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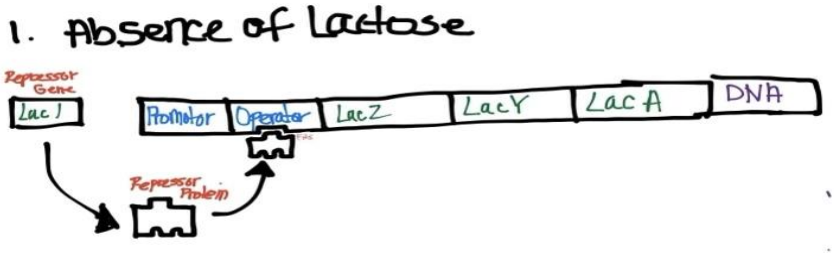
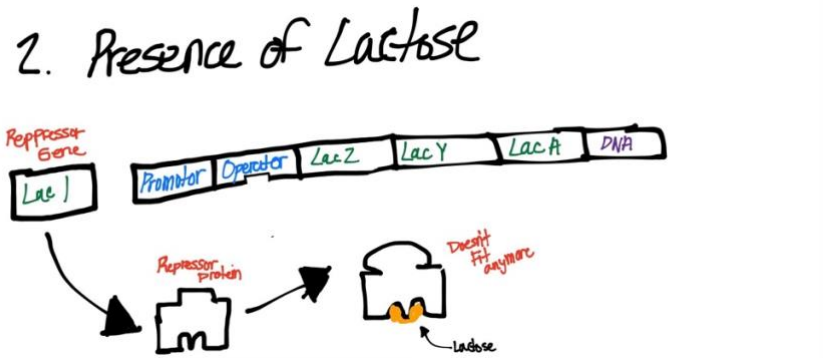
Genetics Bio294
CRN:20222

1. Absence of Lactose



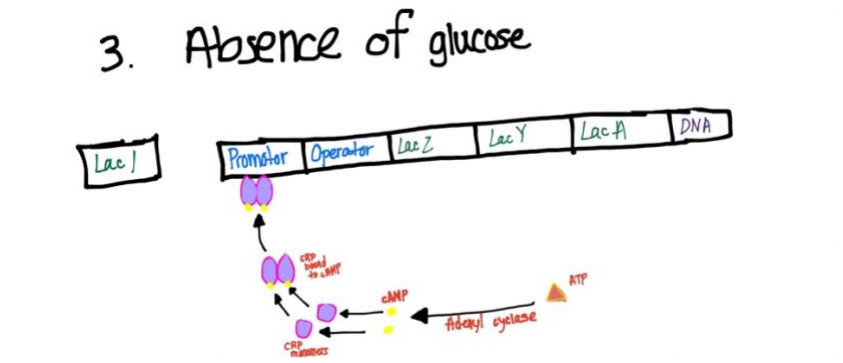
When there isn't any lactose present, the repressor protein is able to bind to the operator. LacZ, lacY, and lacA are not able to be expressed.

2. Presence of Lactose



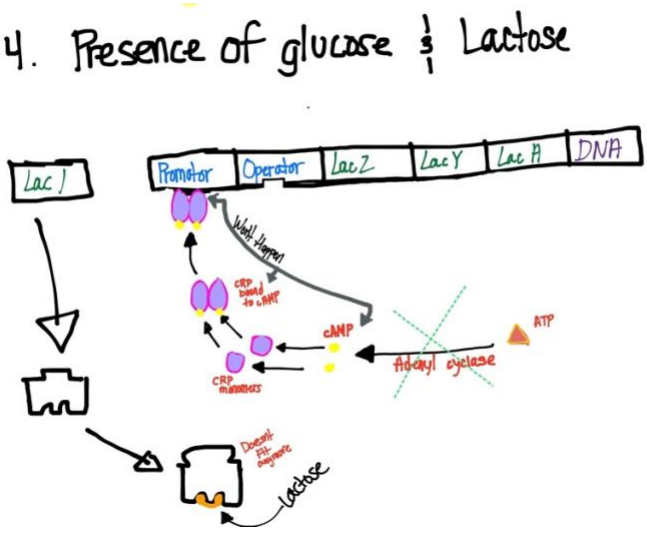
When lactose is present, the repressor protein can't bind to the operator. This is due to lactose binding to the repressor protein and changing its shape. The repressor protein no longer fits the active site of the operator. LacZ, lacY, and lacA can be expressed.

3. Absence of Glucose



When glucose isn't present, adenylyl cyclase uses the ATP to make cAMP (cyclic adenosine monophosphate). CRP monomer and a cAMP bind together, then the CRP binds to the promotor. . LacZ, lacY, and lacA can be expressed.

4. Presence of Glucose and Lactose



When glucose and lactose are present, the genes on the lac operon will be repressed. Lactose binding to the repressor gene causes it to be unable to fit in the operator active site. Which would mean the genes on the operon have the possibility to be expressed. Then since glucose is present, adenylyl cyclase becomes decreasingly unavailable. So cAMP isn't being made and can't bind with CRP monomers. CRP can't bind the promotor causing the genes on the operon to be repressed. LacZ, lacY, and lacA can't be expressed.

5. Transcription regulation would prevent RNA polymerase from being able to transcribe the lacZ,lacY, and lacA genes on the lac operon into mRNA. Post-transcription regulation would occur at the lac operon transcribed mRNA. Translation regulation would prevent the mRna from being translated into proteins. Post-translation regulation would occur after the protein are translated.