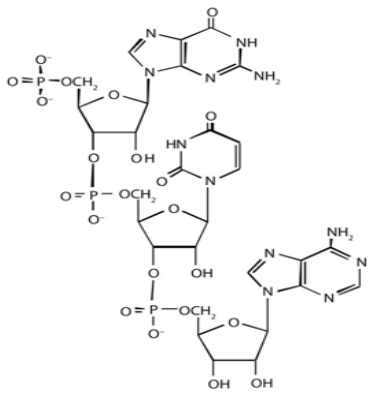
TD 1 (genetic material)

Exercise 1

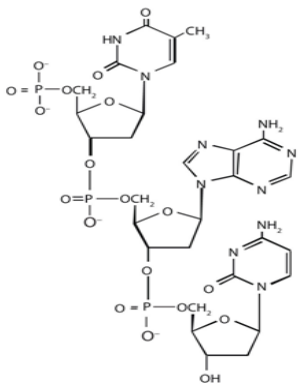
1. What are the 2 main types of nucleic acids?

2. For this nucleic acid segment,

1



2



A. Define the type of nucleic acid of each of the two molecules 1 and 2. Justify your answer?

B. Determine the ends 5'and 3' ? Circle the atoms that form the backbone of the nucleic acid chain

Exercise 2

The sequence F: 5'ATCGTTCG3' refers to one of the strands of double-stranded DNA .

If a DNA chain (F) reads: 5'ATCGTTCG3'3:

1- What do the values and symbols 5' and 3' correspond to and what is their meaning?

2- Among the polynucleotides (A), (B) and (C); determine the one which corresponds to the strand of DNA F, justify your answer.

A= 5'TAGCAAGC3' B= 5'CGAACGAT3' C= 3'CGAACGAT5'

Exercise 3

A DNA molecule is shown below:

Strand1 5'AAATGCCC ATGGCC3'

Strand2 3'TTT ACGGGTACCGG5'

1-Check if CHARGAFF rules apply to this DNA.

2- If a DNA molecule contains 10% adenine, what will be the different percentages of the other three bases of this DNA?

TD 1 (genetic material)

3- RNA polymerase only transcribes strand 1, what will be the structure of the newly formed RNA strand?

Exercise 4 (chromatin in eukaryotes)

1) Define chromatin? What is the difference between DNA, chromatin and chromosomes?

2) If species A has 4 chromosomes and species B has 6 chromosomes. Can you tell from this information which species has more DNA? Can you tell which species has more genes ?

3) The answer to question 2 implies that not all DNA on a chromosome encodes genes. Can you give examples of chromosomal regions that contain relatively few genes ?

Exercise 5

Answer true or false and justify your answer.

QCM 1-The DNA molecule:

a- Is composed of nitrogenous bases, riboses and phosphates.

b- Contains pyrimidine and purine nitrogen bases.

c- Contains as many pyrimidine and purine nitrogenous bases.

QCM 2-Concerning the DNA double helix:

a- It is a coiling of two parallel strands of DNA .

b- Each of its strands has a 5'hydroxyl end and a 3'phosphate end.

c- Each strand is made up of a different sequence of nitrogenous bases.

d- The pairing of its strands is stabilized by covalent bonds

MCQ 3-The human karyotype includes:

a- 46 chromosomes

b- 48 chromosomes

c- 45 chromosomes plus a pair of sex chromosomes.

d- 23 pairs of autosomes plus one pair of sex chromosome.

e- 12 pairs of chromosomes .

QCM 4-The members of a chromosome pair are:

a- Homologous chromosomes.

b- Sex chromosomes.

c- Both inherit from the mother.

d- Both inherit from the father.

TD 1 (genetic material)

e- Carriers of homologous genetic information.