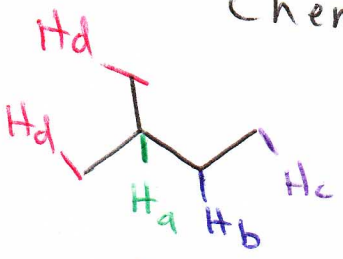
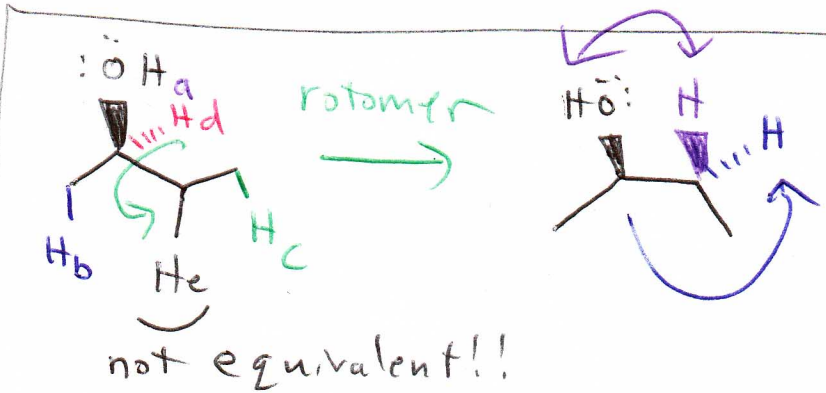
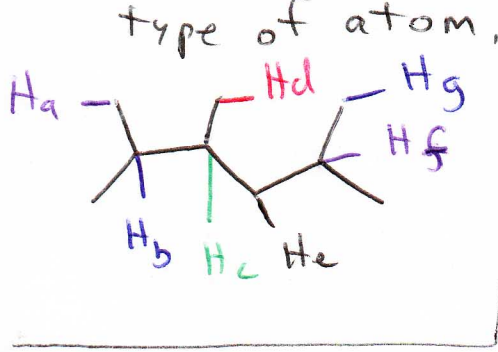


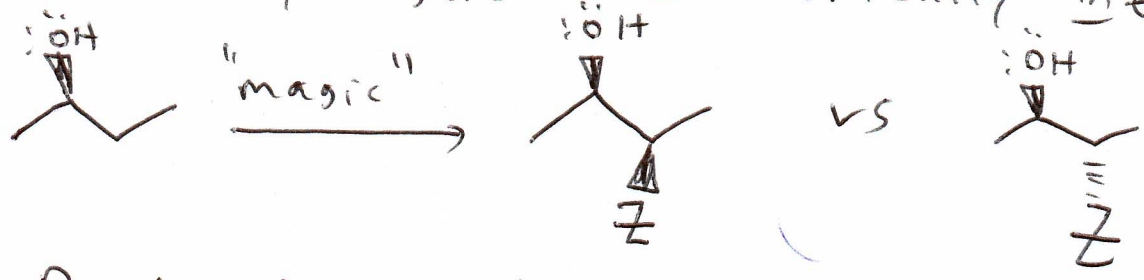
11/9/11 Chemical equivalency



If the chemical environment around two atoms is identical - meaning that the neighbors for both atoms are identical across the whole molecule - the atoms are chemically equivalent. A unique NMR signal is generated for each unique (chemically inequivalent) type of atom.



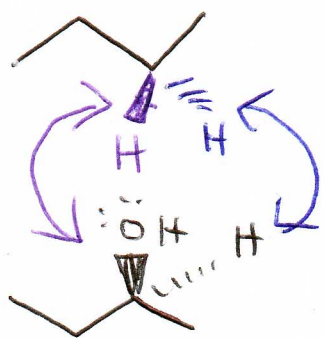
The interactions between the two indicated hydrogens are different, since the two hydrogens are different distances from the OH group. ∴ The hydrogens are chemically inequivalent.



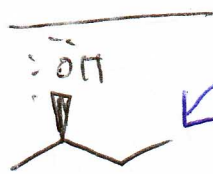
Diastereotopic - If, by replacing one hydrogen versus another, a pair of diastereomers are formed, the hydrogens are called diastereotopic. Diastereotopic protons are always chemically inequivalent.



If, by replacing one hydrogen versus another, a pair of enantiomers are formed, the hydrogens are called, enantiotopic.

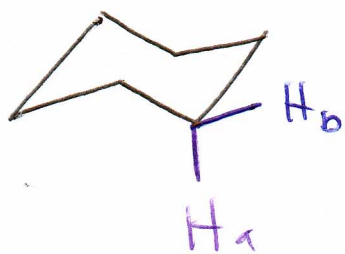


Enantiotopic protons are chemically equivalent in achiral environments and chemically inequivalent in chiral environments.

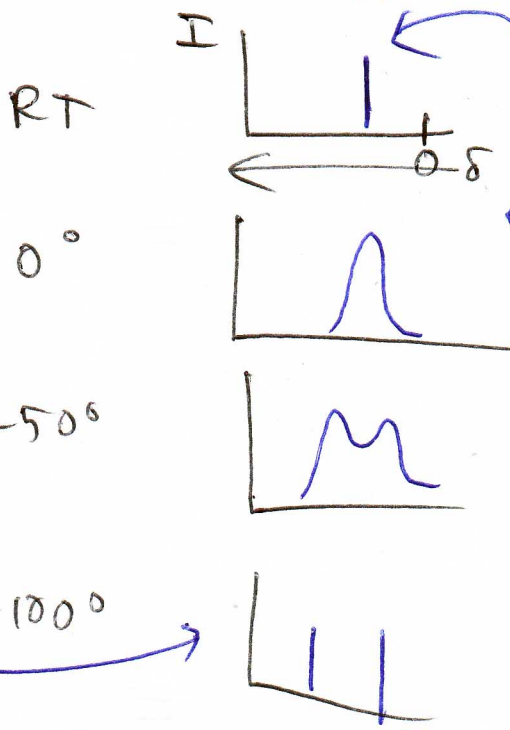


No matter which of the hydrogens at the end of this molecule are replaced, the exact same product would result (no stereocenter is form). Therefore the three hydrogens at that position are entire equivalent \rightarrow homotopic

Homotopic protons are always equivalent.



Far below RT, the ring no longer can flip, so the two types of hydrogens can be distinguished.



@RT, ring flips are occurring rapidly enough that the two types of hydrogens cannot be distinguished, so only one averaged signal results.