Overview

DNA is composed of four deoxyribonucleotides which are **combined through 3′ to 5′ phosphodiester bonds** to polymerize into a long chain.

Deoxyribonucleotide is formed by a combination of **base + deoxyribose + phosphate**.

Deoxyribose and phosphodiester bonds are the same in all repeating nucleotides.

Base sequence is important. The genetic information is coded in a specific sequence i.e. if the bases are altered then so is the genetic information being expressed.

Base sequence is written from the 5′ end to the 3′ end.

Four deoxyribonucleotides

DNT	Symbol	Nucleoside
Deoxyadenylate (deoxyadenosine 5′-monophosphate)	A, dA, dAMP	Deoxyadenosine
Deoxyguanylate (deoxyguanosine 5′-monophosphate)	G, dG, dGMP	Deoxyguanosine
Deoxythymidylate (deoxythymidine 5′-monophosphate)	T, dT, dTMP	Deoxythymidine
Deoxycytidylate (deoxycytidine 5′-monophosphate)	C, dC, dCMP	Deoxycytidine

Salient features of the Watson-Crick Model

1. **Right-handed double helix**: consists of two polydeoxyribonucleotide chain twisted around one corner in a right handed double helix.

2. Two strands are always **complementary** to each other.

3. DNA strands are **held together mainly by hydrogen bonds** between the purines and the pyrimidines.

4. **Antiparallel**: one stand runs 5′ to 3′ while the other runs 3′ to 5′.

5. Each strand of DNA has a **hydrophilic deoxyribose phosphate backbone** (3′ to 5′ phosphodiester bond) on the periphery while the **hydrophobic bases are stacked inside**.

6. Diameter of double helix: **2 nm length**

7. Each turn/pitch of the helix is **3.4 nm with 10 pairs of nucleotides**, each pair placed at a distance ~0.34 nm.

8. **Genetic information resides on one of the strands** (which is the template stand). The opposite of which is the **antisense strand**.

9. Double helix has **major grooves (1.2 nm) and minor grooves (0.6 nm) along the backbone**.

Denaturation of DNA strands

Melting Temperature (Tm): temperature when half of the helical structure is denatured.

Annealing: reassociation of melted strands at lower temperature.