Classification and nomenclature of organic compounds

Tutorial 1

Bioorganic chemistry as science

 Bioorganic chemistry study the relationship between the structure of organic compounds and their biological functions.

Studyind objects

✔ *natural biologically important compounds* (biopolymers, vitamins, hormones, antibiotics, pheromones, etc.);

✔ *synthetic regulators of biological processes* (drugs, pesticides, etc.).

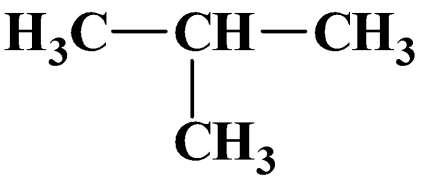
The features of organic compounds classification

- a structure of molecular framework;
- the presence of functional groups in molecule.

***Functional group** is an atom or a group of atoms of non-hydrocarbon origin that determine chemical properties of a compound.*

Classification according to the molecular framework

Acyclic

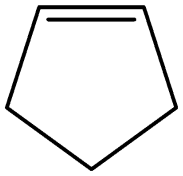


2-methylpropane

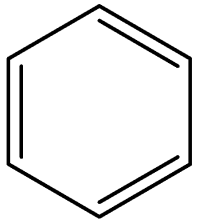
propene

butyne-2

Carbocyclic

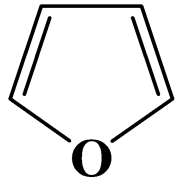


cyclopentene

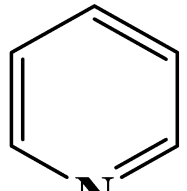


benzene

Heterocyclic



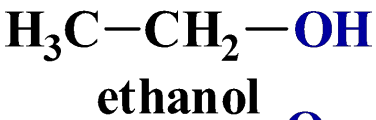
furan



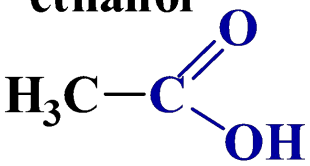
pyridine

Classification according to functional groups

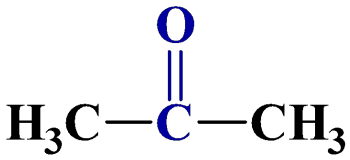
Monofunctional



ethanol

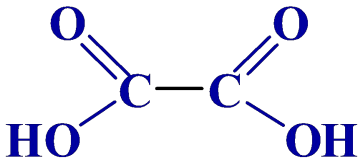


acetic acid

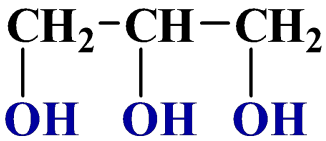


acetone

Polyfunctional

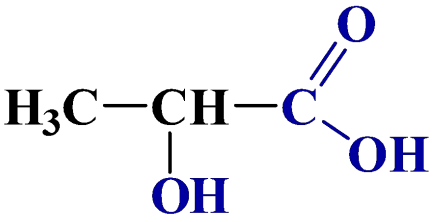


oxalic acid

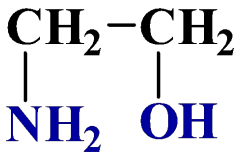


glycerol

Heterofunctional



lactic acid



colamine

Nomenclature of organic compounds

Nomenclature is an arrangement of terms that describes complete structure of organic molecules.

- **trivial nomenclature**
- **radicofunctional nomenclature**
- **substitutive nomenclature IUPAC**

Basic terms

Parent name **– a part of the name used for the formation of a particular name according to the appointed rules.**

Characteristic group **– this term is equal to the term functional group.**

Principal (senior) group **– the characteristic group chosen for expression as a suffix in a particular name, this group has no other advantages over remainder groups.**

Substituent **– any atom or group replacing hydrogen of a parent compound.**

Radical **– a part of a molecule that remains after removal of one or more hydrogen atoms from it.**

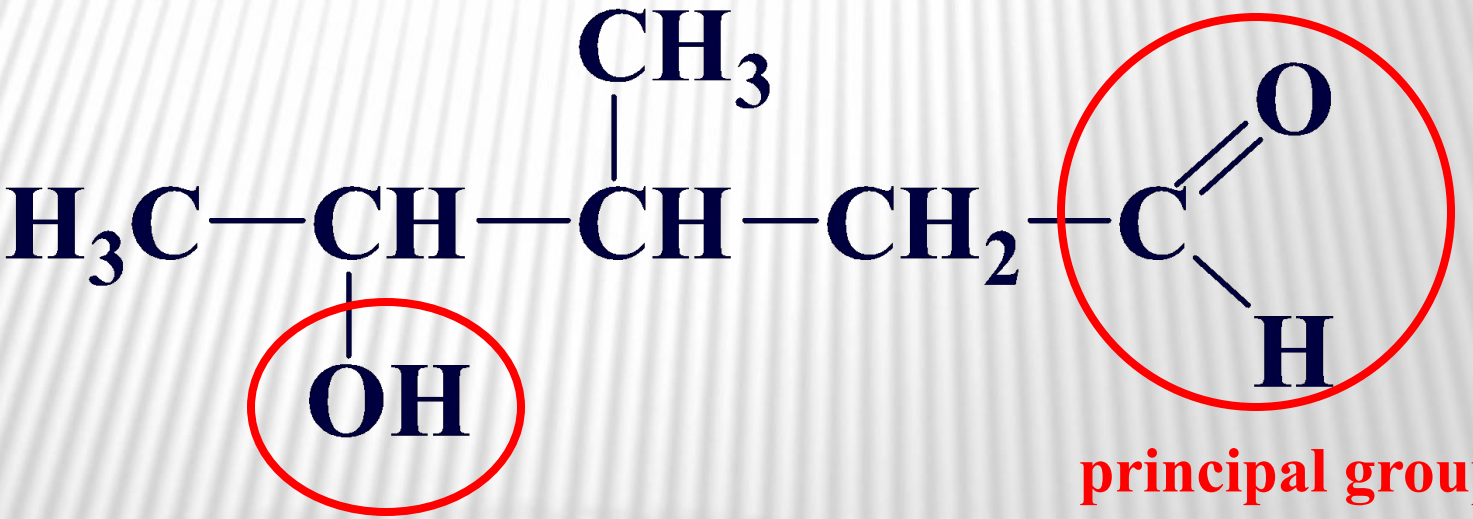
Locant **– a numeral or a letter showing a position of a substituent or a multiple bond in a parent structure.**

Multiplaying affix **– sullables *di-*, *tri-*, *tetra-*, etc., which are used to indicate a set of identical substituents or multiple bonds.**

IUPAC nomenclature rules

Step 1

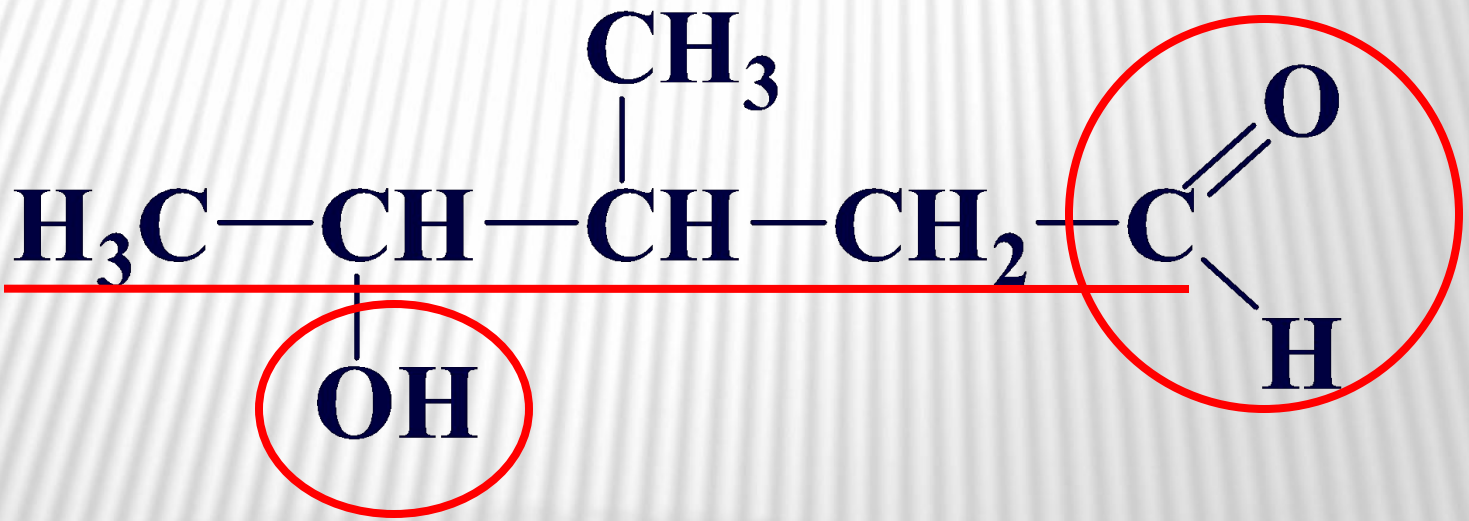
Determine the kind of characteristic group for use as principal group, if any.



IUPAC nomenclature rules

Step 2

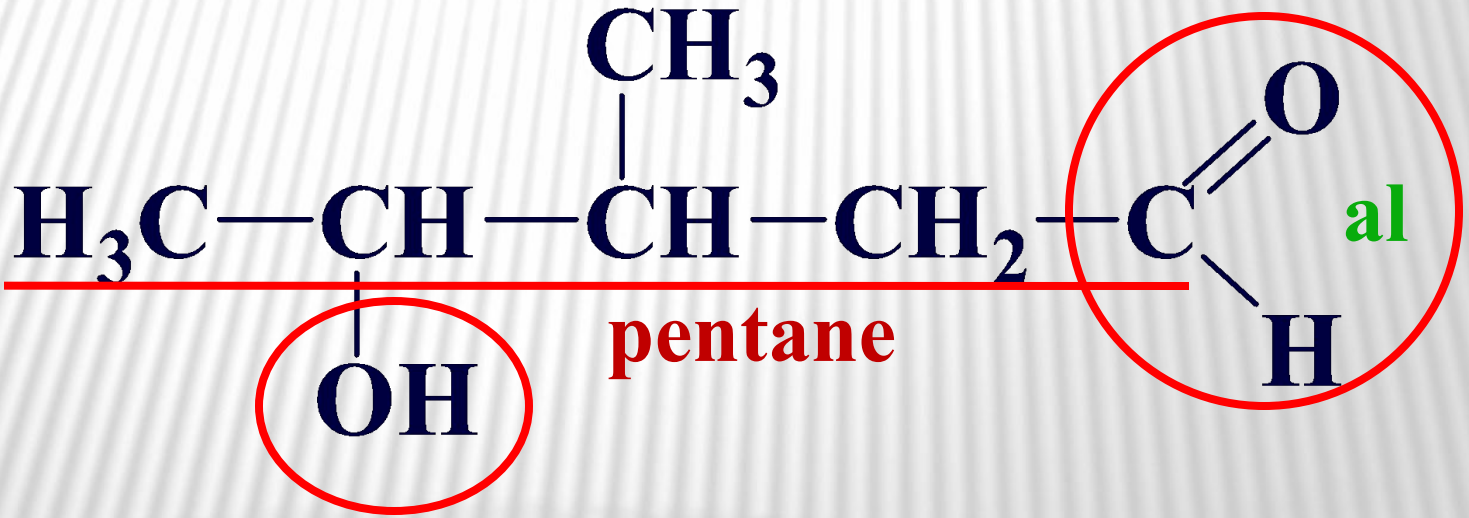
Determine the parent structure (principal chain or parent ring system).



IUPAC nomenclature rules

Step 3

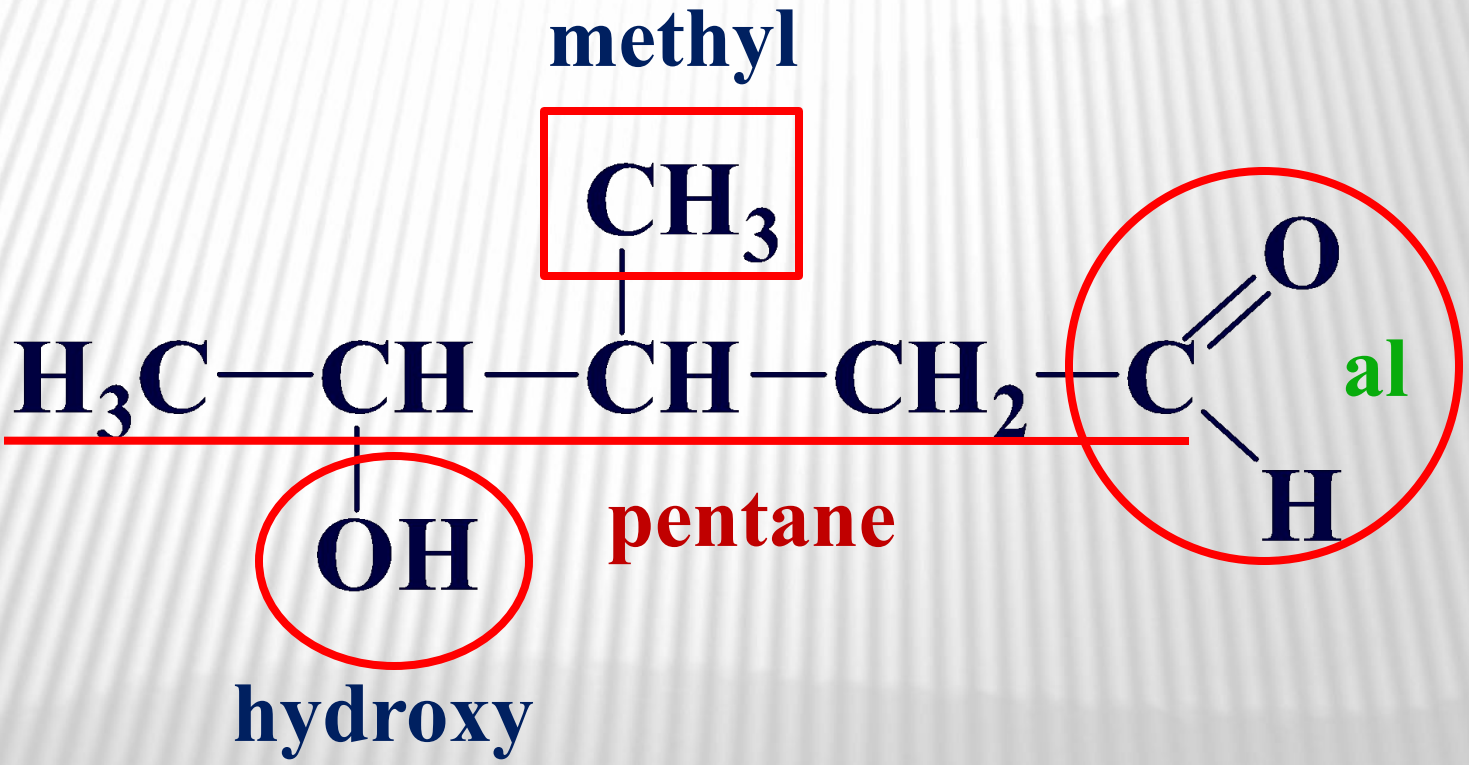
Name the parent structure and the principal group(s).



IUPAC nomenclature rules

Step 4

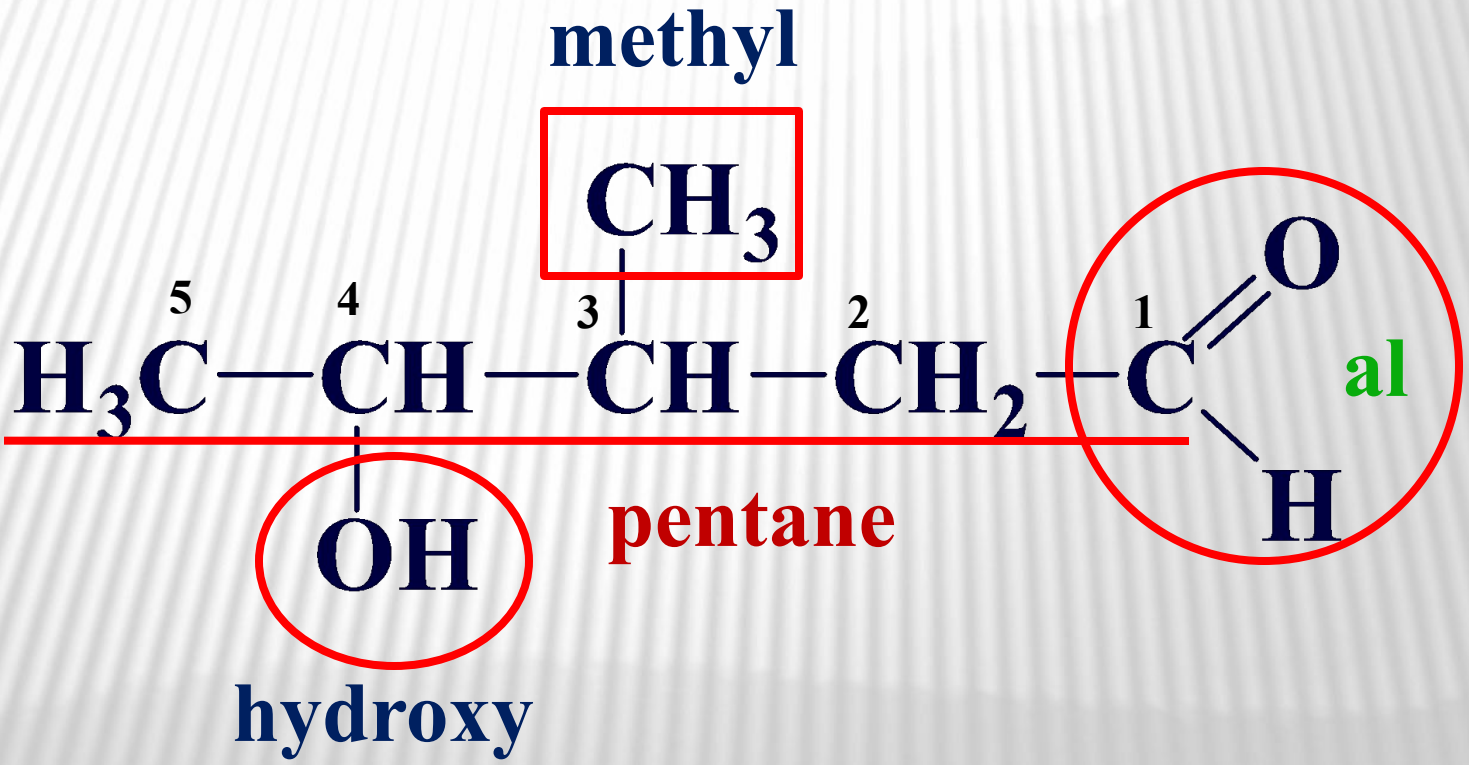
Determine and name prefixes.



IUPAC nomenclature rules

Step 5

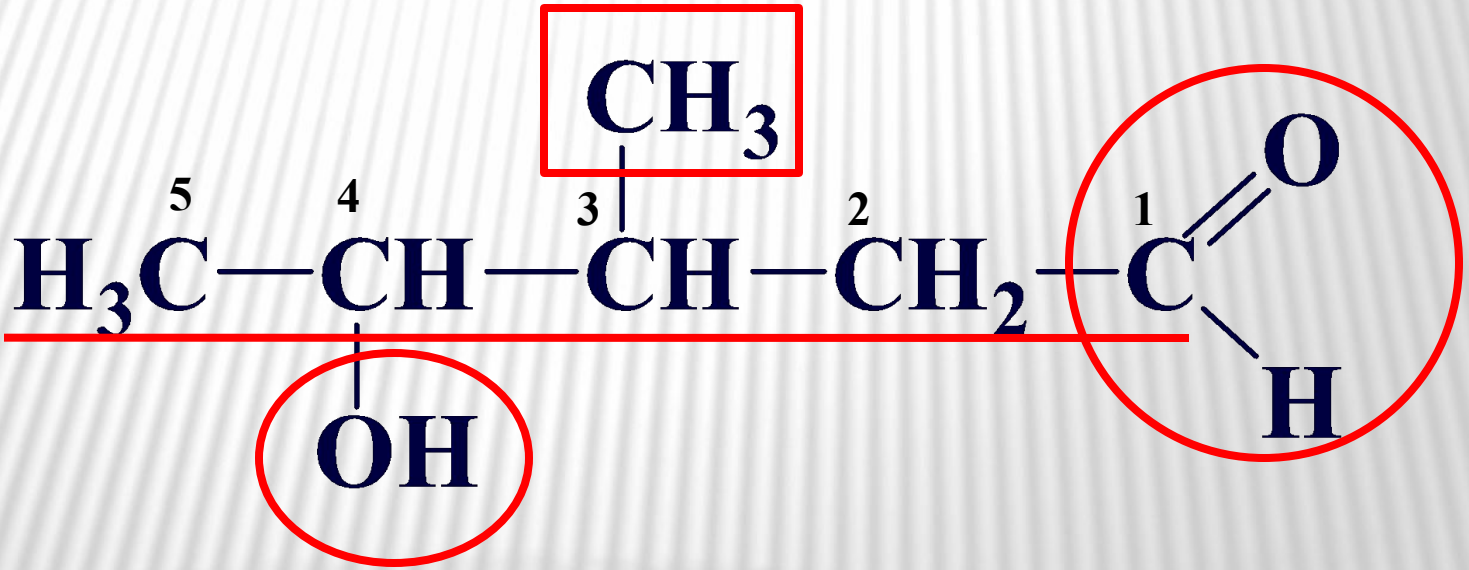
Complete the numbering.



IUPAC nomenclature rules

Step 6

Assemble the partial name into a complete name, using the alphabetic order.



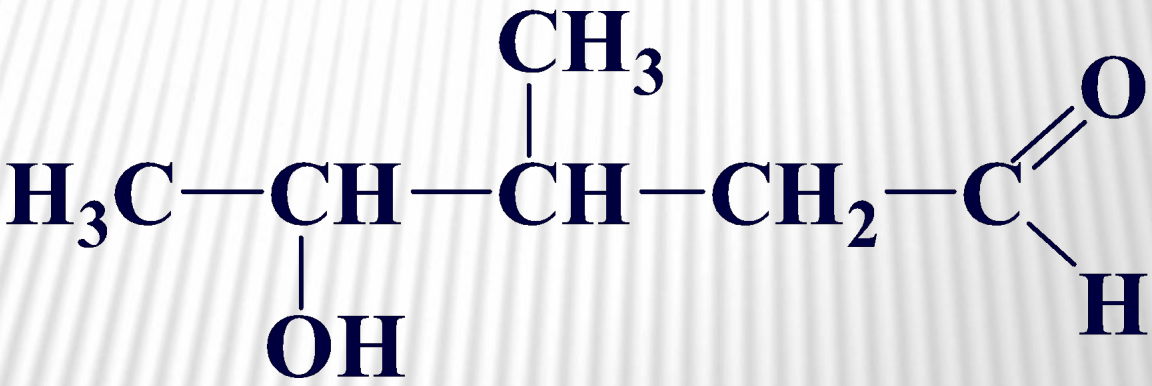
4-hydroxy-3-methylpentanal

IUPAC nomenclature rules

Prefix(es)
Other substituents (functional groups and/or radicals)

Root
Parent structure (the main chain or cycle)

Suffix
Principal functional group



4-hydroxy-3-methyl **pentan** **al**