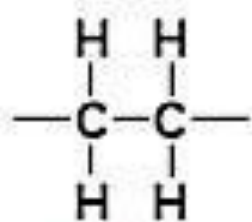


Functional Groups:-

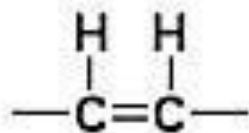
1. Functional groups are the components of organic molecules that are most commonly involved in chemical reactions.
2. The number and arrangement of functional groups give each molecule its unique properties.

Functional Group Name	Suffix Ending	Functional Group Structure
Alkane	-ane	C-H atoms
Alcohol	-ol	--OH
Alkene	-ene	C=C
Alkyne	-yne	HC≡CH
Aldehyde	-al	$\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---H} \end{array}$
Amine	-amine	--N--
Ether	-ether	--O--
Ester	-oate	$\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---O---} \end{array}$
Ketone	-one	$\begin{array}{c} \text{O} \\ \parallel \\ \text{---C---} \end{array}$
Nitrile	-ile	---C≡N

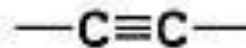
Hydrocarbon Derivatives



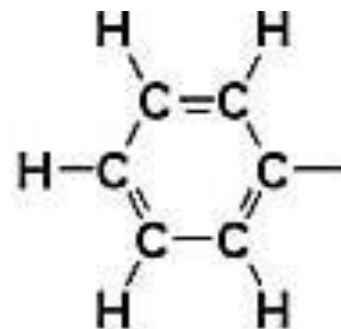
alkane



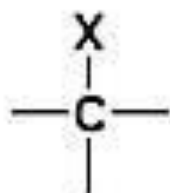
alkene



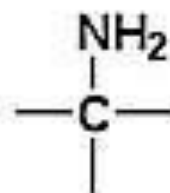
alkyne



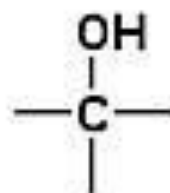
phenyl



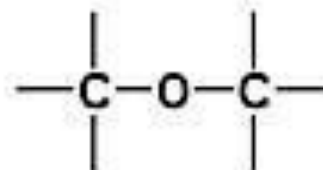
alkyl halide
(X = F, Cl, Br, I)



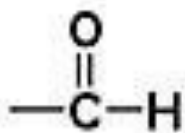
amine



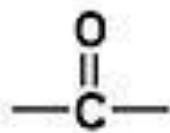
alcohol



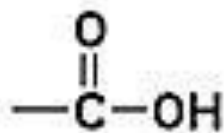
ether



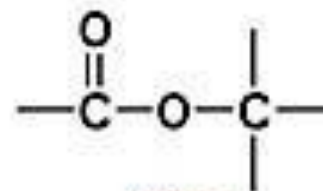
aldehyde



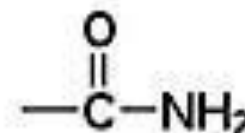
ketone



carboxylic
acid



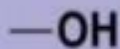
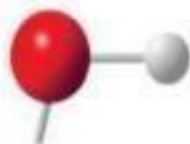
ester



amide

Hydroxyl

STRUCTURE

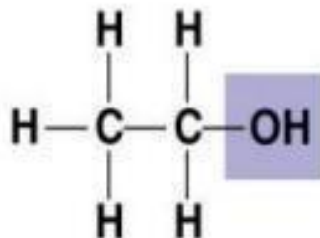


(may be written
 HO—)

Alcohols
(Their specific
names usually
end in *-ol.*)

NAME OF COMPOUND

EXAMPLE



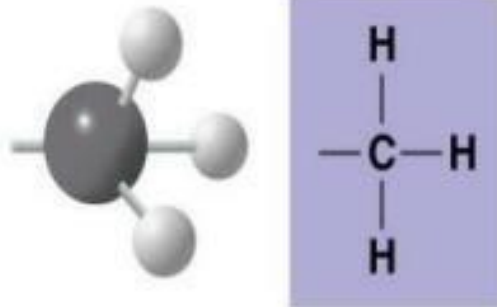
Ethanol

- Is polar as a result of the electrons spending more time near the electronegative oxygen atom.
- Can form hydrogen bonds with water molecules, helping dissolve organic compounds such as sugars.

FUNCTIONAL PROPERTIES

Methyl

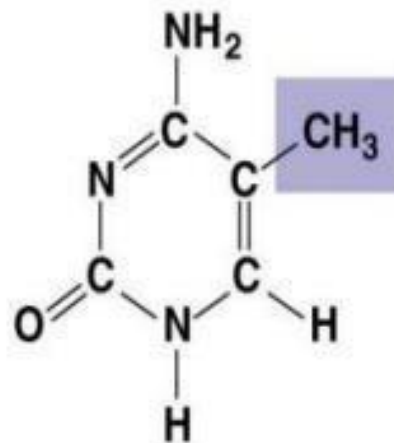
STRUCTURE



Methylated compounds

NAME OF COMPOUND

EXAMPLE



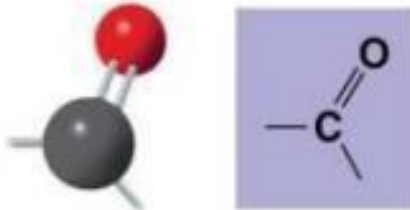
5-Methyl cytidine

- Addition of a methyl group to DNA, or to molecules bound to DNA, affects the expression of genes.
- Arrangement of methyl groups in male and female sex hormones affects their shape and function.

FUNCTIONAL PROPERTIES

Carbonyl

STRUCTURE

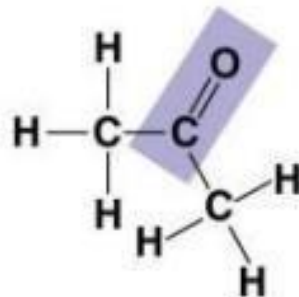


Ketones if the carbonyl group is within a carbon skeleton

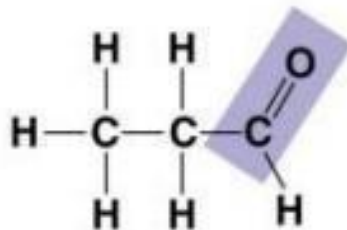
Aldehydes if the carbonyl group is at the end of the carbon skeleton

NAME OF COMPOUND

EXAMPLE



Acetone

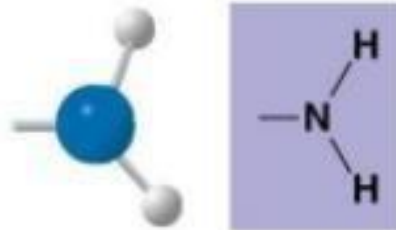


- A ketone and an aldehyde may be structural isomers with different properties, as is the case for acetone and propanal.
- Ketone and aldehyde groups are also found in sugars, giving rise to two major groups of sugars: ketoses (containing ketone groups) and aldoses (containing aldehyde

FUNCTIONAL PROPERTIES

Amino

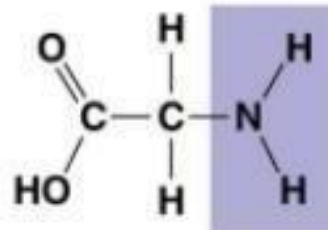
STRUCTURE



Amines

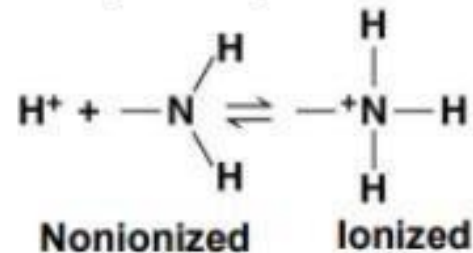
NAME OF COMPOUND

EXAMPLE



Glycine

- Acts as a base; can pick up an H^+ from the surrounding solution (water, in living organisms):

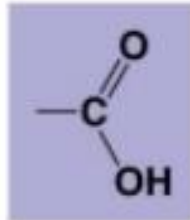
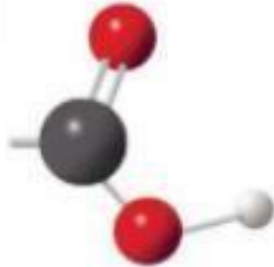


FUNCTIONAL PROPERTIES

- Found in cells in the ionized form with a charge of $1+$.

Carboxyl

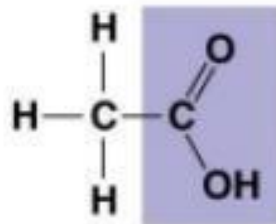
STRUCTURE



Carboxylic acids, or organic acids

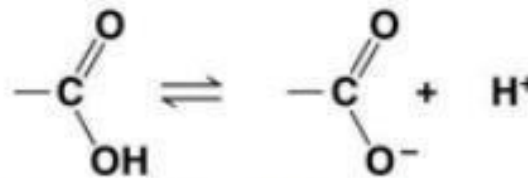
NAME OF COMPOUND

EXAMPLE



Acetic acid

- Acts as an acid; can donate an H^+ because the covalent bond between oxygen and hydrogen is so polar:



Nonionized

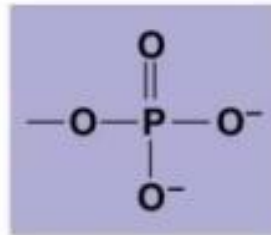
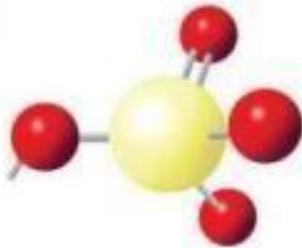
Ionized

FUNCTIONAL PROPERTIES

- Found in cells in the ionized form with a charge of 1^- and called a carboxylate ion.

Phosphate

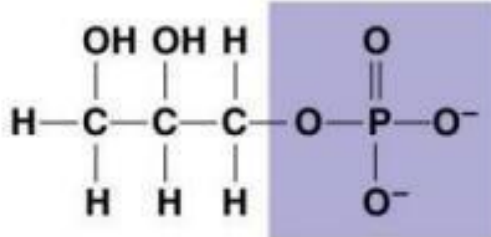
STRUCTURE



Organic phosphates

NAME OF COMPOUND

EXAMPLE



Glycerol phosphate

- Contributes negative charge to the molecule of which it is a part (2- when at the end of a molecule, as at left; 1- when located internally in a chain of phosphates).

FUNCTIONAL PROPERTIES

- Molecules containing phosphate groups have the potential to react with water, releasing energy.

Thank

you

