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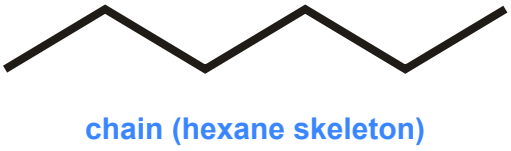
Organic Chemistry: Chapter Introduction

1. What is organic chemistry?

Organic chemistry is the chemistry of **carbon compounds**. They usually contain hydrogen, and often oxygen, nitrogen, sulphur or halogens. Medicines (paracetamol, $C_8H_9NO_2$), plastics, cotton (cellulose) and DNA are all carbon compounds. There are millions of them, so they have a whole branch of chemistry of their own.

2. Why does carbon form so many compounds?

Tetravalency: a carbon atom forms **4 covalent bonds**. In methane, CH_4, the four bonds point to the corners of a tetrahedron (bond angle 109.5°).
Catenation: carbon atoms bond to other carbon atoms to form long **chains**, branched chains and **rings**. C–C bonds are strong, so these skeletons are stable.



chain (hexane skeleton)



3. What this chapter covers

Part	What you learn
Draw & name	Shapes (sp^3, sp^2, sp), structural formulas (complete, condensed, bond-line), functional groups, homologous series, IUPAC names, isomerism
Electrons move	Bond fission, carbocations, carbanions, free radicals, electrophiles and nucleophiles, curved arrows, inductive and resonance effects, hyperconjugation
Purify & analyse	Crystallisation, distillation, extraction, chromatography; Lassaigne's test; estimating C, H, N and other elements

Solved example

Q. How many C–C and C–H bonds are there in propane, $CH_3CH_2CH_3$?
A. Three carbons in a chain give **2 C–C bonds**. Each carbon must have 4 bonds: the end carbons have 3 H each and the middle one has 2 H, so **8 C–H bonds**. Check: total bonds at carbon = 3×4 = 12 = 8 + 2×2.

Practice questions

1. (MCQ) The property of carbon to link with other carbon atoms is: (a) isomerism (b) catenation (c) resonance (d) hydration
2. (Very short) How many covalent bonds does a carbon atom form?
3. (Very short) What is the shape of methane?
4. (Short) Give two reasons why carbon forms millions of compounds.
5. (Numerical) How many C–H bonds are there in ethane, C_2H_6?
6. (Short) Name one everyday substance from each: a medicine, a polymer, a biomolecule, all containing carbon.

Answer key

1. (b).
2. Four.
3. Tetrahedral.
4. Tetravalency (4 bonds) and catenation (chains and rings with strong C–C bonds).
5. 6.
6. For example paracetamol, polythene, DNA.

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