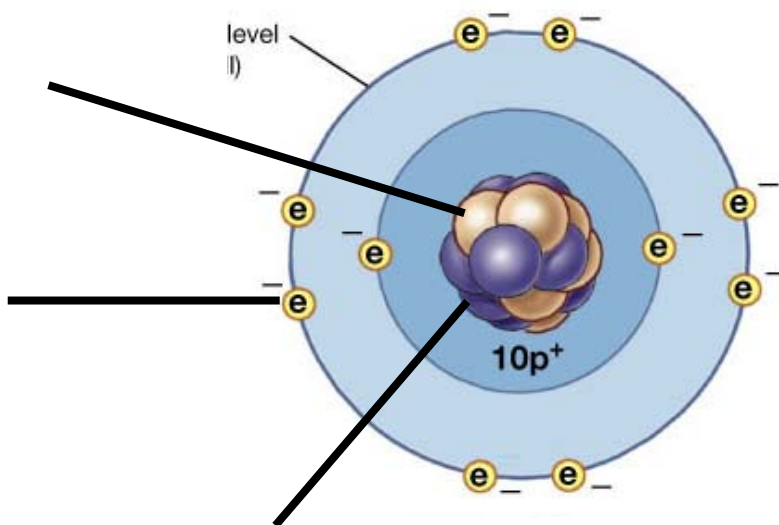


## CHAPTER 2: BASIC CHEMISTRY

Text Reading Assignment: Text pages 26-33, Table 2-2, p. 34. Omit pages 35-36 on chemical reactions. Continue with enzymes and chemical reactions by reading pages 36-56. Omit page 57.

### I. What and why chemistry?

### II. Composition of Matter



### III. Atomic Structure

1 <b>H</b> 1.008	6 <b>C</b> 12.01	8 <b>O</b> 16.00
------------------------	------------------------	------------------------

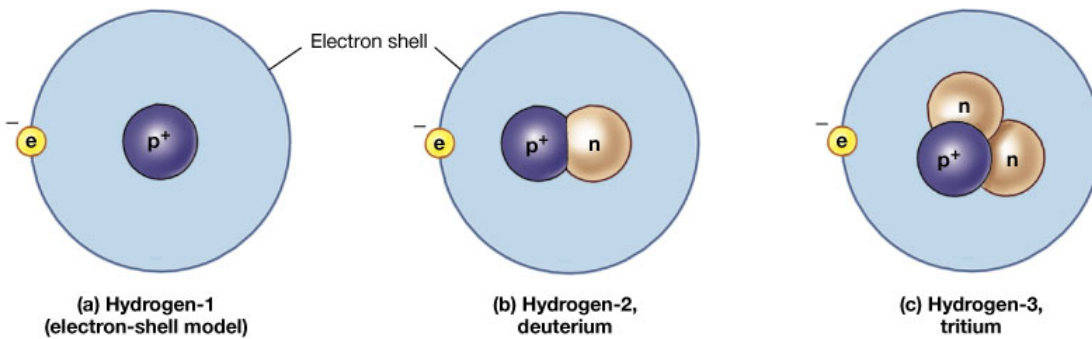
Elements –

Atomic number –

Atomic mass –

Ions –

Isotopes –



#### **IV. Molecules**

##### **A. Chemical bonds**

1) ionic bonds

2) covalent bonds

3) hydrogen bonds

##### **B. Compounds**

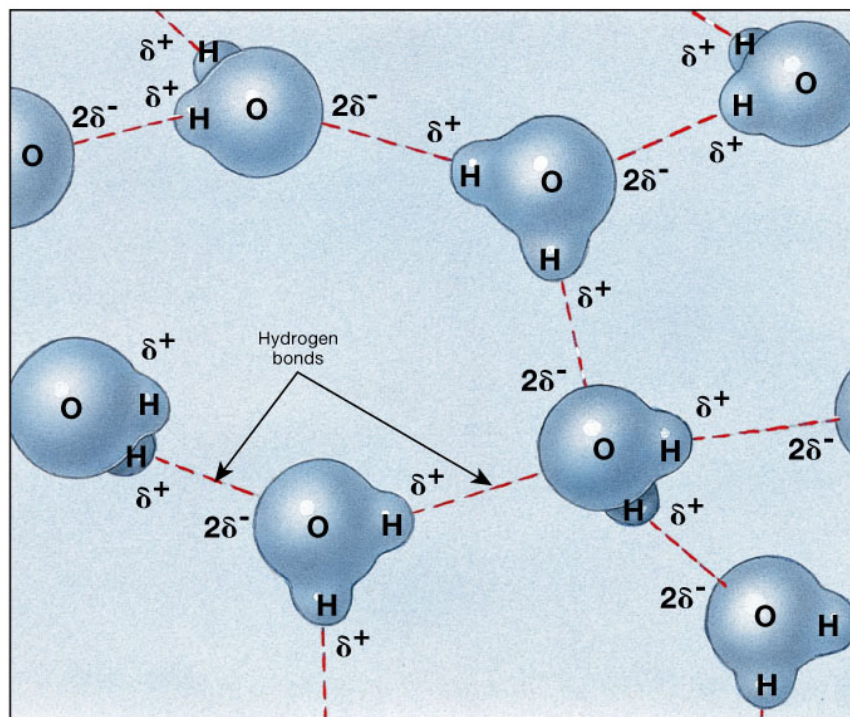
*Formula weight -*

#### **V. Two Types of Important Compounds**

##### **A. Properties**

## B. Inorganic Compounds

### 1) Water



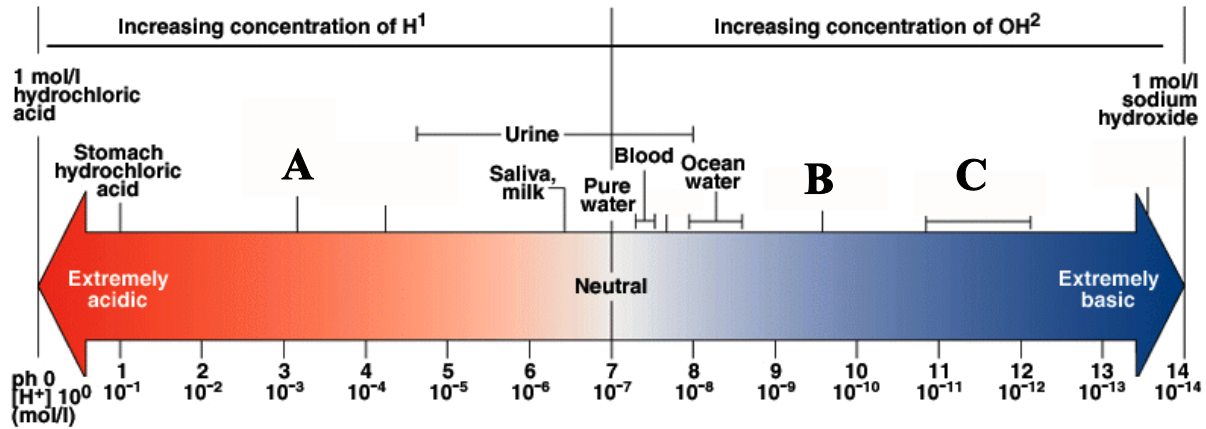
Copyright © 2004 Pearson Education, Inc., publishing as Benjamin Cummings.

2) Acids -

3) Bases -

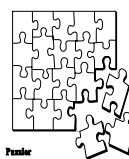
4) Salts -

5) The pH scale



**Harriet Hartline is a 36 year-old accountant working for ENRON. In 2001, she began to take antacids following meals to help fight stomach acid and, after some clinical tests, discovered she had an ulcer. Her doctor prescribed a diet restricting her consumption of alcohol, pickled foods, and tomato-based sauces.**

Why is Harriet’s consumption of these particular foods restricted?

 \_\_\_\_\_ Which letter(s) above corresponds to the area on the pH scale you would find these restricted foods?

\_\_\_\_\_ Which letter(s) above corresponds to the area on the pH scale you would find the antacids?

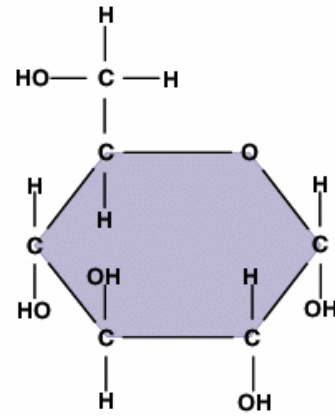
What is the function of the antacid?

## C. Organic Compounds

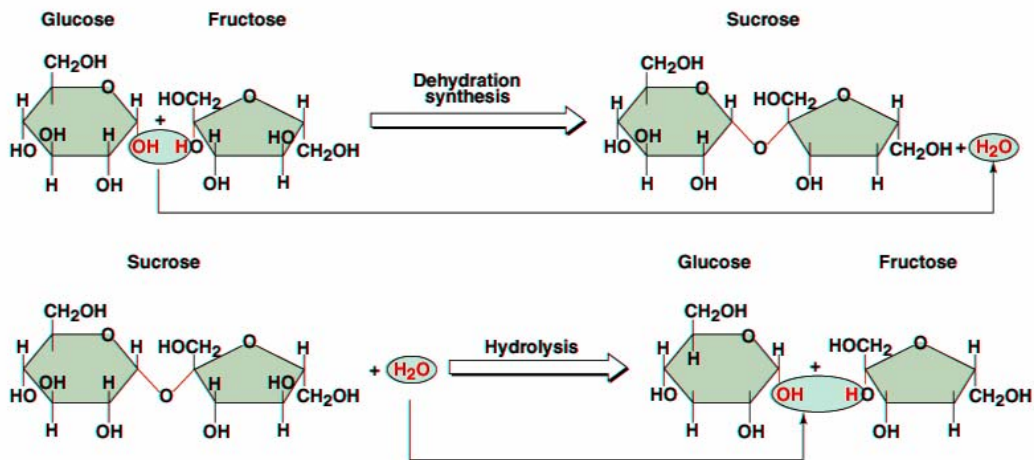
### 1) Carbohydrates

#### Monosaccharides

# Glucose (C<sub>6</sub>H<sub>12</sub>O<sub>6</sub>)



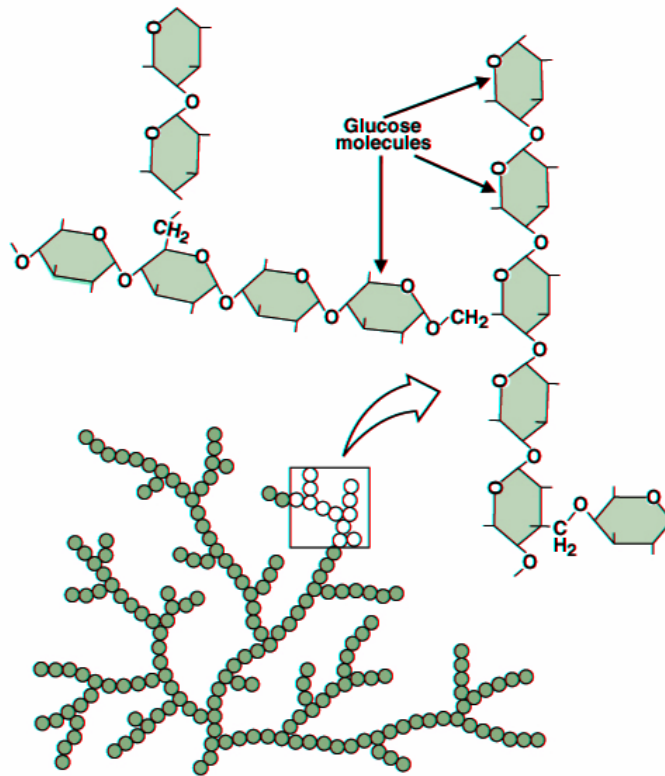
#### Disaccharides



*Other Important Disaccharides*

Monosaccharides	→ (D.S.) ← (Hydrolysis)	Disaccharide
galactose + glucose	→	
	←	Maltose

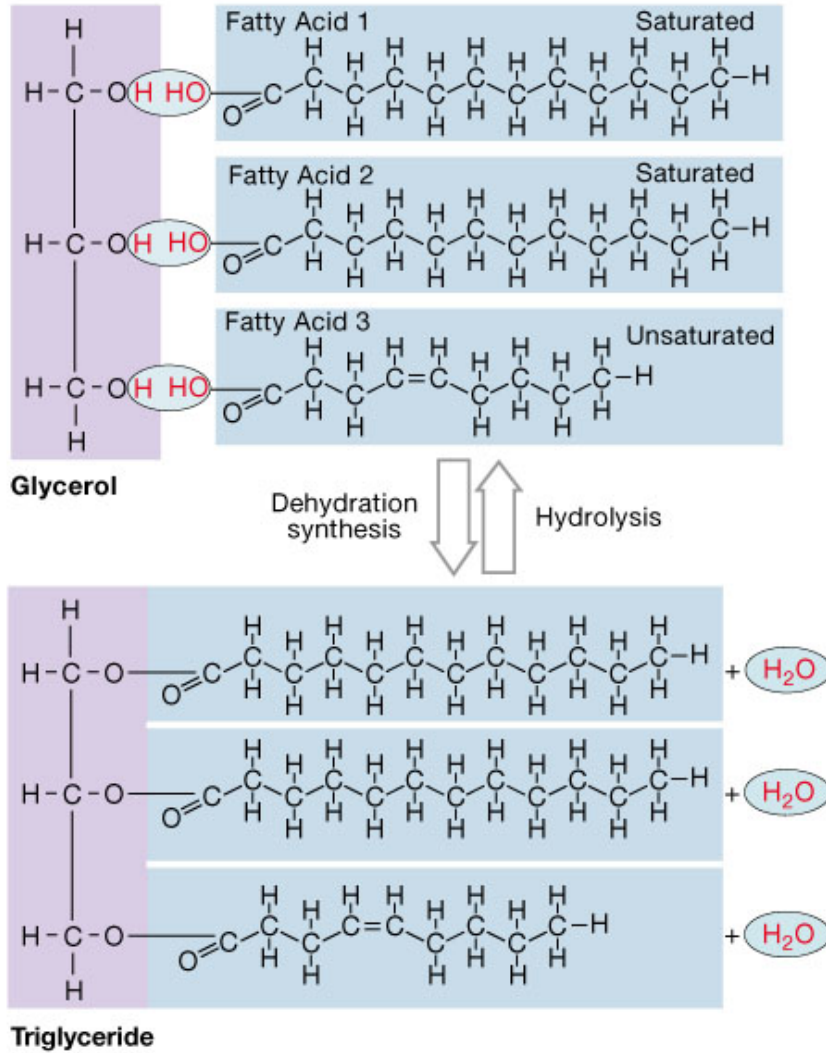
*Polysaccharides*



Carbohydrate Functions

### 3) Lipids

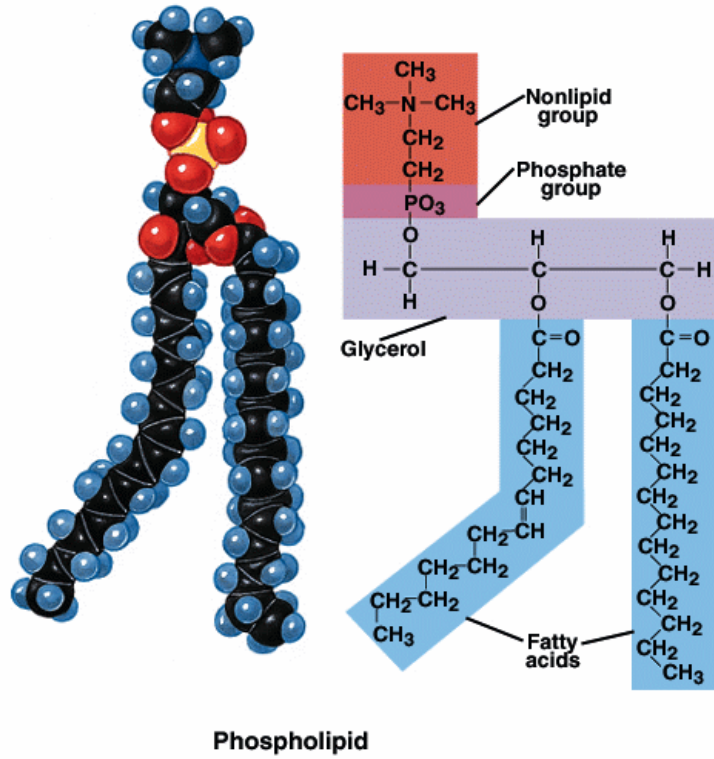
#### Triglycerides (neutral fats)



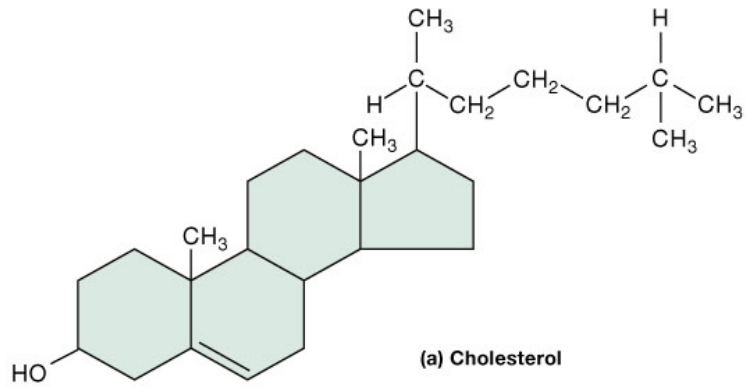
Copyright © 2004 Pearson Education, Inc., publishing as Benjamin Cummings.

### Triglyceride Functions

Phospholipids



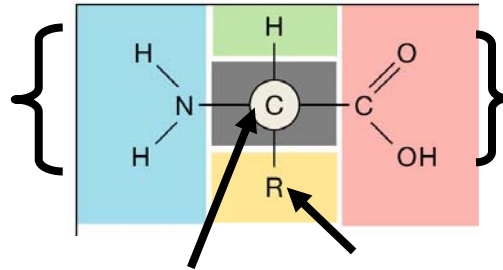
Steroids



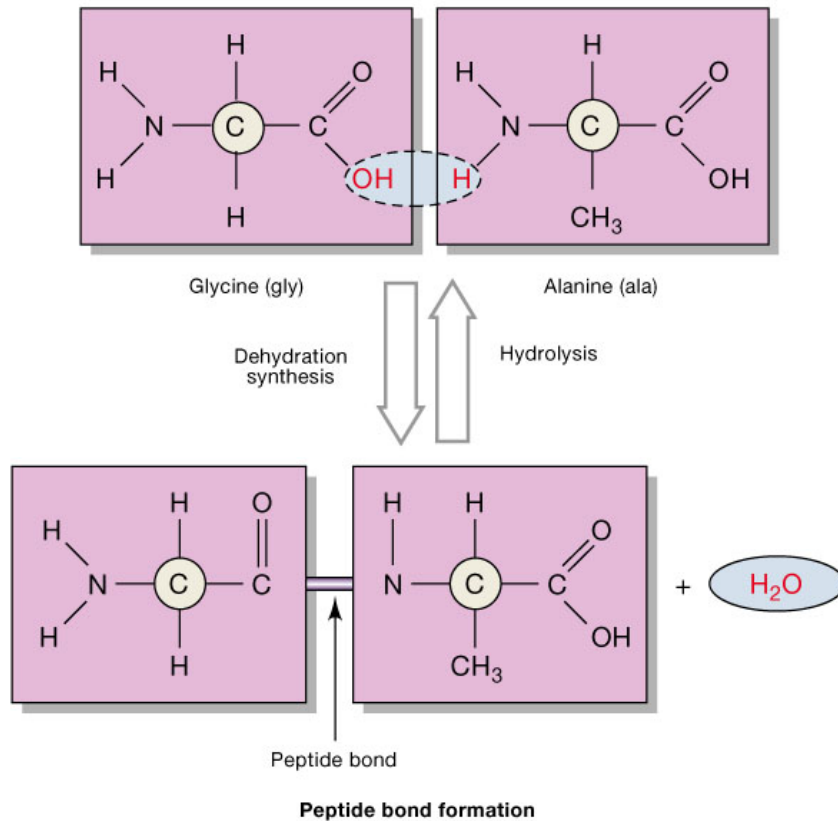
Steroid Functions

### 3) Proteins (polypeptides)

Amino acids –



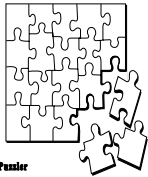
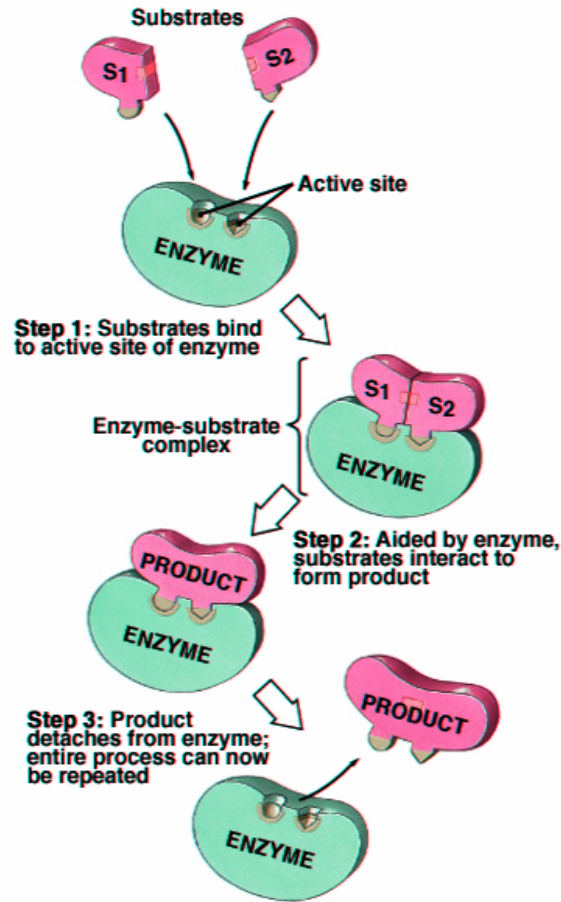
*Formation of Peptide Bonds –*



Copyright © 2004 Pearson Education, Inc., publishing as Benjamin Cummings.

Functions of Proteins (see page 51, Table 2-7)

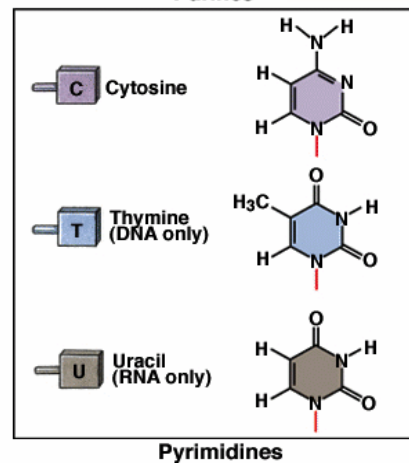
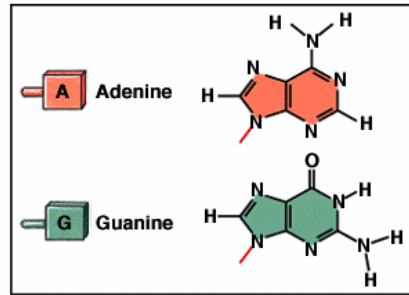
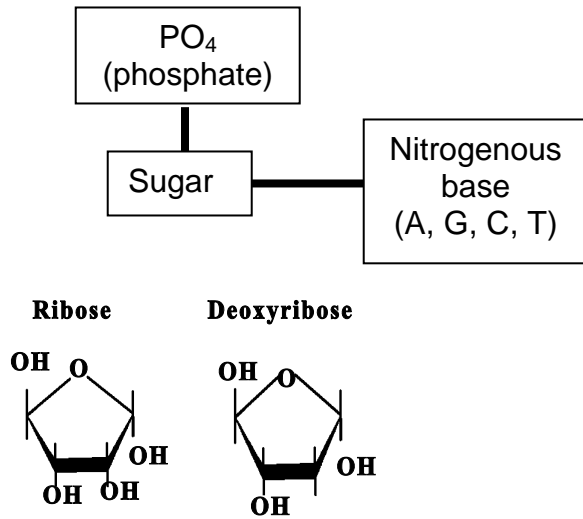
**\*\*Enzymes=biological catalysts\*\***



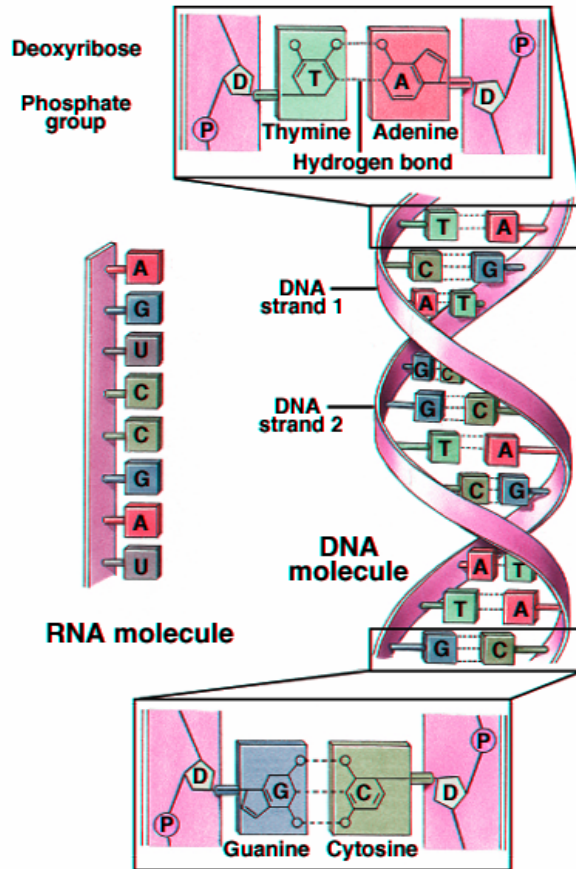
**Lucy Luzern's baby has a fever of 105°F and is acidotic (blood pH is lower than normal). Why should Lucy be concerned?**

4) Nucleic Acids

Nucleotides



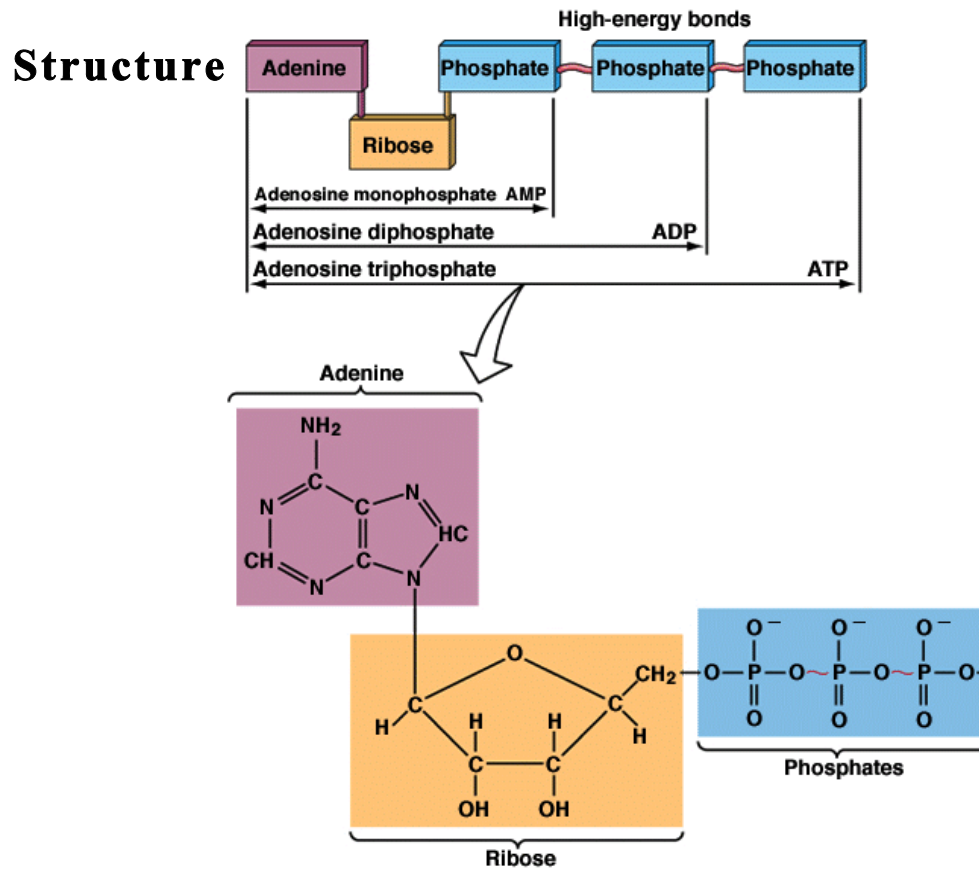
## Two Types of Nucleic Acids



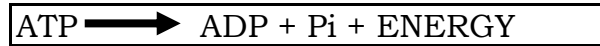
Comparison of Nucleic Acids: DNA vs RNA

	<b>DNA</b>	<b>RNA</b>
Structure		
Sugar		
Bases		
Function		

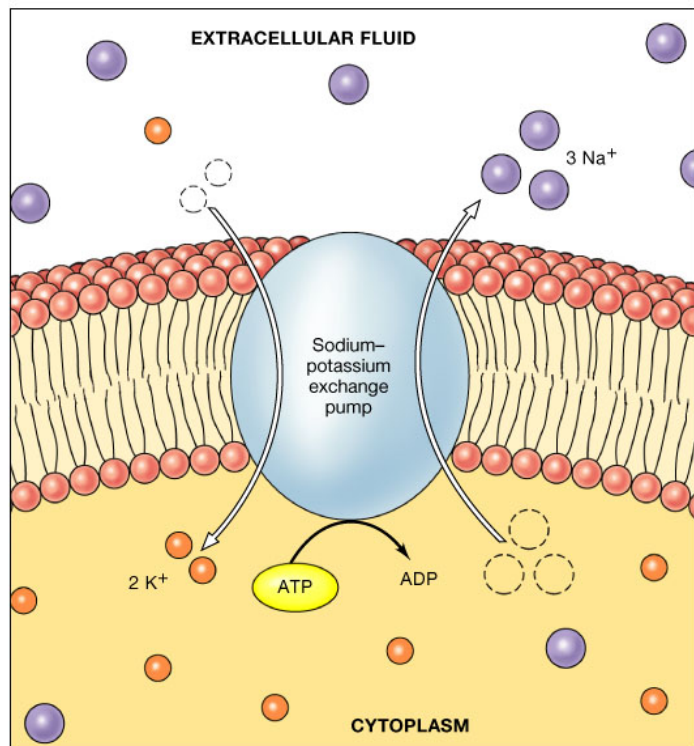
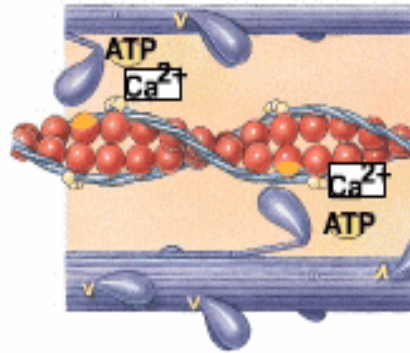
**ATP = the nucleotide that is an energy carrier!**



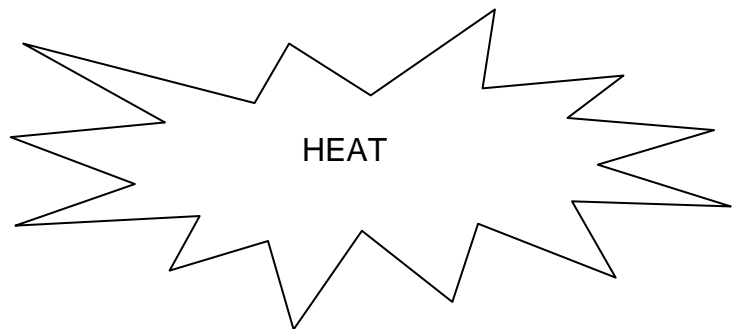
ATP Hydrolysis:



**How is energy from ATP hydrolysis used?**



Copyright © 2004 Pearson Education, Inc., publishing as Benjamin Cummings.



## Chapter 2 Assignments

### Lecture Guide

- 1) Define chemistry, element, acid, base, buffer, inorganic molecule, organic molecule, atomic mass, atomic number, isotope.
- 2) If an atom has an atomic number of 17 and has 18 electrons, what is the charge on the atom?
- 3) What is a radioisotope?
- 4) Is CO<sub>2</sub> a molecule? Is CO<sub>2</sub> a compound?
- 5) Is O<sub>2</sub> a molecule? Is O<sub>2</sub> a compound?
- 6) What atom(s) are common in the human body? In what molecules are they found?
- 7) Which atoms are rare? Where are they located in the body?
- 8) What are the properties of water that make life possible?
- 9) If a molecule contained C, H, and O, what molecule(s) might it be?
- 10) If a molecule contained C, H, N, and O, what molecule(s) might it be?
- 11) If a nucleic acid contained guanine and ribose, adenine would pair with \_\_\_\_\_.
- 12) Why is it dangerous to have a high fever for an extended period of time?
- 13) How is energy released from ATP? What is this energy used for? Is all of the energy from ATP used for cellular work?
- 14) What are simple carbohydrates? What is the function of the simple carbohydrates? How are complex carbohydrates different from simple carbohydrates?
- 15) Which lipids are used for energy? How are phospholipids different from triglycerides?
- 16) How many dehydration synthesis reactions are required to synthesize a polypeptide that is three amino acids long? How many dehydration synthesis reactions are required to synthesize a polypeptide that is 237 amino acids long? (This is rather like the "How many licks does it take to reach the center of a tootsie pop?") How many water molecules are formed in each case?
- 17) Are the two ends of an amino acid identical? Are the two ends of a protein identical?

### Textbook

Chapter 2 (pages 60-61)

Level 1: Reviewing Facts and Terms: 1,2,4,5, 9, 10-19, 24, 25, 27-34.

Level 2: Reviewing Concepts: 20-24, 35, 36, 37

Level 3: 28 a-c

### **Study Guide**

Chapter 2 (Pages 20-39)

- (L1) Multiple Choice: 1-5, 11-25  
Completion: 1-3, 6, 9-15, 18-20  
Drawing/Illustration Labeling: Fig 2-1, Fig 2-3
- (L2) Concept Map I, II, and IV  
Multiple Choice: 6-8, 10-12, 14, 18, 19, 22, 24  
Completion: 3-5, 9, 10, 12-14  
Short Essay: 1, 4, 6-10
- (L3) Critical Thinking and Application: none

Answers to these questions are located on pages 606-608 in the study guide.