Lac Operon Assignment

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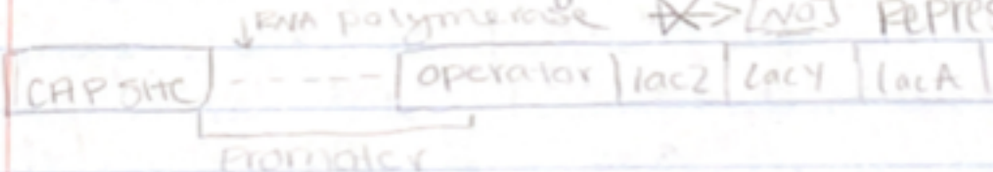
1. In the absence of lactose

The lac repressor, which is a protein that can repress the transcription process of the lac operon in question, binds to the operator. Transcription is ultimately blocked because RNA polymerase is interrupted by this repressor. Along with this, we can also look at the levels of cAMP and how that affects the regulation of Escherichia coli.



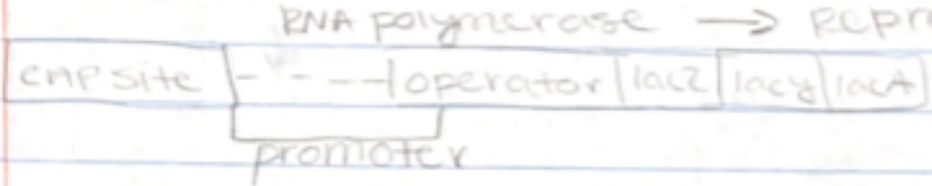
2. In the presence of lactose

Lactose that is rearranged will then bind to the same repressor spoken about earlier. This will cause it to release the lac operon operator, which then enables RNA polymerase to go through transcription. cAMP levels are high in this scenario and transcription is strong.

3. In the absence of glucose

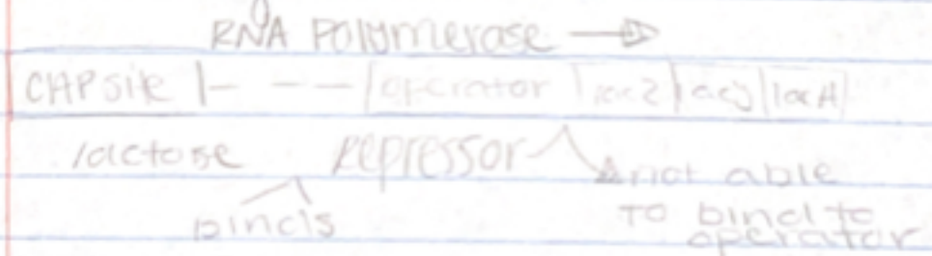
Transcription in this situation would be considered very strong on a level basis. A key factor in order for the lac operon to function in Escherichia coli

is if glucose is not there. This helps in the binding of DNA when cAMP levels are high. In turn this helps RNA polymerase to bind to the promoter.



4. In the presence of glucose AND the prescense of lactose.

Transcription, in this situation, is low. To have an efficient process, E.coli should express the lac operon when glucose is absent but lactose is present. In this scenario the repressor is rearranged which causes the lac repressor to be released from the operator. cAMP levels are low which means DNA cannot be bound by CAP.



5. where in the process of gene expression this regulation takes place?

Regulation of the Escherichia coli lac operon takes place in transcription mainly. Gene expression in general, does involve many steps and has a certain difficulty to understand. In humans and eukaryotes, the process of gene expression is accuriy mainly at the step of transcription.