Summary of the 1st lesson DNA: STRUCTURE AND FUNCTIONS

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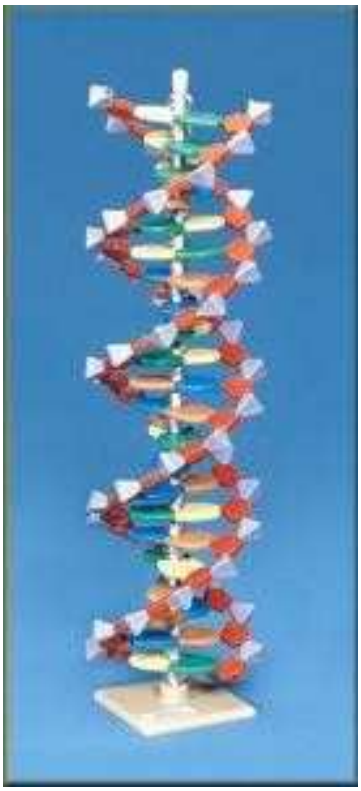

Structure of DNA

It is a chemical code→code for a protein molecule.

DNA is **a polymer of nucleotides→polynucleotide**. This molecule has two strands of nucleotides linked by hydrogen bonds.

Each nucleotide is made of a **deoxyribose (**a **pentose sugar)**, a **phosphate group** and one of four **nitrogenous bases**.

There are only four different **bases: adenine (A), cytosine (C), guanine (G)** and **thymine** (**T).** They pair with each other: G pairs always with C (by three hydrogen bonds), but A pairs always with T (by two hydrogen bonds)→ **Base pairing** A-T and C-G ensures that each strand is **complementary**.

DNA replication

→**DNA** must be copied if a cell is going to divide (→in interphase -S phase-)

→**DNA helicase** is an enzyme that **breaks hydrogen bonds** and separates the DNA strands.

→The enzyme **DNA polymerase** builds a new strand alongside each separated strand.

→**DNA ligase** catalyzes the formation of a phosphodiester bond.

→Each new molecule of DNA contains one strand from the original DNA molecule and a newly synthesised complementary strand.

Main functions of DNA

The **genetic information** is carried by the gene. It codes for the **protein synthesis.**

Proteins→polymers of amino acids. They are synthesised in ribosomes.

The **genetic code** for a protein molecule is carried in a gene.

Transcription produces mRNA that carries the code to the ribosomes. **Codons**→triplets of bases.

Translation→tRNA has an **anticodon** which is complementary to a codon on the mRNA and can bind to it. tRNA brings the amino acids. In ribosome the code is translated into a protein molecule.