

# CH 3 BIG PICTURE

①

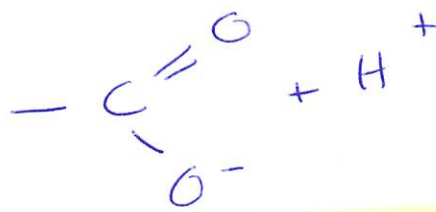
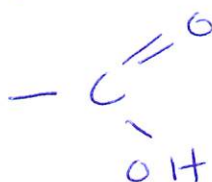
- proteins, carbohydrates, nucleic acids, LIPID
- ORGANIC compounds composed of carbon skeletons
- FUNCTIONAL GROUPS attached to the skeleton

- OH Hydroxyl - Alcohol

- C=O Carbonyl - Ketones (carbonyl within)  
- Aldehydes (carbonyl at end)

- COOH CARBOXYL - Carboxylic Acid

you will see it as



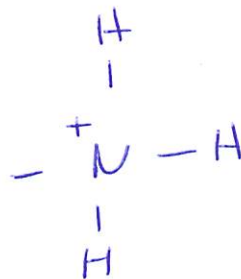
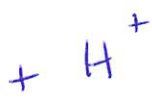
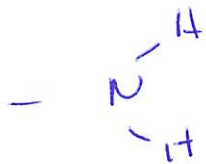
ionized form

- NH<sub>2</sub>

AMINO

- Amino Acids

you will see it as



ionized form of NH<sub>2</sub>

- SH

Sulfhydryl

- Thiol

Cysteine

or  
HS



Phosphate Group

- organic phosphates

ATP!



Methyl Group

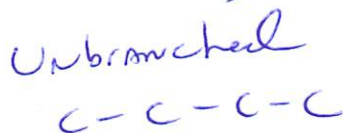
Methylated compounds

Epigenetics

## Carbon Skeletons

(1) Length

(2) Branching -

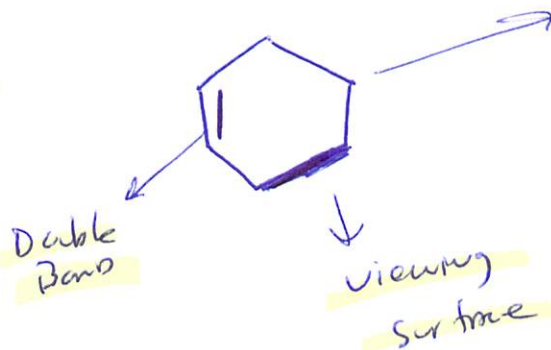


Branched



(3) Double Bond Position

(4) Rings



each corner represents a carbon atom.

★ Except for sulfhydryl, the **FUNCTIONAL GROUPS ARE HYDROPHILIC** and **INCREASE THE SOLUBILITY** of the organic compounds in WATER ←

⇒ the **IONIZED** forms of the **AMINO** and **CARBOXYL** GROUP are the forms AT **NORMAL CELLULAR pH (7.2)**

How Do Functional Groups Affect Function?

- ① They affect the **SHAPE** which in turn affects Function
- ② They are **DIRECTLY INVOLVED** in chemical reactions in their own characteristic way.

ATP



(P) - <sup>ORGANIC</sup> Phosphate (part of ADP or ATP)

**P<sub>i</sub>** - inorganic phosphate (when it is broken off)

Macromolecules → large molecules

↓  
Proteins, Carbohydrates, and Nucleic Acids are macromolecules

⇒ they are polymers composed of monomers (repeating units)

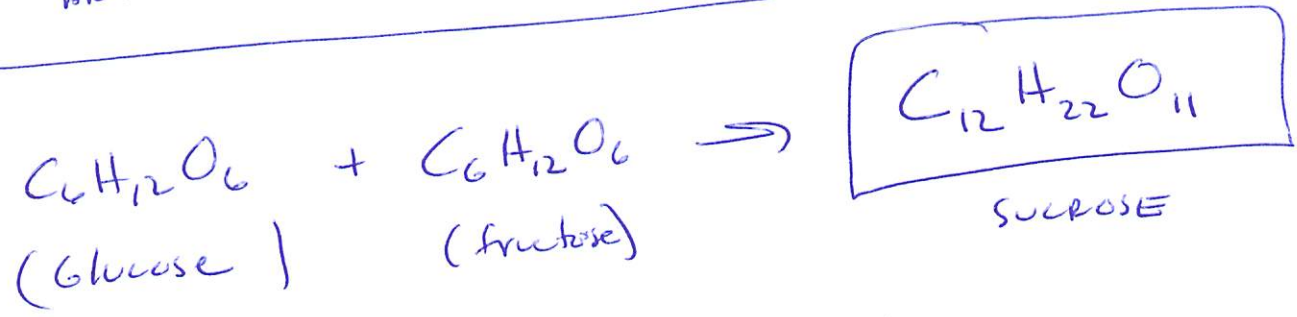
Protein	—	Amino Acid
Carbohydrate	—	Simple Sugars
Nucleic Acid	—	Nucleotides

organize polymers and their monomers.

Dehydration Reaction (Synthesis)

- bond forms between 2 monomers
- one loses a H
- the other loses an OH

- so a  $H_2O$  molecule is removed (Dehydration) and a new bond is formed



→ make sure you understand this  
→ THICK - one O and 2 H per Bond is subtracted.

# Hydrolysis

- the process by which polymers are disassembled
- ADDING WATER BREAKS the bonds between monomers.
- MEDIATED by ENZYMES (i.e. DIGESTION)