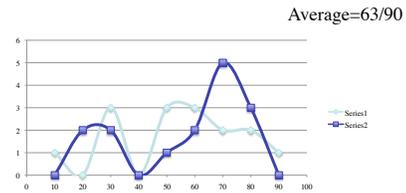


Chem 431C Lecture 10a

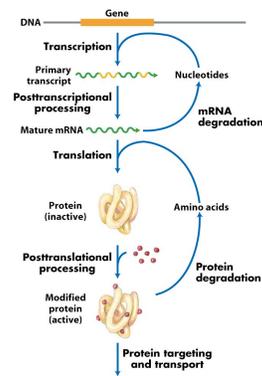
Today:

- a) Quiz 7 (on Chapt 27)
- b) Principles of gene regulation (Ch28)
- c) Deadline for Ch 27 online quiz tonight (note: Quiz 8 on Fri. (Ch. 28))

Test 2 grade distribution



Chapter 28: Regulation of Gene Expression: 7 processes are involved



Types of genes

Terms to know:

- House keeping genes and Constitutive gene expression
- Inducible genes and regulated gene expression
- Repressible genes and repression
- Housekeeping genes' basal rate depends on closeness to consensus sequence. Range in factor: 1-1000

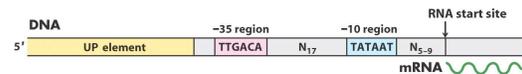
Nomenclature

Promoter = DNA sequence enabling a gene to be transcribed. Promoter is recognized by RNA polymerase.

Operator = DNA segment that a regulatory protein binds to. Usually segment between promoter and the genes of the operon. A regulatory protein can be a repressor or activator or selectivity factor.

Operon contains one or more structural genes transcribed into one polycistronic mRNA: a single mRNA molecule that codes for more than one protein.

Regulatory proteins

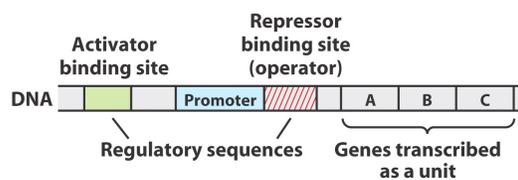


3 types:

- a) Specificity factors - alter spec. of RNAP for promoter
- b) Repressors - bind to operator (near promoter)
- c) Activators - enhance RNA P-promoter interaction

Patterns of regulation: (-) & (+)

Operon=polycistronic gene clusters

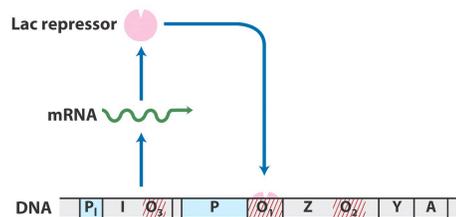


Genes are transcribed together as a unit, a single transcript

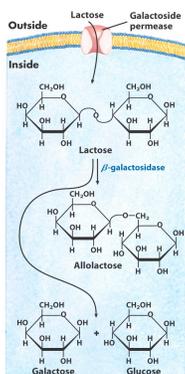
Bacterial growth behavior in glucose and lactose.

Glucose is depleted

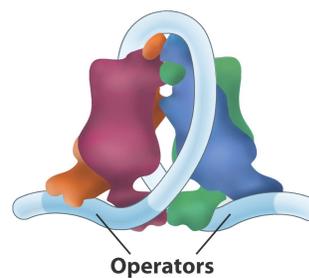
Lac operon



Lactose metabolism



Lac Repressor binding to DNA



Lac Repressor binding to DNA

Repressor without IPTG (like allolactose)

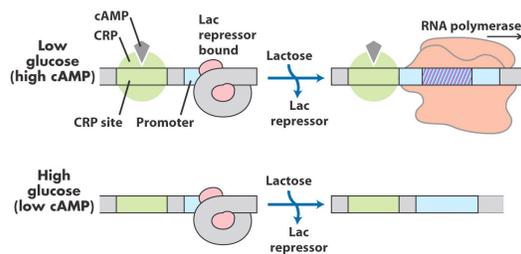
Lac operon subject to + & - regul'n.

(-) Regulation: Absence of lactose allows repressor to bind
 (+) Regul'n: when both glucose and lactose are present, "catabolite repression" restricts expression of genes for other monosacch. other than glucose. (through CRP)

CRP (cyclic AMP Receptor Protein)

CRP-cAMP binds near promoter to enhance transcription 50 fold.

Catabolite repression of lac op.



cAMP Receptor Protein (CRP or CAP) Homodimer

cAMP