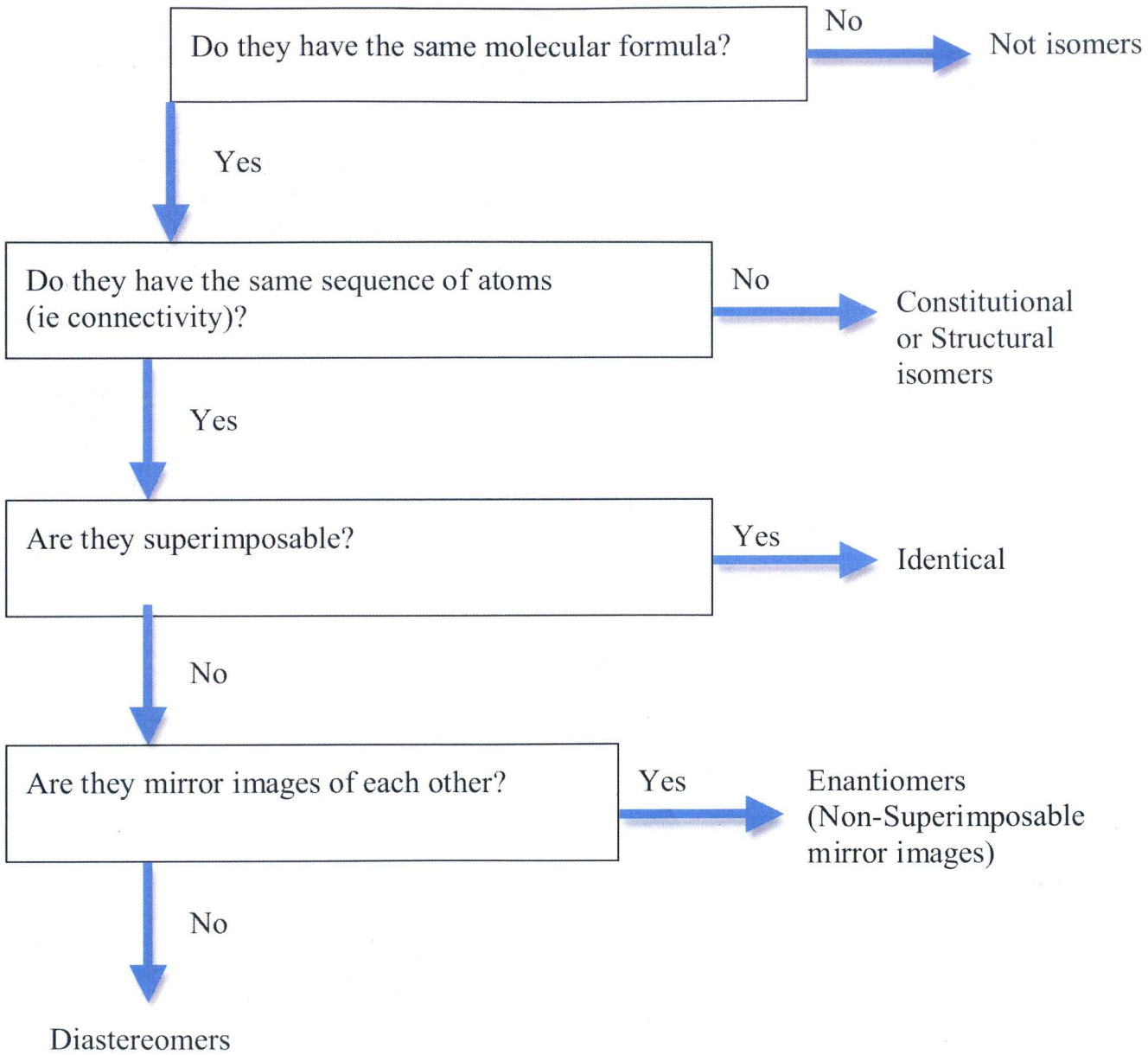
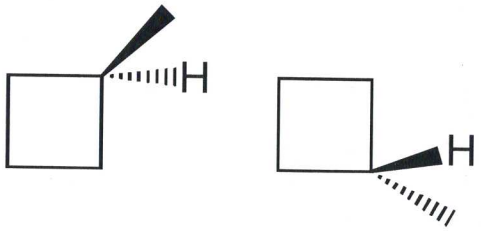
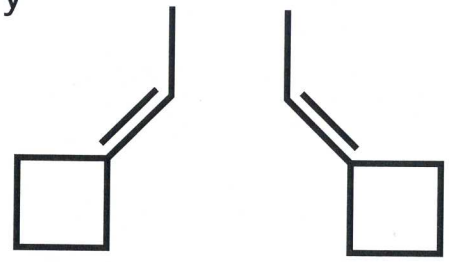
To compare the relationship of 2 structures:



compare the relationship of structures - examples



Identical
Achiral (not chiral)
No stereogenic centres
Plane of symmetry



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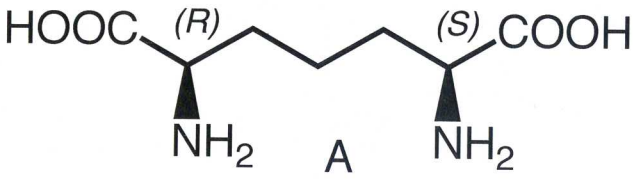
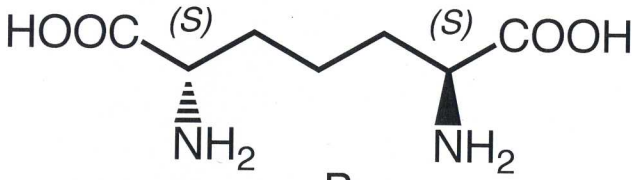
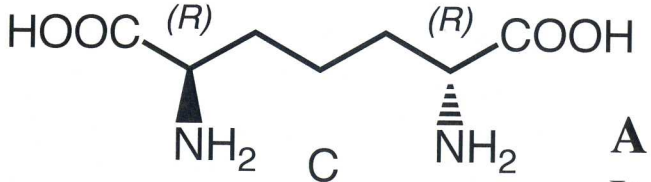


A



B



C

A is achiral, there is a plane of symmetry in molecule. It does have stereogenic centres, but overall is achiral and it is a meso compound.

B and **C** are chiral and are enantiomers of each other

R/S Nomenclature of Stereogenic Centres - Review

a stereocentre is described as being R, from Latin *rectus* (or right-handed),
or S, from the latin *sinister* (or left-handed),

Each group attached to the stereocentre is assigned a priority,
higher the atomic number, the higher the priority

for isotopes of the same atom, the one with the higher atomic weight takes priority

If two identical atoms are attached to the stereocentre,
the next atoms in both chains are examined until a difference is found

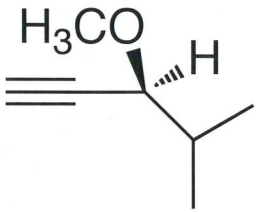
A double/triple bond is counted as two/three single bonds for both atoms

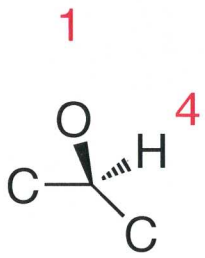
After priorities have been assigned,
the molecule is viewed with the lowest priority away from the viewer
clockwise = R counterclockwise = S
if smallest group is toward you, opposite result is obtained

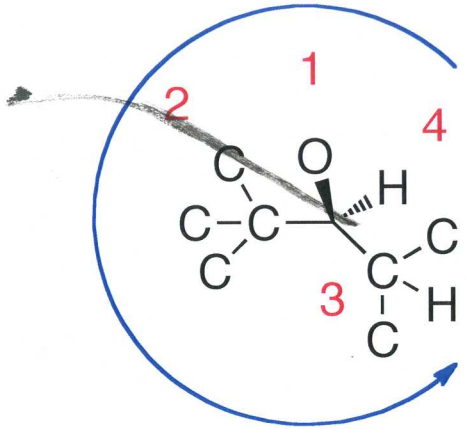
To draw an enantiomer - invert all stereogenic centres

To draw a diastereomer - invert some but not all stereogenic centres

R/S Nomenclature of Stereogenic Centres - Review Example



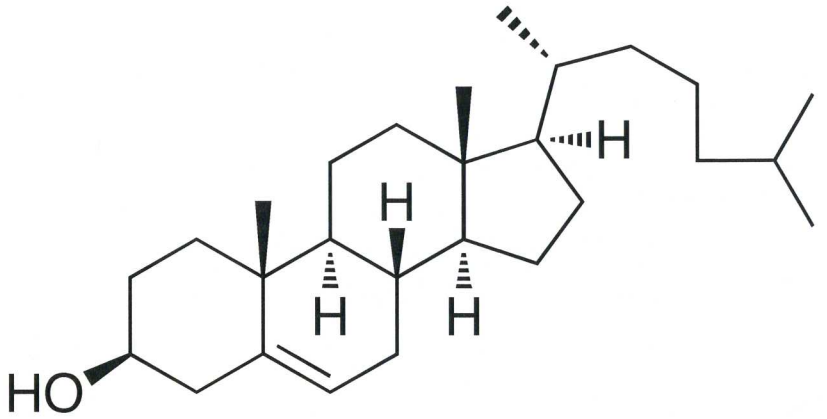




S

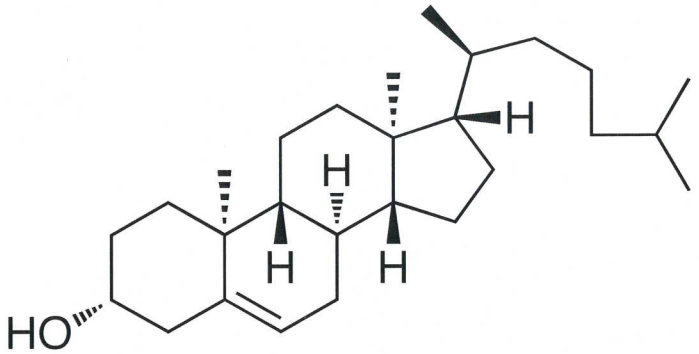
3-methoxy-4-methyl-1-pentyne

R/S Nomenclature of Stereogenic Centres - Example



Cholesterol is a steroid

Steroid skeleton

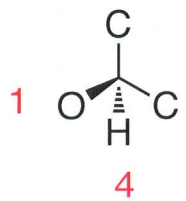


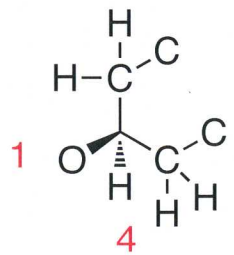
carbon centre bearing alcohol is S

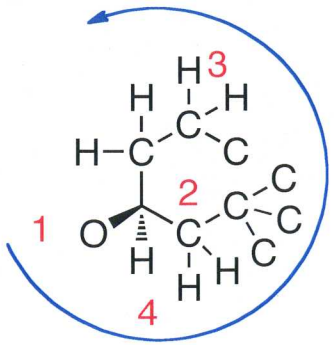
the enantiomer of cholesterol

It has 8 stereogenic centres

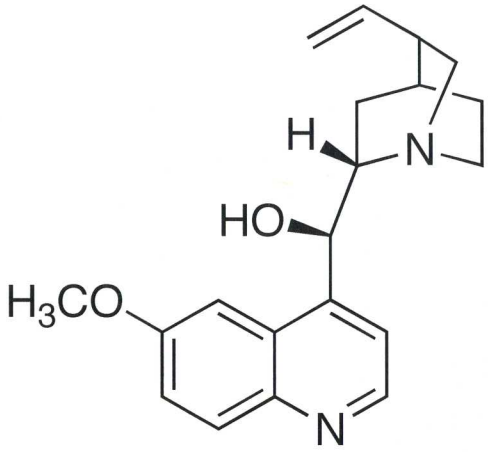
are $2^8 = 256$ stereoisomers, 1 is cholesterol,
1 is the enantiomer,
and the other 254 are diastereomers







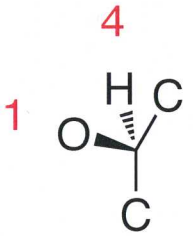
R/S Nomenclature of Stereogenic Centres - Example

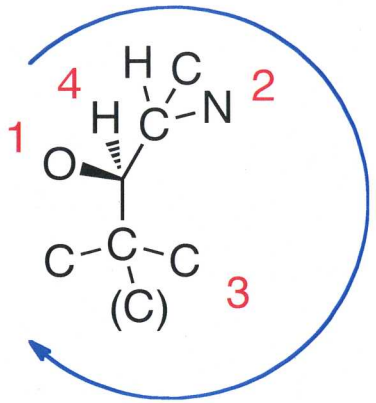


Quinine is an anti-malarial compound from *Cinchona officinalis*

It has 5 stereogenic centres because N cannot invert

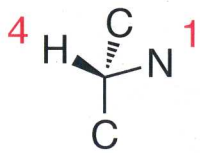
carbon centre bearing alcohol is R

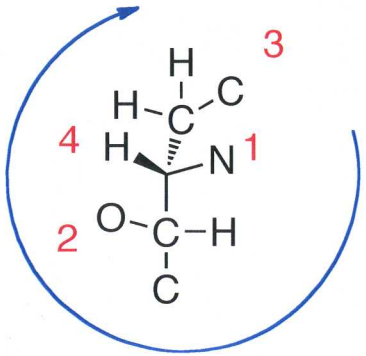




are $2^5 = 32$ stereoisomers, 1 is quinine,
1 is the enantiomer,
and the other 30 are diastereomers

carbon centre bearing single bonded N is S





clockwise but smallest group toward you