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HEREDITY MOLECULE
DNA – structure

Modul no. 1: Animal Genetics

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Deoxyribonucleid acid - DNA

- A DNA is a macromolecule composed of two polynucleotide chains.
- These molecules carrying genetic information are localized in the cell nuclei of organisms.
- The nuclear DNA of an individual is universal to every cell of its organism.

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Nucleotide

NITROGENOUS BASE – *purine* → adenine A
→ guanine G

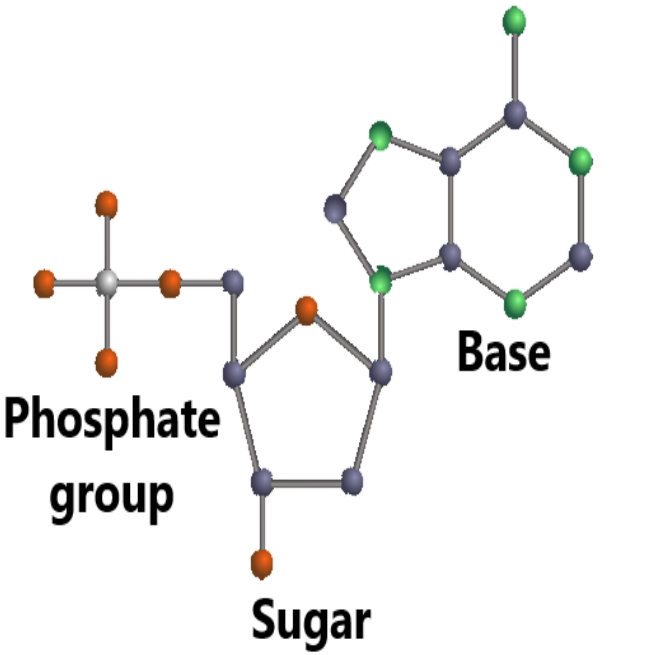
β-N-glycosyl bond

– *pyrimidine* → cytosine C
→ thymine T

PENTHOSE SUGAR – *2-deoxyribose*

phosphodiester bond

PHOSPHATE GROUP



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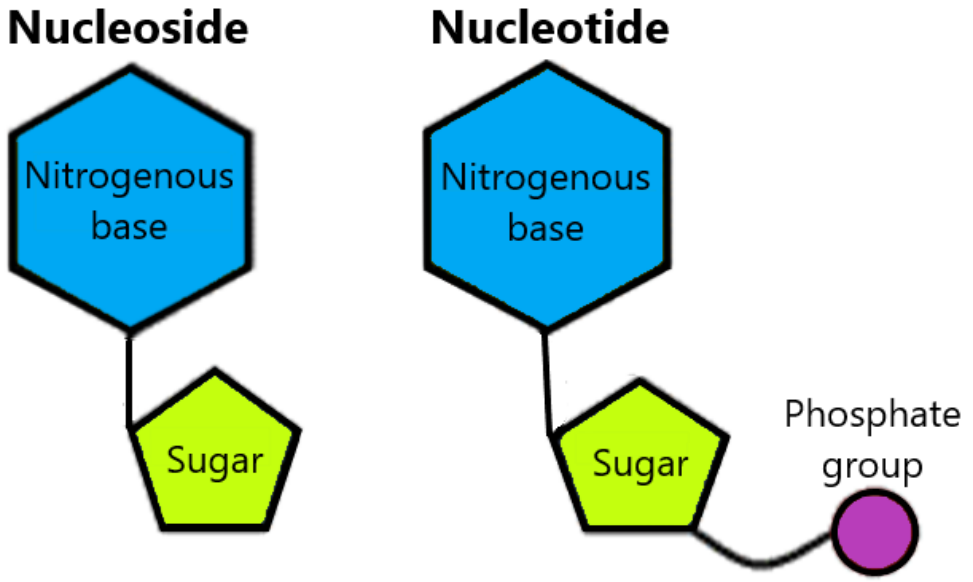
Nucleoside

Nucleosides are glycosylamines made by attaching a nitrogenous base to a ribose or deoxyribose (pentose - sugar) ring.



Difference between nucleotide and nucleoside

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DNA - important facts

- DNA is **double-stranded** - consists of two single-stranded polynucleotide chains that are held together by **hydrogen bonds**

- The nucleotide building blocks of DNA always match up in a **complementary** fashion

$A = T$ and $C \equiv G$.

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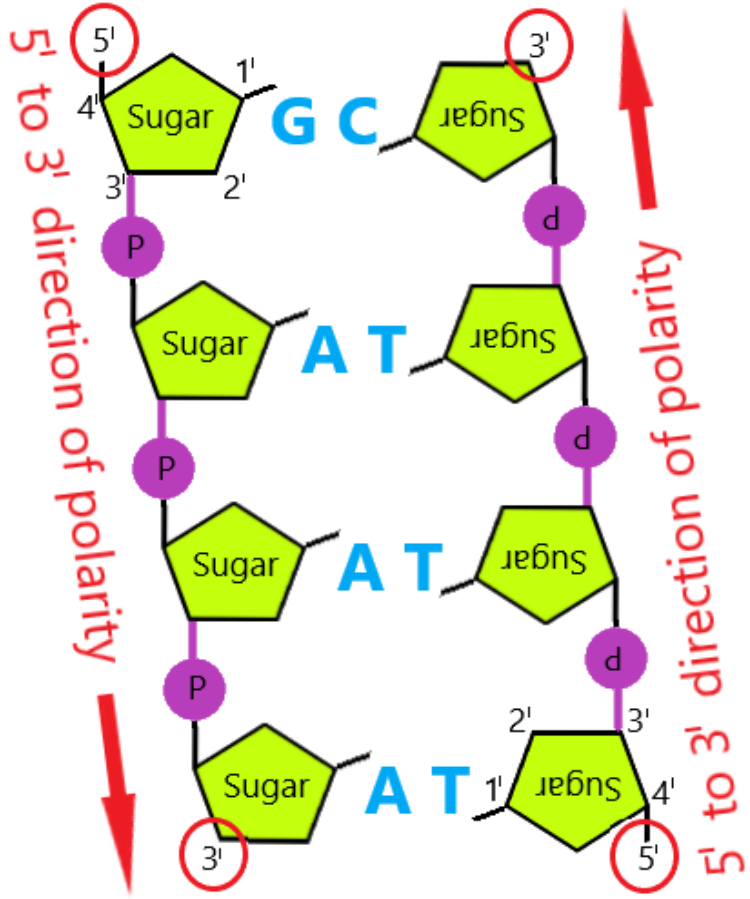
DNA - important facts

- DNA strands run **antiparallel** to each other - the two strands of DNA have opposite chemical polarity.



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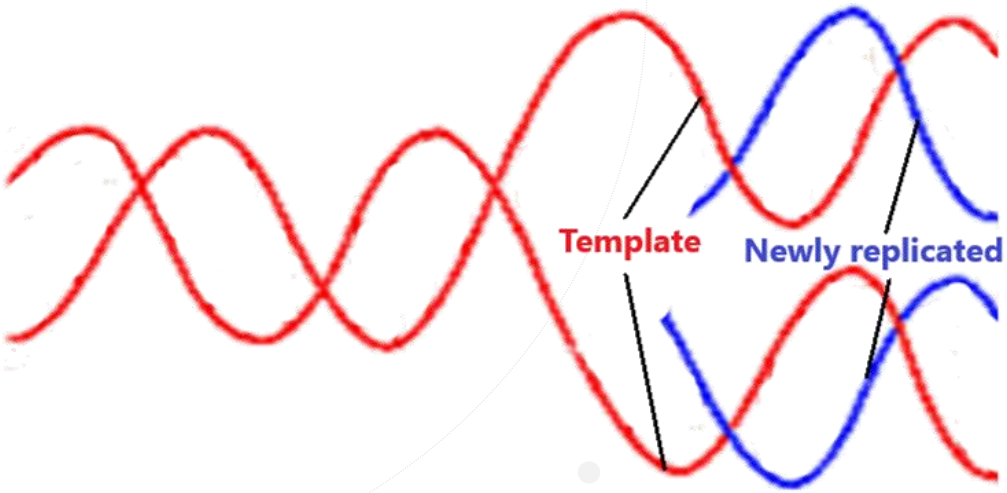
DNA - important facts

- Mechanism of DNA replication is **semiconservative.** The result of replication is two complete, double-stranded molecules, each composed of „**old**“ and „**new**“ strand of DNA.



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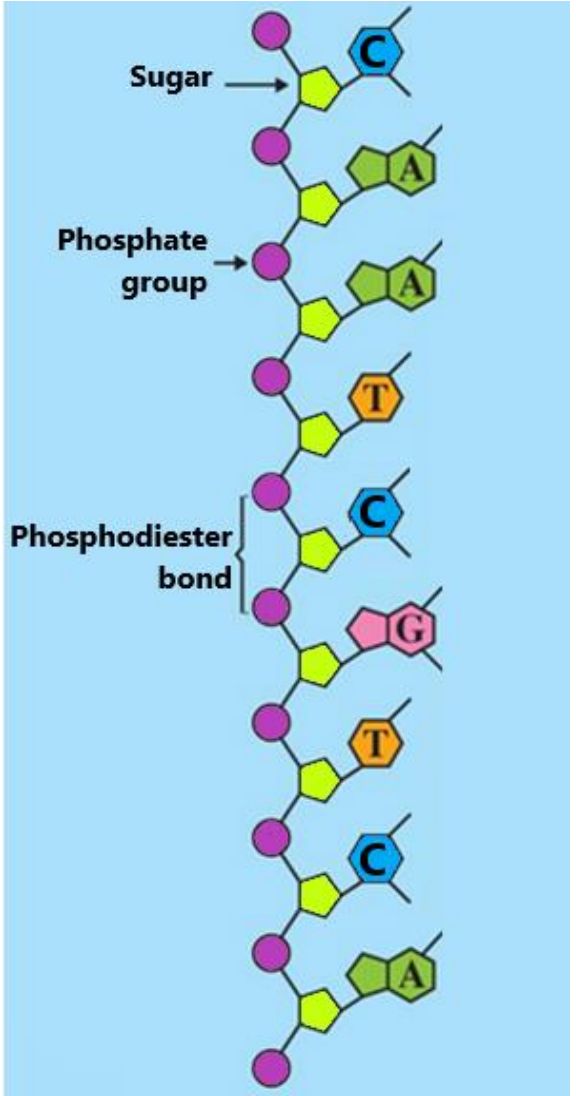
DNA structure

Primary structure

Nucleotides are linked together by phosphodiester bonds to form a polynucleotide strand and thus the skeleton of nucleic acids. The phosphate group is bonded to the 5' carbon of one pentose and to the 3' carbon of the other pentose.



5´ A T G C A 3´

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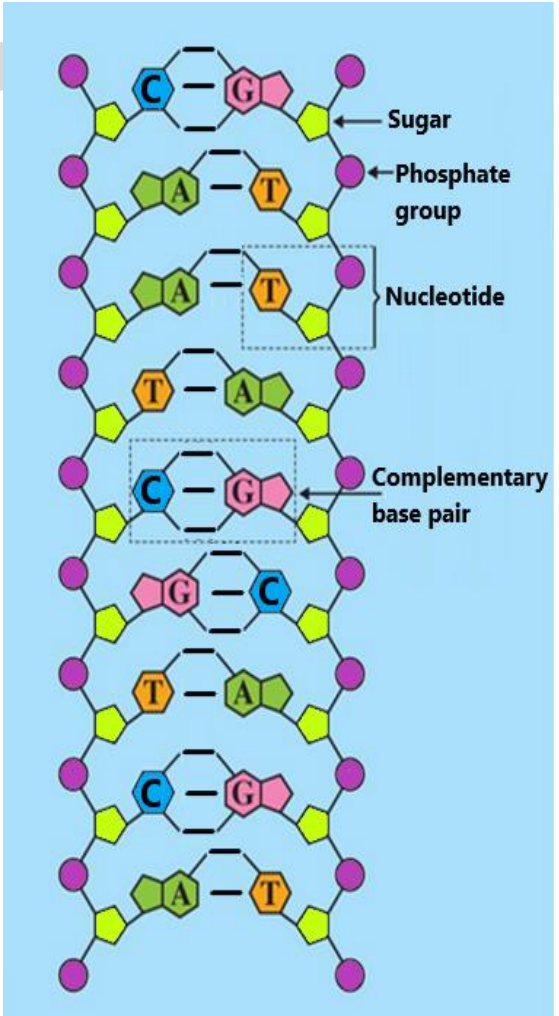
DNA structure

Secondary structure (base pairs)

The secondary structure of DNA is a double right-handed helix (α-helix) formed by two antiparallel DNA strands bind together by hydrogen bonds between bases.

5´ A T G C A 3´

3´ T A C G T 5´



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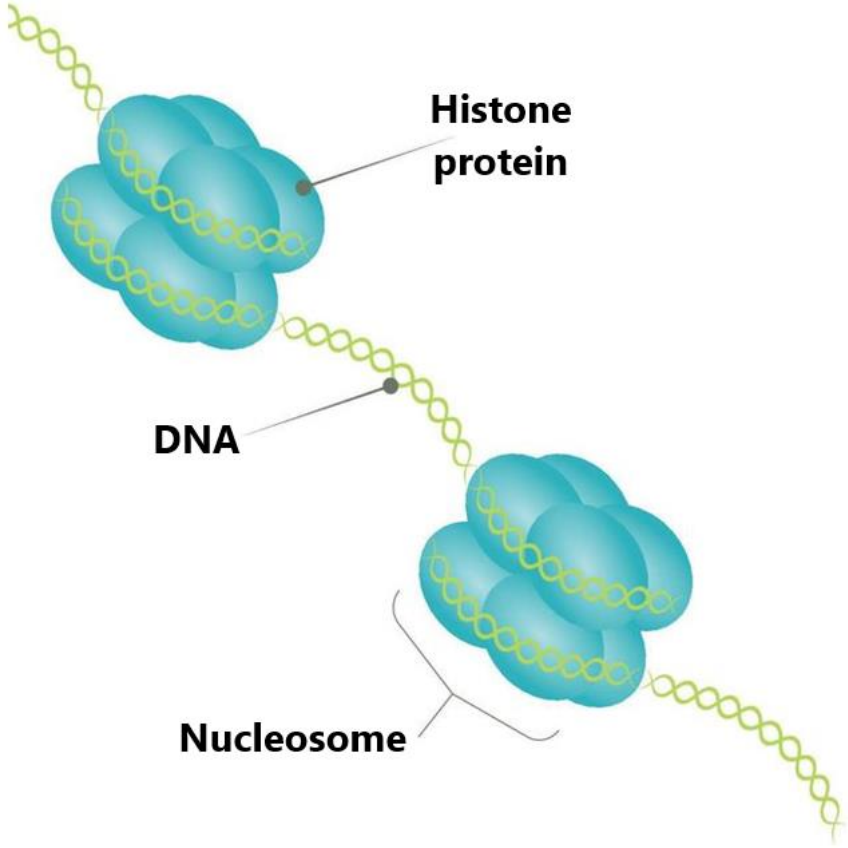
DNA structure

Tertiary structure (nucleosome)

The tertiary structure is the nucleosome model of the chromosome, which consists of a core composed of histone-type proteins around which a double-stranded DNA molecule is wrapped.



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Thank you for your attention!

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