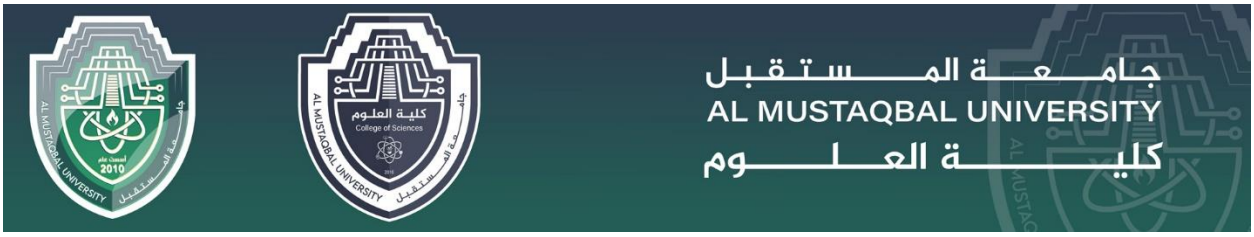


Organic Chemistry

1st stage

Asst. Lect.Zahraa Hazim Hamid

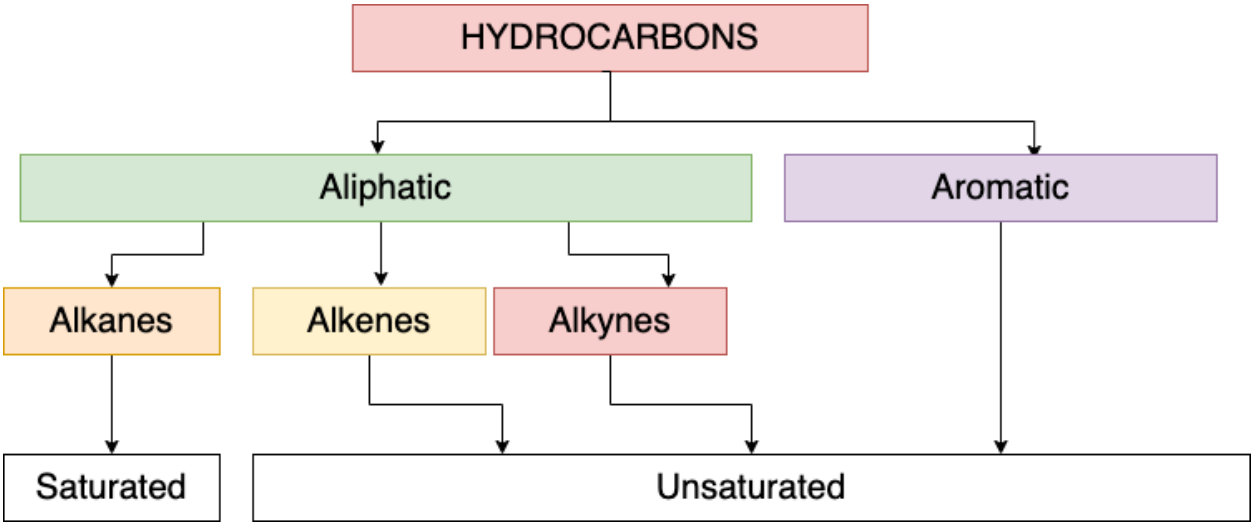
Lecture 4: Hydrocarbons (alkane)

Department of Medical Biotechnology

2024-2025

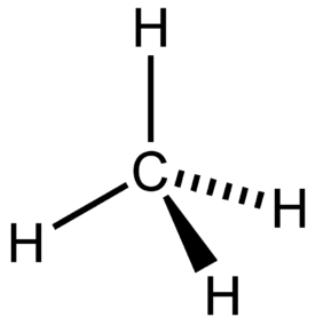
1.1 Hydrocarbons

A **hydrocarbon** is a compound composed of only carbon and hydrogen. Figure 1 shows the four classes of hydrocarbons.



1.1.1 Alkanes

Alkanes are the simplest type of organic compounds and member of a larger class of organic compounds called saturated hydrocarbons that contains only carbon–carbon single bonds. Alkanes have the general molecular formula C_nH_{2n+2}.



The simplest alkane is methane which is CH_4. Alkane molecules have a tetrahedral shape around carbon atoms. Carbon atoms in alkane molecules form sigma bonds with surrounding carbon and hydrogen atoms. As a result, carbon atoms in alkanes are surrounded by 4 pairs of bonding electrons which equally repel each other to form 109.5o bond angles.

1.1.2 Nomenclature of Alkanes

قواعد تسمية الألكانات (Alkanes Naming Rules)

IUPAC NAME

1- Choose the longest continuous chain of carbon atoms.

اختيار اطول سلسلة ممكنة من ذرات الكاربون

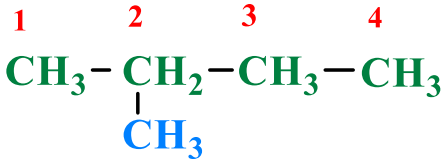
2- Number the chain starting from the end closest to a branch to give the branches the lowest possible numbers.

الترقيم من الجهة الأقرب للتفرع بحيث يكون للتفرع اقل الأرقام الممكنة

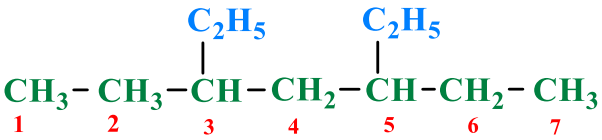
3- Use the prefixes di-, tri-, or tetra- if there are identical branches in the compound.

Molecular Formula	Structural formula	Name
CH_4	CH_4	Methane
C_2H_6	$CH3 – CH_3$	Ethane
C_3H_8	$CH3 – CH_2–CH3$	Propane
C_4H_{10}	$CH3 – CH_2–CH2–CH_3$	Butane
C_5H_{12}	$CH3 – CH_2–CH2–CH_2–CH_3$	Pentane
C_6H_{14}	$CH3 – CH_2–CH2–CH_2–CH_2–CH_3$	Hexane
C_7H_{16}	$CH3 – CH_2–CH2–CH_2–CH_2–CH_2–CH_3$	Heptane
C_8H_{18}	$CH3 – CH_2–CH2–CH_2–CH_2–CH_2–CH_2–CH_3$	octane

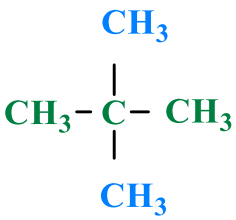
Examples



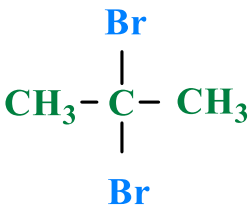
2-methyl butane



3,5 di ethyl heptane



2,2 dimethyl propane



2,2 dibromo propane

Q/ whish is correct