

TD 1 Biologie Moléculaire Génie Génétique

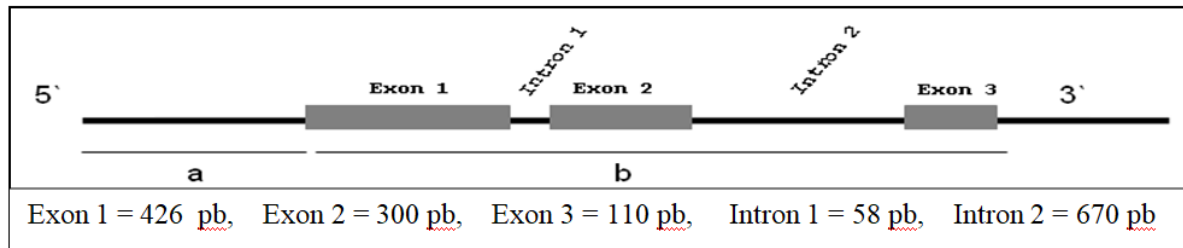
Licence Microbiologie

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Exercice 3 :

Attached is a schematic representation of a gene that encodes a protein X.



- Define parts **a** and **b**, and indicate the **transcription initiation site** and the **stop codon**.
- If the promoter length is **198 bp**, what is the **size of the gene**, not including other possible regulatory sequences?
- Excluding the **5' cap** and **poly(A) tail**, what will be the size of the **primary transcript**, the **mRNA in the case of constitutive splicing**, and the **mRNA in the case of alternative splicing** leaving only exons 1 and 3?
- **Draw schematically** the RNAs described in question 3.

Exercice 4 :

Let a human protein consist of **576 amino acids**.

1. What is the **minimum number**:
 - of **nucleotides contained in the primary transcript** that produces this protein?
 - of **base pairs contained in the structural gene** encoding this protein?
2. Why could the **number of nucleotides** be **higher** than the value you have just given in both cases?

Exercice 5 :

The **Bcl-x gene** undergoes **alternative splicing**, generating two isoforms with **opposing functions** in the regulation of apoptosis:

- **Bcl-xL**: Anti-apoptotic isoform.
- **Bcl-xS**: Pro-apoptotic isoform.

The **Bcl-x gene** contains several **exons and introns**. Its essential structure is as follows:

- **Exon 1**: Common to both isoforms; contains the start of the coding sequence.
- **Exon 2**: Plays a key role in alternative splicing.
- **Exon 3**: Common to both isoforms; contains the end of the coding sequence.

Describe the two possible alternative splicing events for the Bcl-x gene.