1、**Housekeeping genes**(持家基因):

expressed constitutively, essential for basic processes involving in cell

replication and growth

1. **Inducible genes**: （诱导基因）

expressed only when they are activated by inducers or cellular factors.

1. **Operon**: （操纵子）/ Lactose operon（乳糖操纵子）

a unit of prokaryotic gene expression and regulation ...有问题？

4、lacZ半乳糖苷酶、lacY(半乳糖苷渗透酶)、lacA(硫代半乳糖苷转乙酰酶)

**Topic1 看**

**Principles of Transcription Regulation**

Gene Expression is Controlled by Regulatory Proteins

Positive regulators or activators increase the transcription

Negative regulators or repressors decrease or ELIMINATE the transcription

Transcription process：

Targeting promoter binding by activators or repressors → Promoter “melting” → Initial transcription → Elongation and termination

**Topic2 看**

**Regulation of Transcription Initiation**

Operon includes：Structural genes、Control elements、 Regulator gene(s).

Lac operon

Lactose operon: a regulatory gene and 3 stuctural genes, and 2 control elements

Structure genes：lacZ半乳糖苷酶、lacY(半乳糖苷渗透酶)、lacA(硫代半乳糖苷转乙酰酶)

The enzymes required for the use of lactose as a carbon source are only

synthesized when lactose is available as the sole carbon source.

①Absence of inducer：

repressor binds to operantor region and prevents the RNA polymerase from transcribing the operon

②presence of inducer:

**Inducer binds repressors,(**inducer bind repressor or represser mRNA**). →** inactive repressot ,operon transcription → lac mRNA

An activator and a repressor together control the lac genes

CAP and lac repressor have opposing effects on RNA polymerase binding to the lac

promoter.

The lac operator overlaps promoter, and so repressor bound to the operator physically prevents RNA polymerase from binding to the promoter.

CAP has separate activating and DNA-binding surface;CAP and lac repressor bind

DNA using a common structural motif (DNA binding by a helix-turn-helix motif )

The activity of Lac repressor and CAP are controlled allosterically by their

Signals

Lack of inducer: the lac repressor block all but a very low level of transcription of lacZYA .

Key points of this chapter

1.Operon

2.Operator

3.Polycistronicmessage

4.Cis-acting elements

5.Activator/represor

7.Regulatory gene/structural gene

8.Regulation of transcription initiation in bacteria: the lacoperonmodel

Catabolite repression （分解代谢物阻遏又被称为葡萄糖效应）