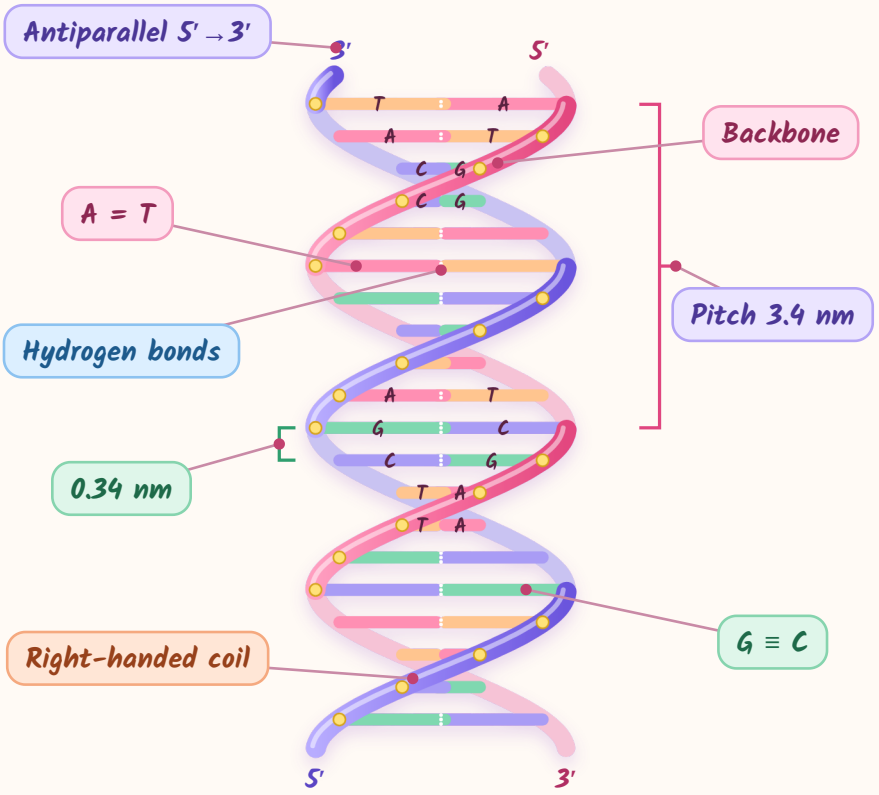
DNA Double Helix

Watson–Crick model · base pairing · 3.4 nm · 0.34 nm



Original drawing by SLH · based on NCERT Fig 5.3

Key points ✍️

- **DNA** — a long polymer of deoxyribonucleotides.
- **Nucleotide** — nitrogenous base + pentose sugar (deoxyribose in DNA) + phosphate group.
- **Purines** = adenine, guanine; **Pyrimidines** = cytosine, thymine (uracil in RNA in place of thymine).
- **Double helix model** — given by Watson and Crick (1953), based on X-ray diffraction data of Maurice Wilkins and Rosalind Franklin.
- **Chargaff's rule** — in double-stranded DNA, A : T and G : C ratios are constant and equal to one.
- **Backbone** — sugar–phosphate; the bases project inside.
- **Antiparallel** — one chain 5′ → 3′, the other 3′ → 5′.
- **Base pairing** — A = T (two H-bonds), G ≡ C (three H-bonds).
- **Purine opposite pyrimidine** — keeps the distance between the two strands almost uniform.
- **Right-handed coil** — pitch 3.4 nm, roughly 10 bp in each turn.
- **0.34 nm** — approximate distance between two consecutive base pairs.

- **Stacking** — base pair planes stack one over the other; with H-bonds this gives the helix stability.
- **Complementary strands** — if one strand's base sequence is known, the other can be predicted.
- **Length** — a typical mammalian cell: 6.6×10^{9} bp $\times$ 0.34×10^{-9} m/bp $\approx$ **2.2 metres** of DNA.

💡 Remember

"Pure As Gold" → **Pur**ines = **A**denine, **G**uanine.

AT = 2, GC = 3 H-bonds · **3.4 nm ÷ 10 = 0.34 nm** per bp

Source: NCERT Biology Class 12, Ch 5 Molecular Basis of Inheritance (Fig 5.3 DNA double helix).
Notes and drawing: original work by Simple Learning Hub.