Organic Nomenclature: Part Two

Cycloalkanes and the Phenyl Group

Common Cycloalkanes

cyclopropane  cyclobutane  cyclopentane  cyclohexane

Monosubstituted Cycloalkanes
- Only one substituent
- No number is required in the name

- CH₂

- methylcyclopentane

- OCH₂CH₂

- ethoxycyclohexane

Disubstituted Cycloalkanes
- Two substituents on the ring
- Must be numbered
- The substituent which comes first alphabetically is assigned to carbon 1
- Number in the direction which gets you to the next carbon in as few steps as possible
Disubstituted Cycloalkanes

Cycloalkanes with Three or More Substituents

- Number so that you get the lowest possible numbers on the ring
  - Generally, this means that the second substituent you encounter should have the lowest possible number
  - If numbering either way gives the same number for the second substituent, continue to the next substituent as a tie-breaker
  - If you get the same numbering scheme regardless of how you number, then number so that the group which comes first alphabetically gets the lowest possible number

Cycloalkanes with Three or More Substituents

Cycloalkanes as Substituents

- When a cycloalkane is attached to a carbon chain, we must determine which is the substituent, and which is the parent
  - The parent is the one which contains more carbon atoms (in the chain itself or the ring, not including substituents)
Cycloalkanes as Substituents

sec-butylcyclopentane

3-cyclopropylhexane

The Phenyl Group

- When a benzene ring is attached to a hydrocarbon chain, it may be named as a phenyl group.
- This term is used when:
  - The chain contains additional substituents in addition to the benzene ring, or
  - A named functional group appears on the chain.
- Naming of other compounds containing benzene will be addressed in a later lecture.

The Phenyl Group

4-chloro-3-phenylheptane

1,1,1-triphenylethane

alternatively, may be written as (Ph)\textsubscript{3}C-CH\textsubscript{3}

Practice

Name each compound below.

- 4-chloro-3-phenylheptane
- 1,1,1-triphenylethane
- alternatively, may be written as (Ph)\textsubscript{3}C-CH\textsubscript{3}
- [Additional practice compounds with structures]
Practice—Solutions

1-bromo-3-methylcyclopentane

1,2-dibromo-4-ethyl-cycloheptane

5-cyclobutyl-1-nitro-6-phenyloctane

bromocyclodecane