FACULTY OF ENGINEERING &TECHNOLOGY
DEPARTMENT OF BIOTECHNOLOGY

PROMOTERS

A promoter is a region of DNA that initiates transcription of a particular gene.

Promoters are located near the transcription start sites of genes, on the same strand and upstream on the DNA (towards the 5' region of the sense strand).

Promoters can be about 100–1000 base pairs long.

Functions of Promoter:

RNA polymerase binding site

- Initiation of transcription
- control by regulatory sequences

control the expression of genes

Prokaryotic Promoters:

-35 box and – 10 box (also called Pribnow box) are consensus sequences

- The two boxes are far appart from a specific distance, so they are located on the same face of the double helix.

PROMOTERS

Eukaryotic Promoters:

- There are two parts: - The core promoter or basal promoter - Upstream promoter element (one or more)
- Core promoter is constituted by the TATA box and the transcriptional start site (TSS)
- Initiation complex bind to the core promoter
- Upstream elements are responsible of the regulation of the transcription

Bidirectional Promoters:

- Pairs of genes control by same promoter but located on opposite strand and opposite direction.
- Their TSS are separated by less than 1,000 bp.
- In general, they are rich in CpG content
- Function of genes represented in bidirectional class are often: DNA repair genes, chaperone protein, and mitochondrial genes.
- Genes control by bidirectional promoters are often coexpress, but a minority of bidirectional genes have a mutual exclusive expression.
- No correlation between lenght of promoter and degree of expression
- Genes of bidirectional promoters shared some element of the promoter
- If there is deletion of TSS of one transcript, the transcription of the gene on the opposite direction is increased.
- bidirectional promoter acts as an inseparable functional units which regulate the transcription of both genes