Al- Mustaqbal University
College of Science
Medical Physics Department
First Stage

General biology

Lecture : 4

DNA

Lecturer: M.SC Jaafar Hamid Jaafar

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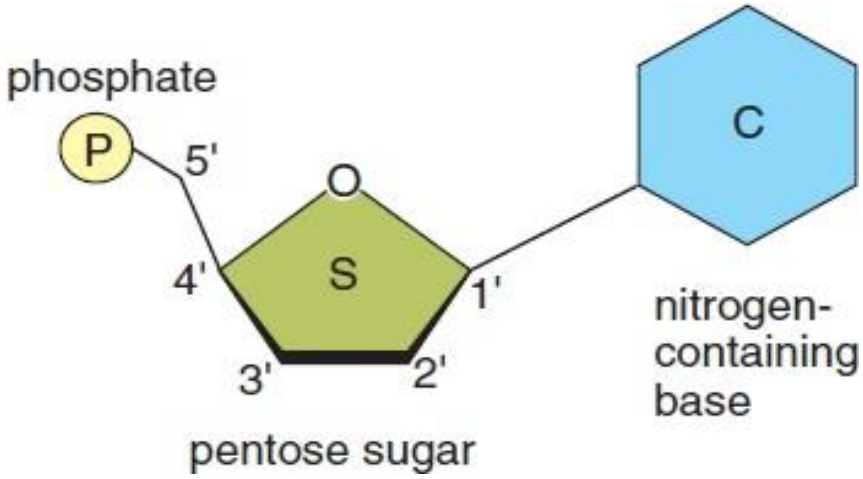
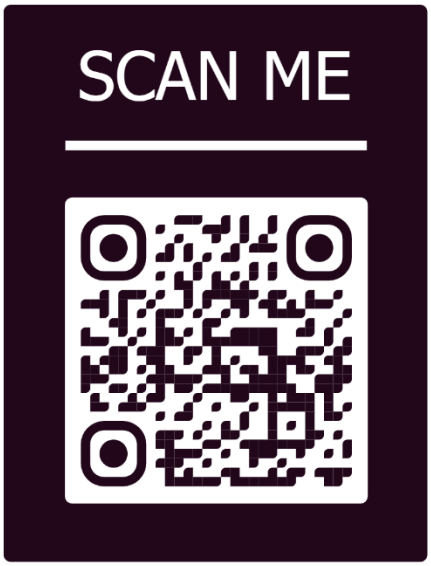
DNA

The two types of nucleic acids are **DNA (deoxyribonucleic acid)** and **RNA (ribonucleic acid).** Both DNA and RNA are polymers of nucleotides. Every **nucleotide** is a molecular complex of three types of subunit molecules—phosphate (phosphoric acid), a pentose sugar, and a nitrogen-containing base:



Genes: are pieces of deoxyribonucleic acid (DNA) that contain a code for a specific protein that works in one or more cell types in the body.



STRUCTURE OF NUCLIEC ACID (DNA AND RNA)

1- The nucleotides in DNA contain the sugar deoxyribose, and the nucleotides in RNA contain the sugar ribose.

2- There are four different types of bases in DNA: A _ **adenine,** T _ **thymine,** G _ **guanine,** and C _ **cytosine.** The base can have two rings (adenine or guanine) or one ring (thymine or cytosine).

3- In RNA, the base **uracil** replaces the base thymine. The nucleotides form a linear molecule called a strand, which has a backbone made up of phosphate-sugar phosphate- sugar, with the bases projecting to one side of the backbone.

4- DNA is double stranded, with the two strands twisted about each other in the form of a double helix. the two strands are held together by hydrogen bonds between the bases.

5- Thymine (T) always pairs with adenine (A), and guanine(G) always pairs with cytosine (C). Complementary bases have shapes that fit together.

6- The bases are purines with a double ring including (Adenine & Guanine) and pyrimidines with a single ring including (Thymine & Cytosine).

7- Complementary base pairing allows DNA to replicate in a way that ensures the sequence of bases will remain the same.

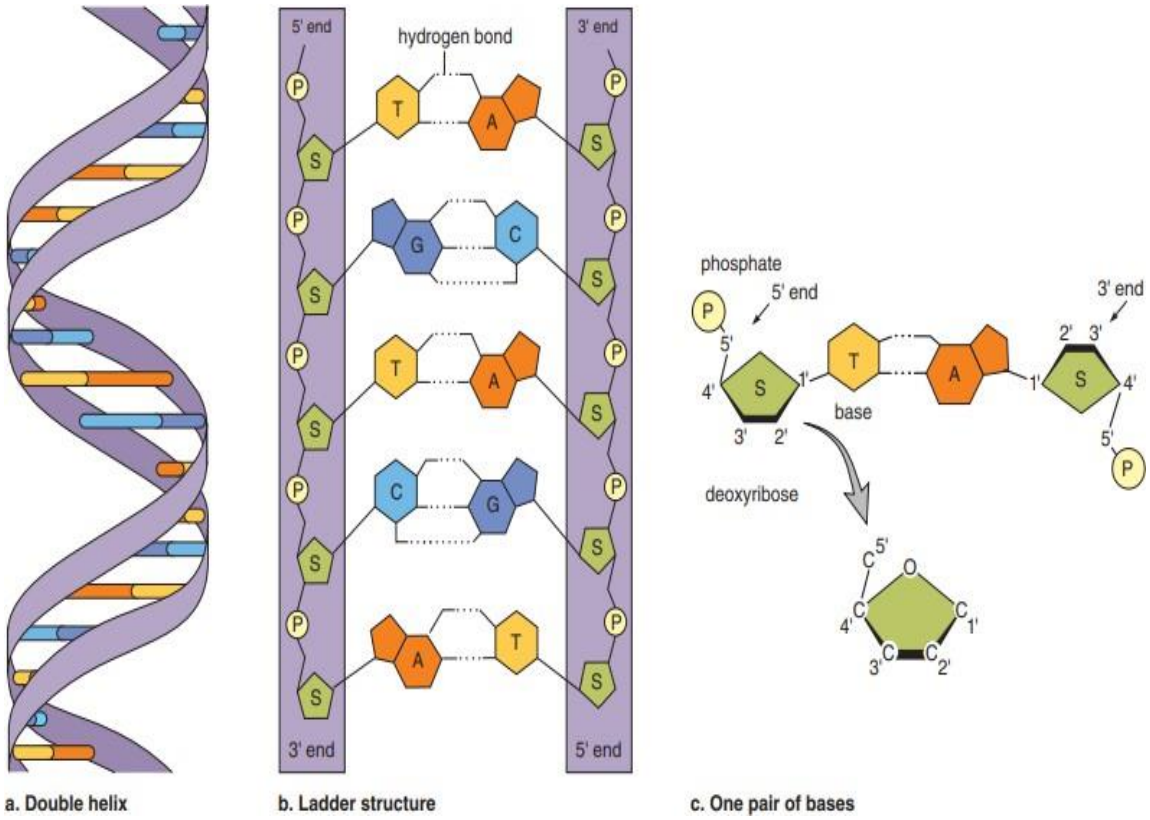


diagram to describe the parts of a DNA molecule.

ATP (Adenosine Triphosphate)

1- When adenosine (adenine plus ribose) is modified by the addition of three phosphate groups instead of one, it becomes **ATP (adenosine triphosphate),** an energy carrier in cells.

2- the energy of glucose is converted to that of ATP molecules. ATP contains an amount of energy that makes it usable to supply energy for chemical reactions in cells.

3- ATP is a high-energy molecule because the last two phosphate bonds are unstable and easily broken.

4- Usually in cells, the terminal phosphate bond is hydrolyzed, leaving the molecule **ADP (adenosine diphosphate)** and a molecule of inorganic phosphate P.

5- The energy released by ATP breakdown is used by the cell to synthesize macromolecules such as carbohydrates and proteins.

https://www.youtube.com/watch?v=S9aWBbVypeU