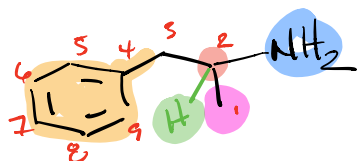


Chapter 5 Stereochemistry

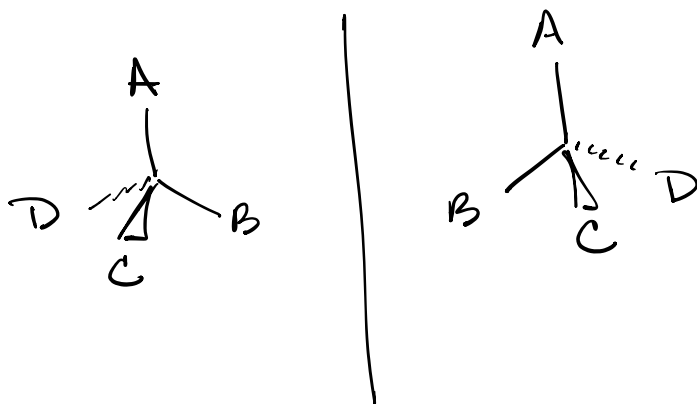
Designation of Configuration



Stereogenic centers?

yes, #2 is stereogenic

Designation of Configuration



Mirror images

Enantiomers

2 Configurations possible

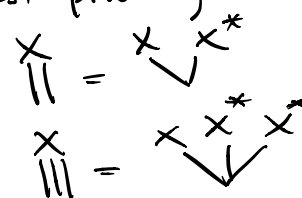
Clockwise = R

Counterclockwise = S

Use Cahn-Ingold-Prelog w/ Newman

Cahn-Ingold-Prelog

- Highest atomic mass at 1 point of difference
- Lone pairs e^- have lowest priority
- double & triple bonds

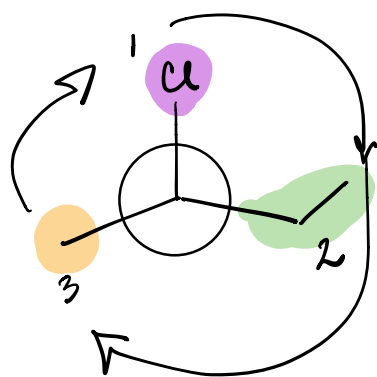


Rank groups 1 \rightarrow 4

* Highest priority group gets #1



\Rightarrow Newman projection w/ lowest group back
 \Rightarrow Look down stereogenic carbon to lowest group.

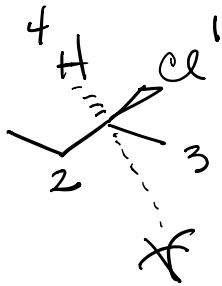


Clockwise orientation of groups in Newman
 \Rightarrow R Configuration

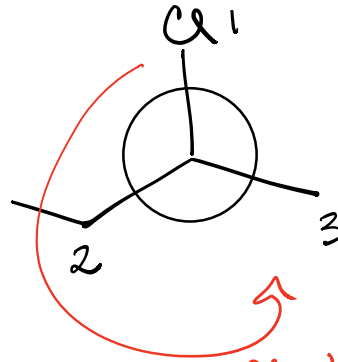


(R)-2-Chlorobutane

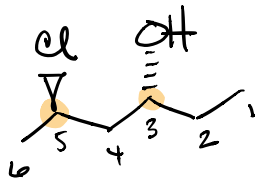
\curvearrowright stereochemical Configuration



(S) 2-Chlorobutane

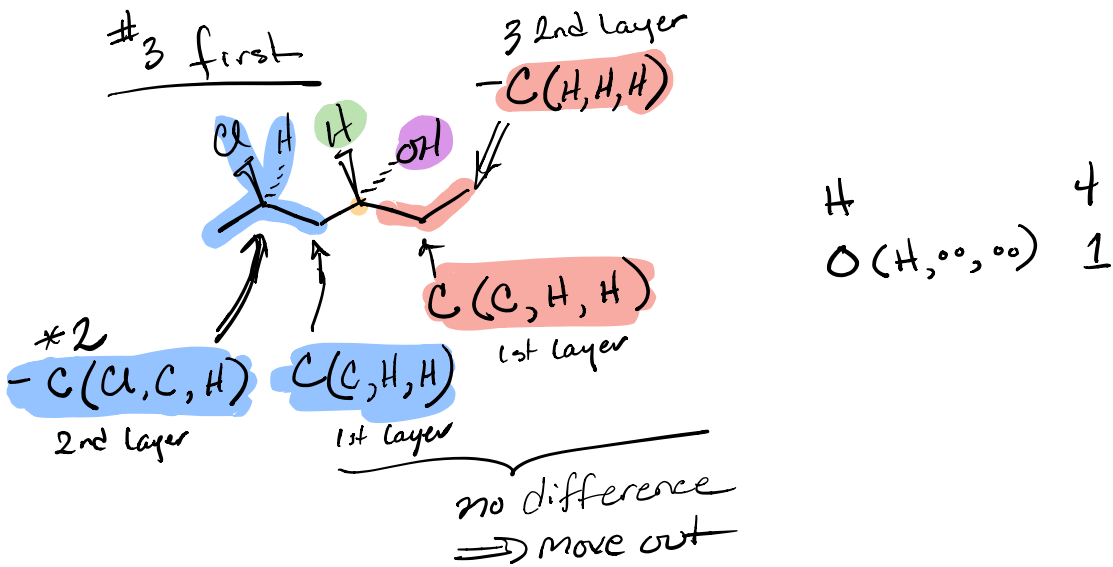


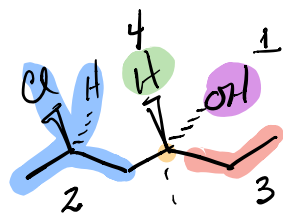
Counter Clockwise
 \Rightarrow S Configuration



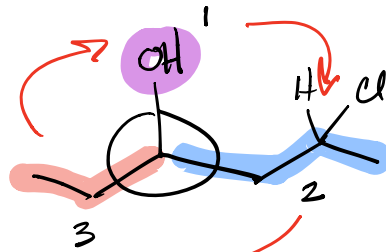
3-ol
 5-chloro
 hexane

5-chlorohexan-3-ol





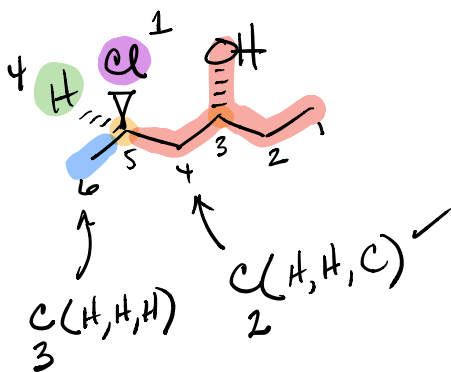
look down from
Behind the C-H
bond



Clockwise
⇒ R

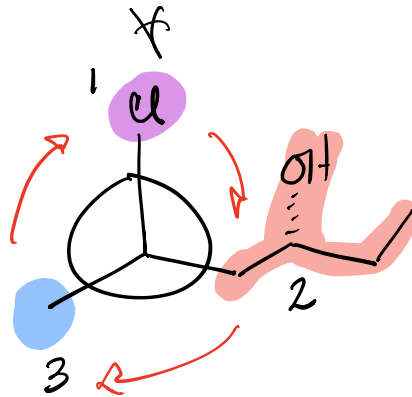
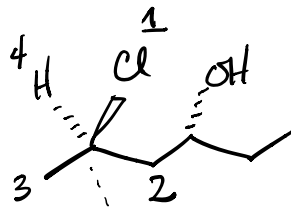
#3 is R

Now Assess #5 Carbon

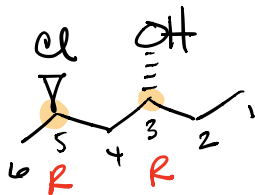


C(H,H,H)
3

C(H,H,C)
2



Clockwise ⇒ R

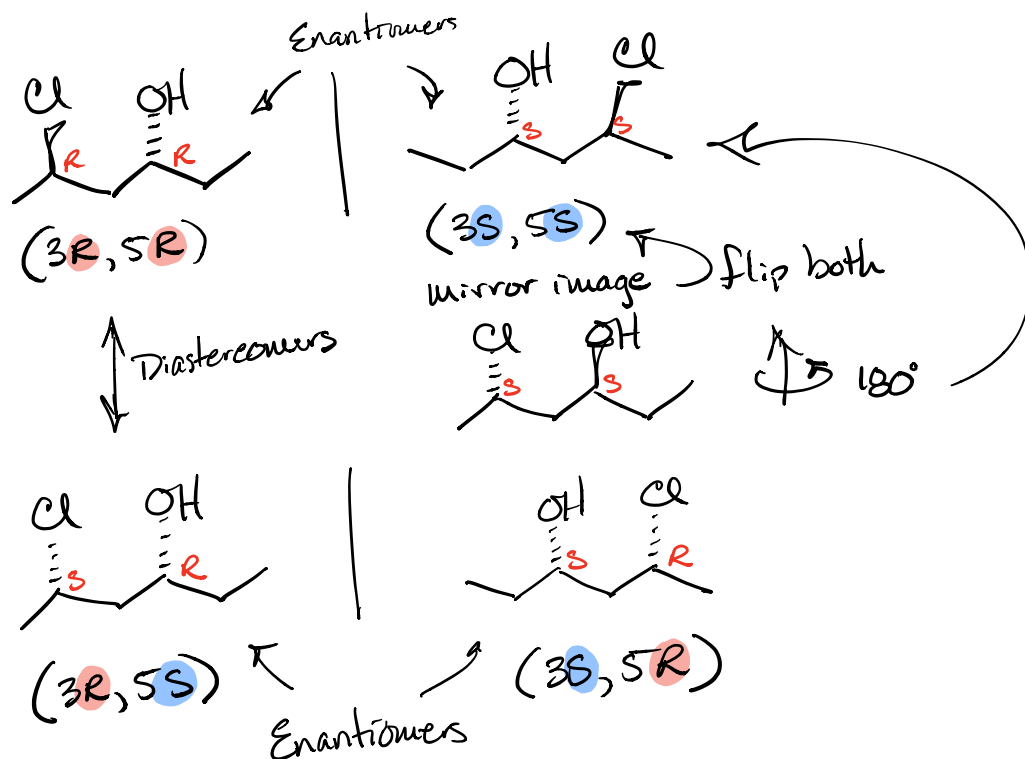
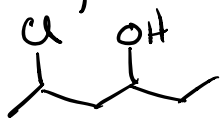


(3R, 5R)

3-ol
5-chloro

(3R, 5R)-5-Chlorohexan-3-ol

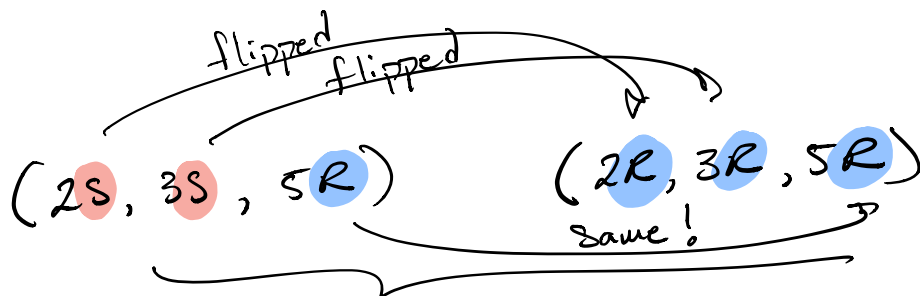
How many molecules are represented
(How many stereoisomers) by the formula?



⇒ 4 Stereoisomers

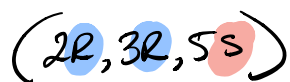
2^n ← $n = \#$ of stereocenters

stereocenters	Max isomers
$n = 1$	2
$n = 2$	4
$n = 3$	8

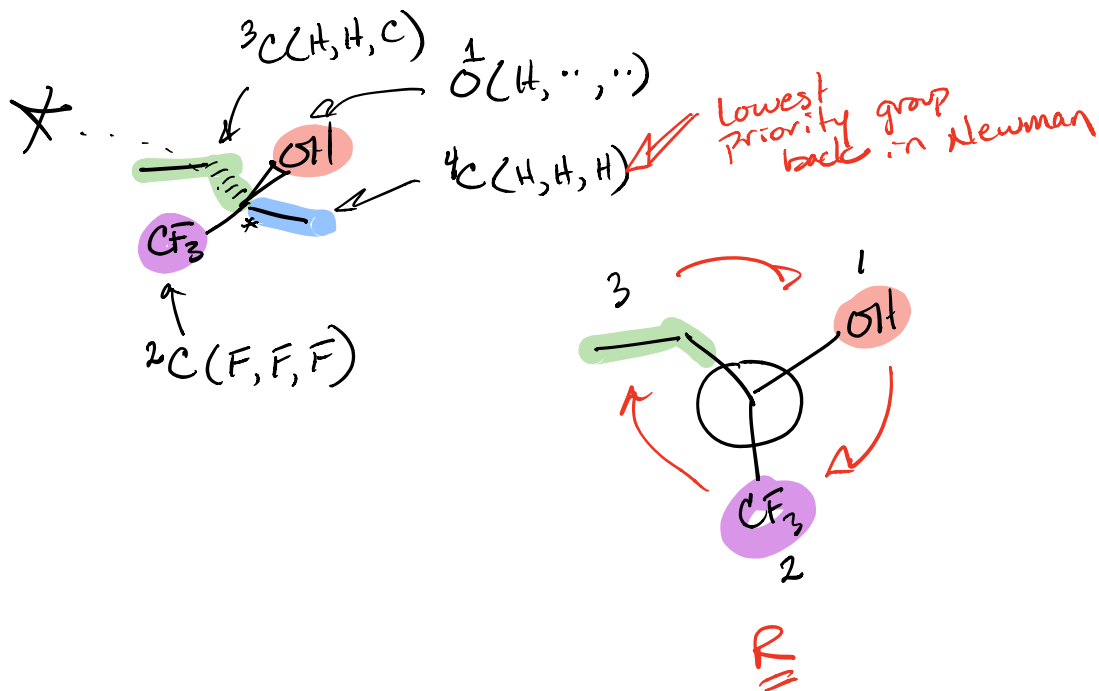


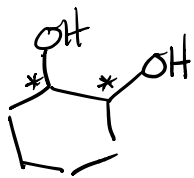
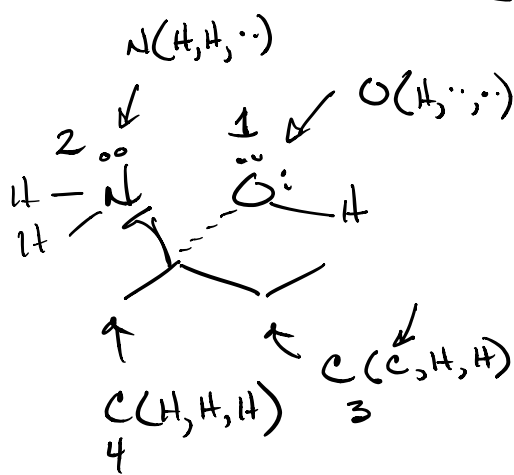
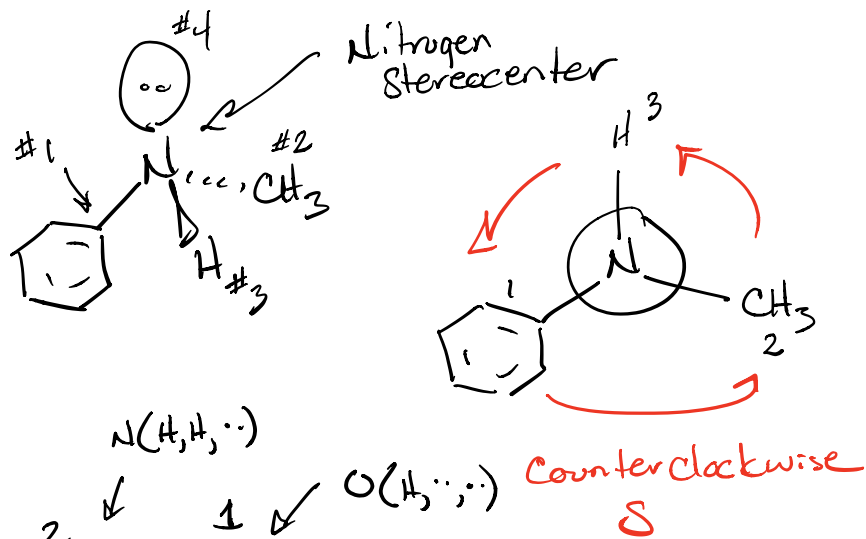
What is the relationship?

Enantiomers or Diastereomers?



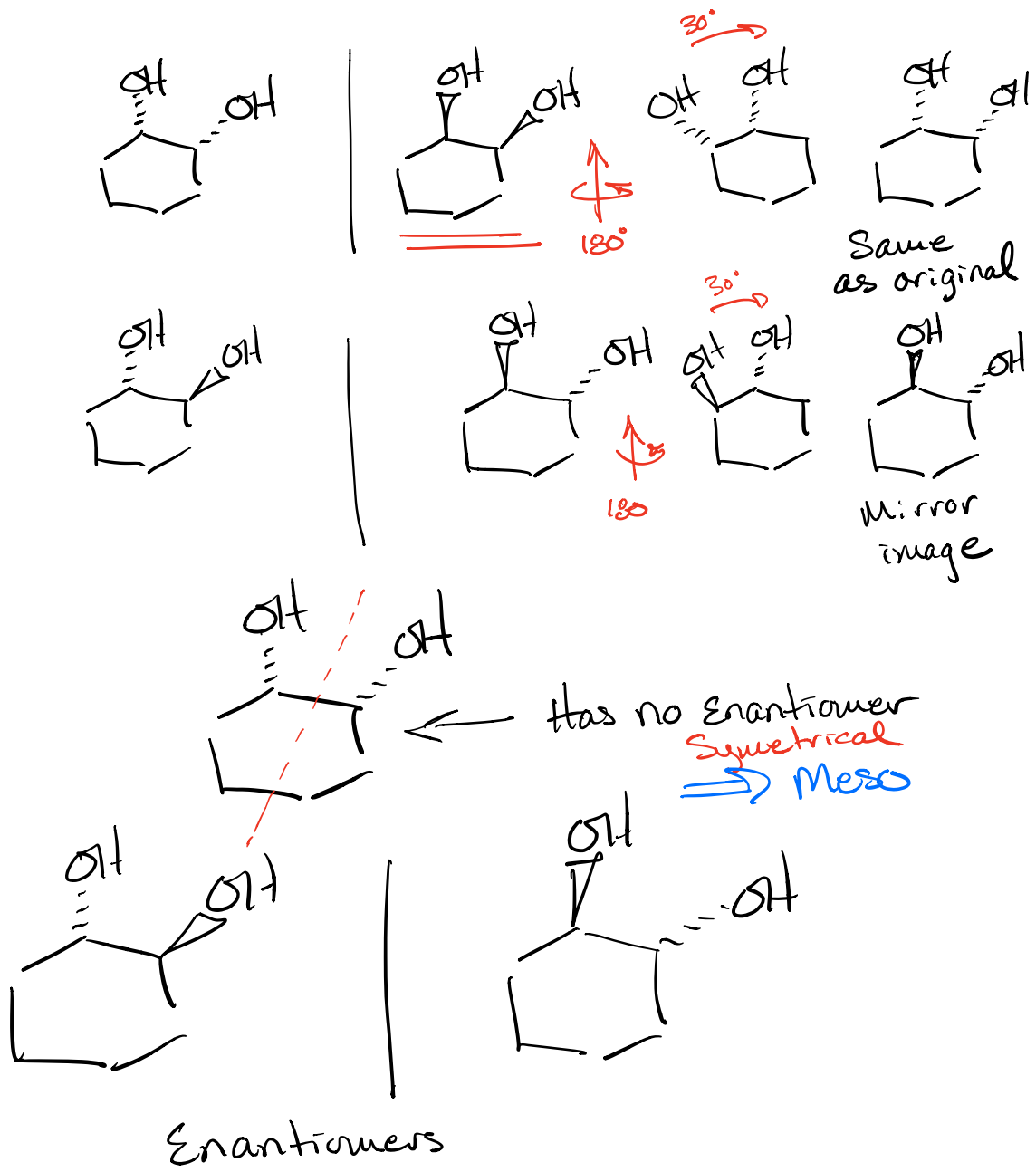
What if there is no hydrogen on the stereocenter?



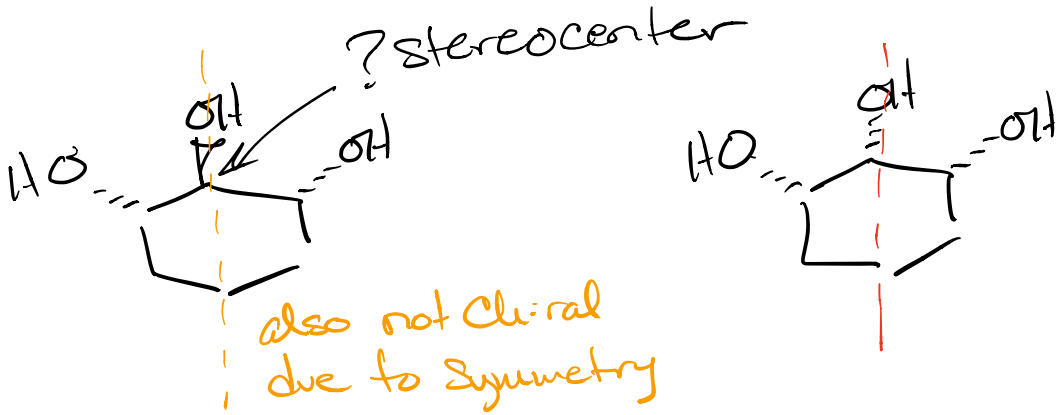
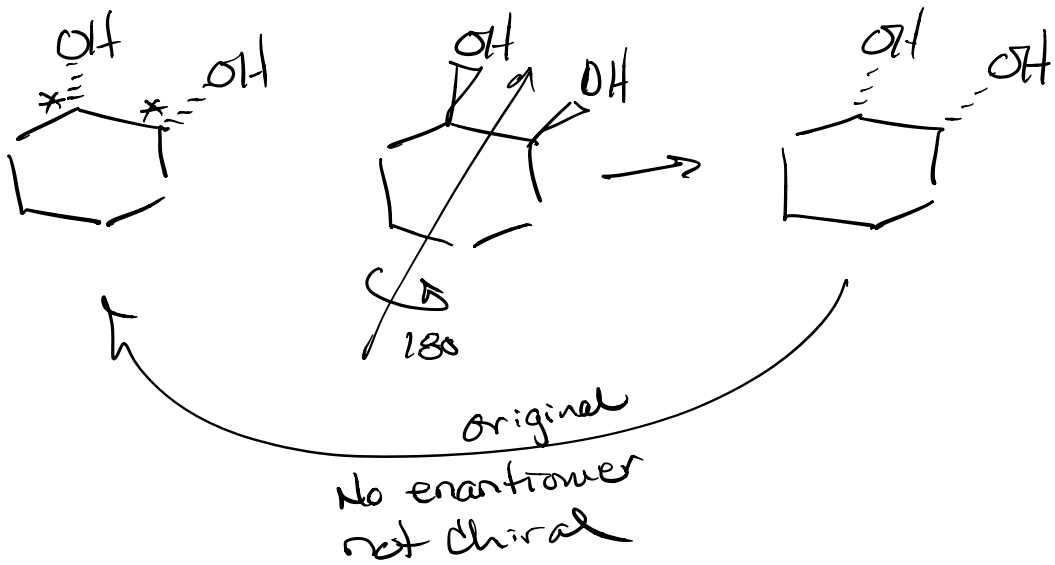


How many stereoisomers possible?

$$2^n = 2^2 = 4 \text{ stereoisomers}$$



Meso → a molecule that is not Chiral
 does not rotate plane polarized
 light due to a plane of
 Symetry in the molecule.



Meso
achiral

2^n isomers | $n = \# \text{ of stereocenters}$
 \Rightarrow maximum $\&$
 the number may
 be less due
 to symmetry \Rightarrow Meso

