

Organic Molecules

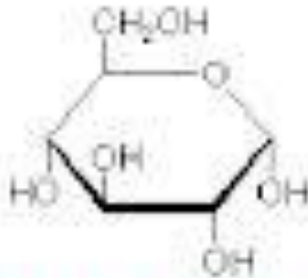
- All biological molecules fall into one of four categories
 - Carbohydrates
 - Lipids
 - Proteins
 - Nucleic Acids

The table in your note packet is not really big enough for all the information on the following slides to be written. You have a choice:

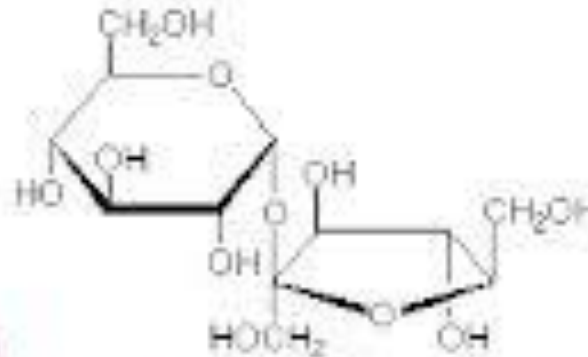
- 1. Create your own, larger table and staple it to your note packet*
- 2. Write really small.*

Table 3-2 The Principal Biological Molecules

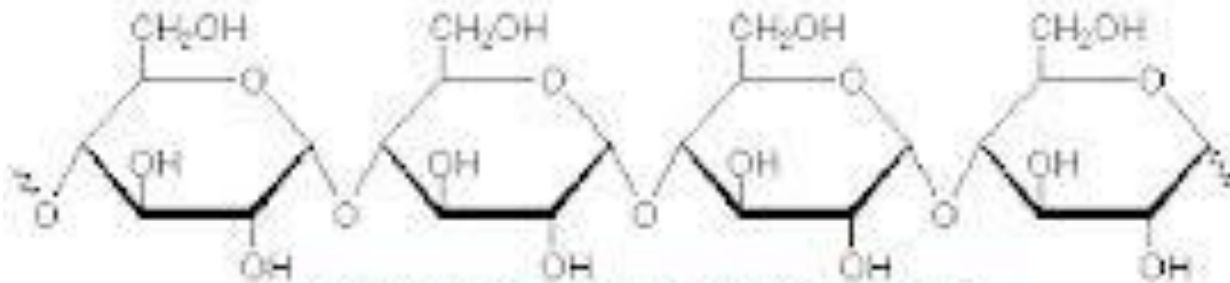
Class of Molecule	Principal Subtypes	Example	Function
Carbohydrate: Usually contains carbon, oxygen, and hydrogen, in the approximate formula $(\text{CH}_2\text{O})_n$	Monosaccharide: Simple sugar with the formula $\text{C}_6\text{H}_{12}\text{O}_6$	Glucose	Important energy source for cells; subunit of polysaccharides
	Disaccharide: Two monosaccharides bonded together	Fructose Sucrose	Energy-storage molecule in fruits and honey Principal sugar transported throughout bodies of land plants
	Polysaccharide: Many monosaccharides (usually glucose) bonded together	Starch Glycogen Cellulose	Energy storage in plants Energy storage in animals Structural material in plants



glucose (a monosaccharide)



sucrose (a disaccharide)



amylose (a polysaccharide/starch)

Lipid: Contains high proportion of carbon and hydrogen; usually nonpolar and insoluble in water

Triglyceride: Three fatty acids bonded to glycerol

Wax: Variable numbers of fatty acids bonded to long-chain alcohol

Phospholipid: Polar phosphate group and two fatty acids bonded to glycerol

Steroid: Four fused rings of carbon atoms with functional groups attached

Oil, fat

Waxes in plant cuticle

Phosphatidylcholine

Cholesterol

Energy storage in animals, some plants

Waterproof covering on leaves and stems of land plants

Component of cell membranes

Common component of membranes of eukaryotic cells; precursor for other steroids such as testosterone, bile salts



Triglyceride



Phospholipid

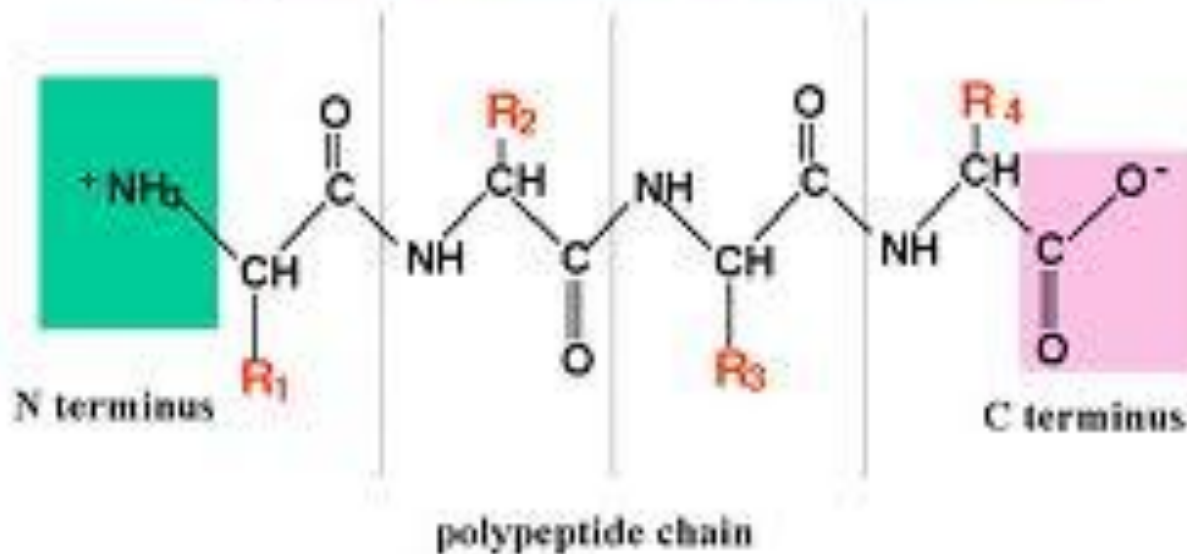


Steroid

Table 3-2 The Principal Biological Molecules

Class of Molecule	Principal Subtypes	Example	Function
Protein: Chains of amino acids; contains carbon, hydrogen, oxygen, nitrogen, and sulfur	<i>Peptide:</i> Short chain of amino acids	Keratin Silk	Helical protein, principal component of hair Beta-pleated sheet protein produced by silk moths and spiders
	<i>Polypeptide:</i> Long chain of amino acids; also called "protein"	Hemoglobin	Globular protein composed of four subunit peptides; transport of oxygen in vertebrate blood

Peptide = chain of amino acids



Nucleic acid: Made of nucleotide subunits containing carbon, hydrogen oxygen, nitrogen, and phosphorus. May consist of a single nucleotide or long chain of nucleotides.

Long-chain nucleic acids: polymer of nucleotide subunits

Single nucleotides

Deoxyribonucleic acid (DNA)

Genetic material of all living cells

Ribonucleic acid (RNA)

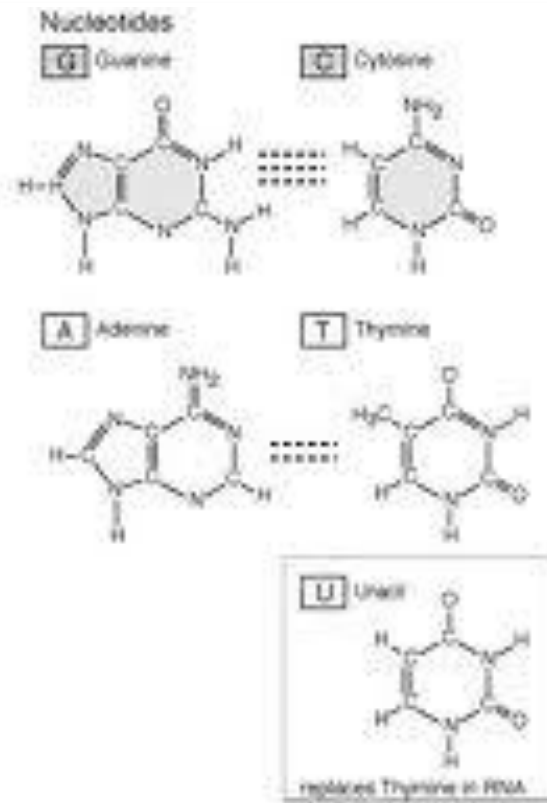
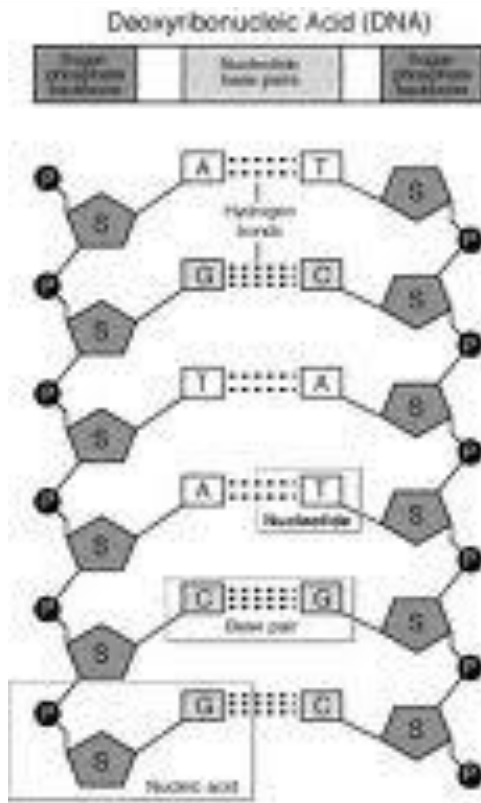
Genetic material of some viruses; in cells, essential in transfer of genetic information from DNA to protein

Adenosine triphosphate (ATP)

Principal short-term energy carrier molecule in cells

Cyclic adenosine monophosphate (cyclic AMP)

Intracellular messenger





The big idea...

- *Can you list the 4 major categories of biological molecules?*
- *Can you recognize the major molecular structures of each class of biological molecule?*