Exercise 1:

The following sequence is found in the template strand of a DNA molecule.

Template Strand Sequence: 3'-TAC TGG CCG TTA GTT GAT ATA ACT-5'
Nucleotide Numbering: 1 ⟶ 24

1. Determine the amino acids of the protein coded by this sequence using the genetic code chart.
2. Give the amino acid sequence of the protein coded by the following mutated sequences:
    a) A transition at nucleotide 11
    b) A deletion of nucleotide 7
    c) A transversion T----A at position 15
    d) The addition of a TGG triplet after nucleotide 6.

Exercise 2:

The following figure schematizes an enzyme we have imagined. The four regions of this enzyme are designated by the letters A, B, C, and D.

- Explain the effect of the following mutations on the biological activity of the mutated enzyme designate the four regions of this enzyme:

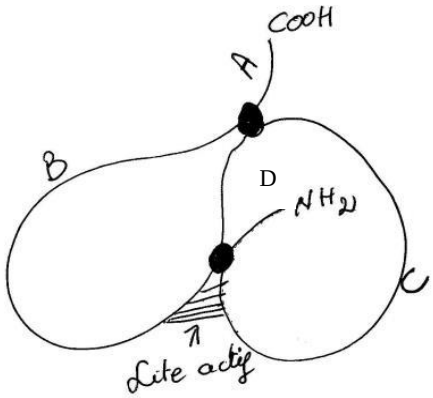
a) Nonsense mutation in the DNA coding for region A.

b) Silent mutation in region D.

c) Deletion of a complete codon in region C.

d) Missense mutation in region B.

e) Insertion of a nucleotide in region C.



Exercise 3:

A chromosome contains the following segments, where "**.**" represents the centromere: ABCDE**.**FG

What types of chromosomal mutations are necessary to change this chromosome into each of the following chromosomes? (In some cases, more than one mutation may be necessary)

a. ABE**.**FG

b. AEDCB**.**FG
c. ABABCDE**.**FG
d. AF.EDCBG
e. ABCDEEDC**.**FG

Exercise 4:

Using the codon sequence corresponding to a wild-type bacterial strain:

Determine the type of mutation affecting the sequences of strains a, b, c, and d.

Wild-type Sequence: AUG ACU CGG AAG UCA CUA ACG AUU AGG CUU UAC……

Modified Sequences:

(a) AUG ACU CCG AAG UCA CUA ACG AUU AGG CUU UAC……

(b) AUG ACU CGG AAG UGA CUA ACG AUU AGG CUU UAC……

(c) AUG ACU CGG ACA GUC ACU AAC GAU UAG GCU UUA……

(d) AUG ACU CGG AGU CAC UAA CGA UUA GGC UUU AC……

Second letter

First letter	U	C	A	G	Third letter
U	UUU, UUC: Phe UUA, UUG: Leu	UCU, UCC, UCA, UCG: Ser	UAU, UAC: Tyr **UAA: Stop** **UAG: Stop**	UGU, UGC: Cys **UGA: Stop** UGG: Trp	U C A G
C	CUU, CUC, CUA, CUG: Leu	CCU, CCC, CCA, CCG: Pro	CAU, CAC: His CAA, CAG: Gln	CGU, CGC, CGA, CGG: Arg	U C A G
A	AUU, AUC, AUA: Ile **AUG: Met**	ACU, ACC, ACA, ACG: Thr	AAU, AAC: Asn AAA, AAG: Lys	AGU, AGC: Ser AGA, AGG: Arg	U C A G
G	GUU, GUC, GUA, GUG: Val	GCU, GCC, GCA, GCG: Ala	GAU, GAC: Asp GAA, GAG: Glu	GGU, GGC, GGA, GGG: Gly	U C A G