

38 - Regulation of gene expression

→ prokaryotes → occur at 2 level

(1) Transcription + (2) Translation

→ Translation :- operon

↓ encode

σ -protein [Ribosomal Protein]

↓ regulated by

Specific σ -protein binding to SD sequence on its mRNA

↓ cause

(-) of σ -protein synthesis.

→ Transcription :- operon

↓ encode

Enzyme for use of lactose

↓ Regulated by

positive [Inducer] & Negative [Repressor] Control

Enzymes for synthesis of Trp

↓ also regulated by

Regulated by

Negative [Trp corepressor] Control

σ RNA, tRNA

↓ Regulated by

ppGpp

↓ through Stringent response

→ Trp - Tryptophan

→ SD - Shine - Dalgarno

→ ppGpp - guanosine tetraphosphate

GRE - glucocorticoid response element
RNAi - RNA interference
eIF - eukaryotic initiation factor

* Eukaryotes

① DNA level

- changes in access to DNA → Histone modification
DNA methylation
Nucleosome repositioning
- changes in amount of DNA → gene amplification
- changes in arrangement of DNA → Immunoglobulin Transposons

② Transcription

→ through - Transacting proteins binding to cis acting element on DNA

↓ through

DNA binding motifs such as zinc finger

↓ as exemplified by

Gal4 protein binding to UASGal

↓ & by

steroid hormone receptor complex binding to GRE

③ co & post transcription events

- variation in mRNA processing & stability
↓ as exemplified by

Alternative splicing, polyadenylation,
mRNA editing, RNAi

④ Translation

- phosphorylation of eIF-2

seen with ↓

AA starvation,

Heme deficiency)

dsRNA, unfolded protein in ER

gal [galactose]

UAS - upstream activating sequence