Lac Operon Assignment

In the *Escherichia coli* lac operon, an absence of lactose causes the lac operon to be unable to function. This is due to the lac repressor protein binding to the operator site which stops RNA Polymerase from transcribing the lac operon. The absence of lactose causes the allolactose isomer to never induce transcription, permanently inhibiting transcription.

In the *Escherichia coli* lac operon, the presence of lactose causes the lac operon to function normally. The allolactose isomer binds to the lac repressor, which causes the repressor to let go of the operator. Thus inducing transcription by allowing RNA polymerase to go past the operator and out of the promoter region.

In the *Escherichia coli* lac operon, glucose stops the allolactose inducer from binding to the repressor thus causing the lac operon to inhibit RNA polymerase from transcribing. Glucose also causes cAMP and CAP levels to lower, therefore the absence of glucose would cause an abundance of cAMP to be produced. The cAMP binds to CAP and activates it. Which then helps RNA polymerase attach to the promoter. Also causing the lac operon to transcribe at high levels if lactose is present, if lactose is absent then the repressor will remain to be binded to the operator and transcription will not occur.

In the *Escherichia coli* lac operon the absence of glucose and the presence of lactose causes strong transcription. The lack of glucose causes cAMP to be produced, which then binds to CAP and activates it to be bound to DNA. The lactose causes the lac operator to release the lac repressor due to its inducer, allolactose, being present. Transcription is induced and occurs at high rates due the absence of glucose causing high cAMP levels.

This regulation is post-transcription, this is due to lac repressor being bound to the origin site. Thus causing RNA polymerase to be unable to transcribe the lac operon, therefore it has to take place before the lac operon is transcribed. Post-transcription regulation is when a gene expression is being controlled at the RNA level.

Works Cited

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