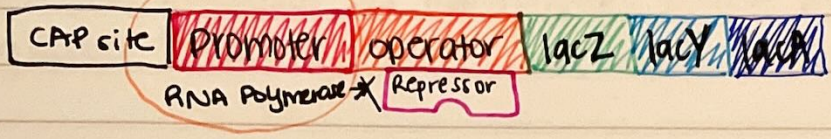
Kristin May

Lac Operon

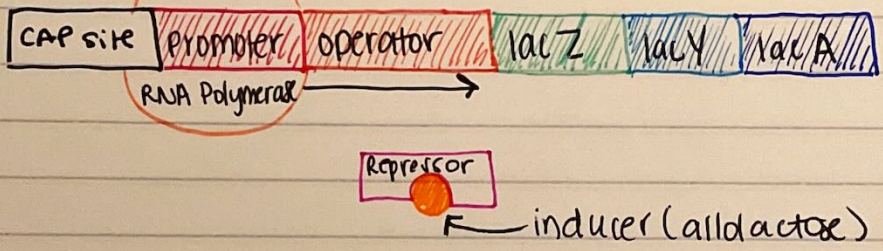
No lactose in medium:

- when lactose is absent, lacI produces repressor which binds to the operator. It blocks RNA polymerase's way, which prevents transcription so theres no gene expression



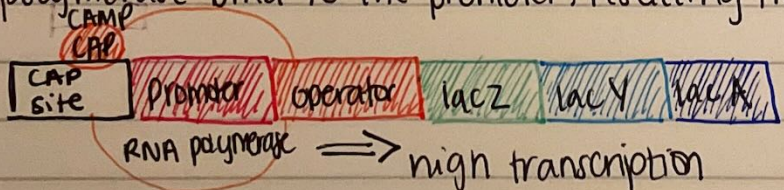
lactose in medium:

- Lactose (inducer ⇒ Allolactose) binds to the repressor and makes it so it can't bind to the operator anymore. RNA polymerase can now transcribe the operon. ⇒ gene expression



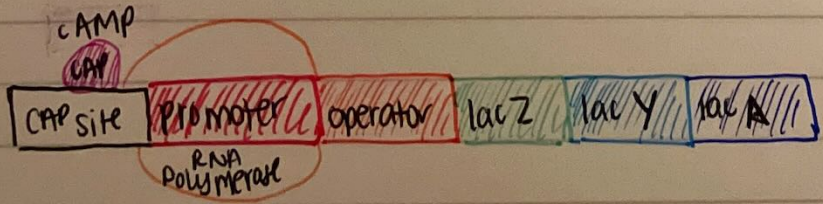
Absence of glucose:

- cAMP is produced, it attaches to CAP, allowing it to bind DNA. CAP helps RNA polymerase bind to the promoter, resulting in high levels of transcription



Absence of glucose and Lactose:

No transcription of the lac operon occurs ⇒ no gene expression. Because there's no glucose, CAP is active and bound to DNA, but the lac repressor is on the operator, and blocking RNA polymerase.



In the process of gene expression, transcription is where this regulation takes place. The lac repressor acts as a lactose sensor. The CAP (catabolite activator protein) acts as a glucose sensor. These proteins bind to the DNA of the lac operon and regulate its transcription based on lactose and glucose levels.