Organic chemistry is the study of carbon compounds. Biochemistry (and Biology!) is the study of carbon compounds that crawl.

-Mike Adams

Biology 190
Chapter 4

Class notes

I. Overview: Carbon—The Backbone of Biological Molecules

• All living organisms
II. Organic chemistry- The study of carbon-based compounds

• Organic molecules -

III. Carbon atoms can form diverse molecules.

• Carbon-based molecules come in a wide variety of lengths and shapes
III. Carbon atoms can form diverse molecules.

- Carbon has four valence electrons and can form 4 covalent bonds.
- Can covalently bond with many other elements.

Question 4.2

- Hydrocarbons = molecules that contain ONLY carbon and hydrogen
- 
-
IV. Hydrocarbons

V. Functional Groups

- No functional group (-H); hydrocarbon

1. Hydroxyl group (-OH); alcohols
V. Functional Groups

2. Carbonyl group (\(\text{C}=\text{O}\)); 2 types

2a.  

\[
\text{H} - \text{C} - \text{O} - \text{H}
\]

2b.  

\[
\text{H} - \text{C} - \text{C} - \text{H}
\]

V. Functional Groups

3. Carboxyl group (\(\text{C}=\text{O}\)); carboxylic acid

\[
\text{H} - \text{C} - \text{C} - \text{O} - \text{H}
\]

V. Functional Groups

4. Amino group (\(\text{N}+\)); amines

\[
\text{R} - \text{N} - \text{H} \rightleftharpoons \text{R} - \text{N} - \text{H}^+ \quad \text{(amines)}
\]
V. Functional Groups

5. Sulfhydryl group; thiols

\[ \text{R} - S - \text{H} \]

6. Phosphate group

\[ \text{R} - \text{O} - \text{P} - \text{O}^- \]

VI. Functional groups can influence the function of sex hormones.

- Male = testosterone
- Female = estrogens (e.g. estradiol)

Question 4.3