

Substitution of AraR operon

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Since weeks have we stuck in the search of the mathematical model of AraR and AraE promoter in *Bacillus subtilis*, but apparently, no progress has been made because a minor field it is to research arabinose operon in *Bacillus subtilis*. Hence we need to come up with a alternative choice:substitute the AraR with a negative regulatory operon in *E.coli*.

1 Similarity of LacI and AraR

As we have learnt in molecular biology,LacI promotion syssytem is a negative regulation syssytem.As the concentration of lactose rises ,LacI will binds to arabinose and then release from *lacI*,relieve the cell form the negative regulation.People call this status **induced** state.(Kuhlman2007)

Lac is not a mono protein,it is a protein in consists of two asymmetric subunits,which will be transcribed and translated in dependent of *lacZY*,which are the structural gene of lactose operon.The presence of lactose will change the formation of two LacI subunits,which lead to a loss of interaction between protein and DNA.Such a contraption will enable LacI to response to the change of lactose level.

It's also discovered that AraR in *Bacillus subtilis* functions in a same pattern as LacI ,it is also a nage-tive regulatory operon.The raise of arabinose concentration will lead to the release of AraR from promoter AraE.The mechanism of AraR to regulate the expres-sion is very close to what will happend on LacI.

Apart from theoretic summary,these two operon also present many similarity in experimental data.Taking the expression data into considera-tion ?? We can observe a similar trend in both ara and lac operon model.The expression of their structure gene just increased.Therefore,i come up with this idea to substitute ara with lac.

But,there is one distinct difference between these two operons. The AraR is a **monomer** protein.There does not exist any interaction within it.We will make a further discussion afterwards.

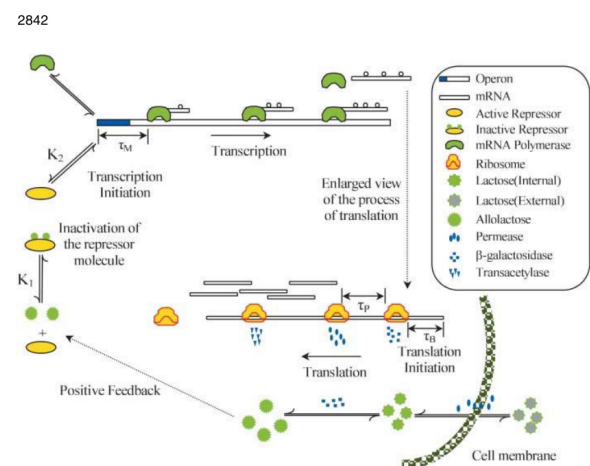


Figure 1: Summary of Lac operon

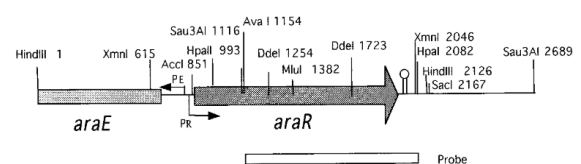


Figure 2: Summary of Ara operon

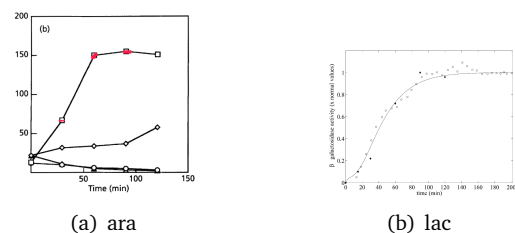


Figure 3: Comparism of ara and lac operon

2 Modeling of Lac promoter