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**Alcohols**

Alcohols are compounds that have a hydroxyl group (-OH) bonded to a carbon atom (but not a carbonyl C=O). Alcohols can be thought of as organic derivatives of water in which one of the hydrogens is replaced by an organic group: H-O-H versus R-O-H. Alcohols occur widely in nature and have many industrial and pharmaceutical applications. Ethanol is one of the simplest alcohols, finding use as a fuel additive, an industrial solvent, and key ingredient in many beverages (beer, wine etc).



Ethanol

**Naming Alcohols**

Alcohols are classified as primary (1°), secondary (2°), or tertiary (3°), depending on the number of organic groups bonded to the hydroxyl bearing carbon.



primary alcohol (1°) secondary alcohol (2°) tertiary alcohol (3°)

**Alcohol and Ether Nomenclature**



Alcohols are classified as primary (1°), secondary (2°), or tertiary (3°), depending on the number of organic groups bonded to the hydroxyl bearing carbon.

Simple alcohols are named using the IUPAC system as derivatives of the parent alkane, using the suffix *ol*:

1. Select the longest carbon chain containing the alcohol, and derive the parent name by replacing the -*e* ending of the corresponding alkane with –*ol­.*
2. Number the alkane chain, beginning at the end closest to the hydroxyl group.
3. Number the substituents according to their position on the chain.

For example:



methanol ethanol n-propanol 2-propanol

or ethyl alcohol

or grain alcohol

or methyl alcohol

or wood alcohol

or 1-propanol or isopropanol



butanol

1-butanol

n-butanol (n means normal or straight chain)

If there is more than 1 OH group:

2 OH’s diol (glycol)

3 OH’s triol

4 OH’s tetraol

5 OH’s pentaol

Some simple and widely occurring alcohols have common names that are accepted by IUPAC. For example:

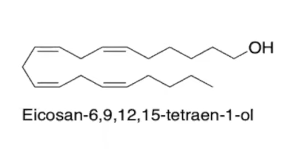


ethylene glycol glycerol or glycerine

or 1,2-ethanediol or 1,2,3-propanetriol

(antifreeze) or propane-1,2,3-triol

the freezing point is lower if mixed with water Glycerol is a precursor to fats (fatty acid esters in cell membranes)





phenol 4-hydroxyphenol quinone catechol

or p-hydroxyphenol

or hydroquinone

A more difficult example is the name of the sex pheromone from the silkworm moth shown below.



hexadeca-10Z,12Z-dien-1-ol

The longest chain is 16 carbons long, which is a hexadecane. The -*e* ending is dropped, and replaced with *–ol­* to become hexadecan-1-ol. There are two cis double bonds present at positions 10 and 12. This information allows the compound to be named a 10,12-diene. Putting the overall name together then gives hexadeca-10Z, 12Z-dien-1-ol.

This molecule was discovered by Adolf Butenandt in 1959.

The word pheromone comes from Greek pherein (to carry) and horman (excitement)