

# Prokaryotic Gene Expression

# Overview

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## Benefits:

- gene control in bacteria may allow them to make nutrients when their host is not supplying them

## Transcription Unit:

- genes that code for proteins that work together are normally grouped together

# Operon System.....

Operon consists of 3 parts:

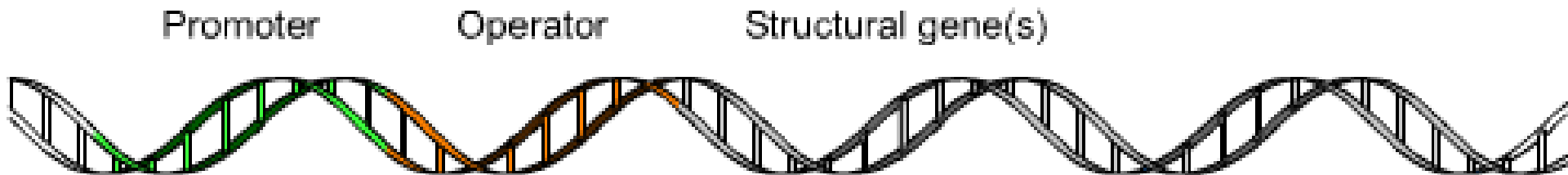
1. Promoter

- segment of DNA that RNA polymerase attaches to

2. Operator

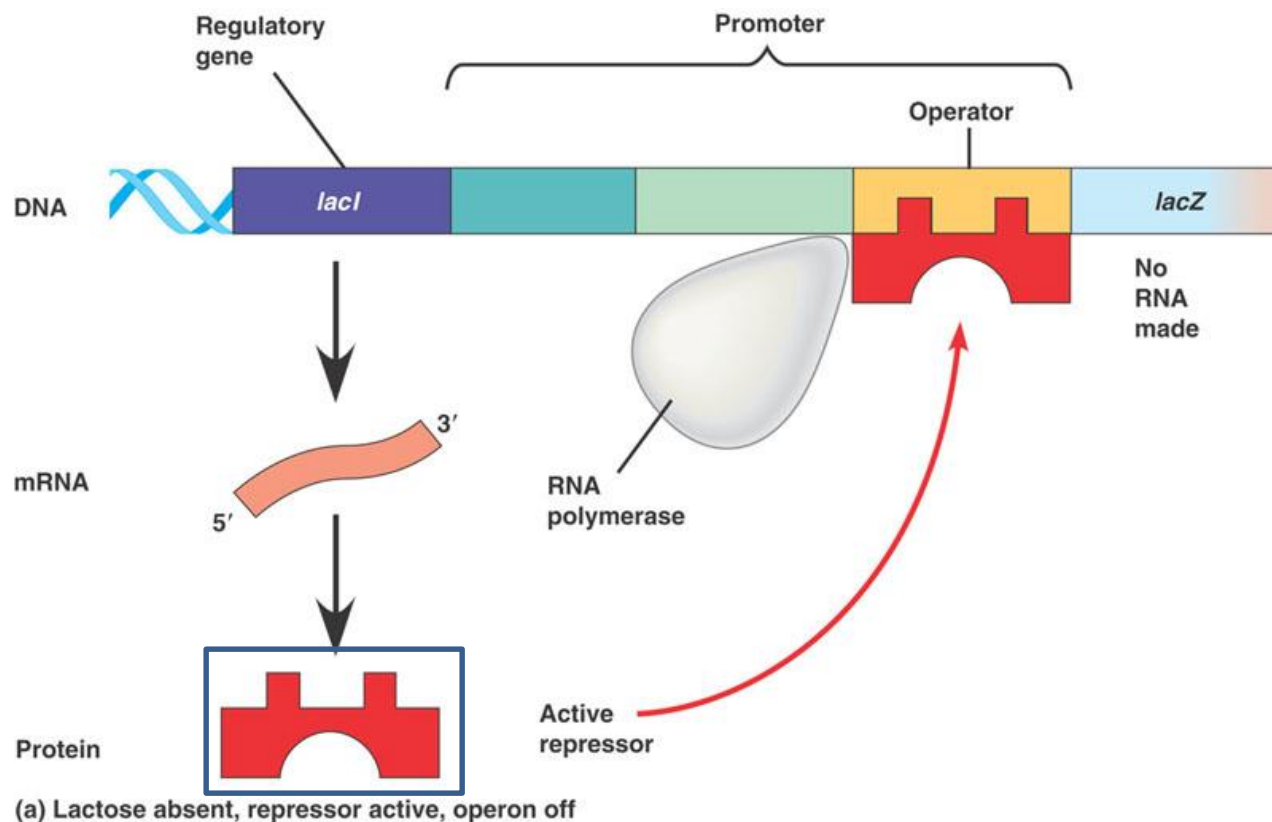
- on/off switch

3. Genes that they control

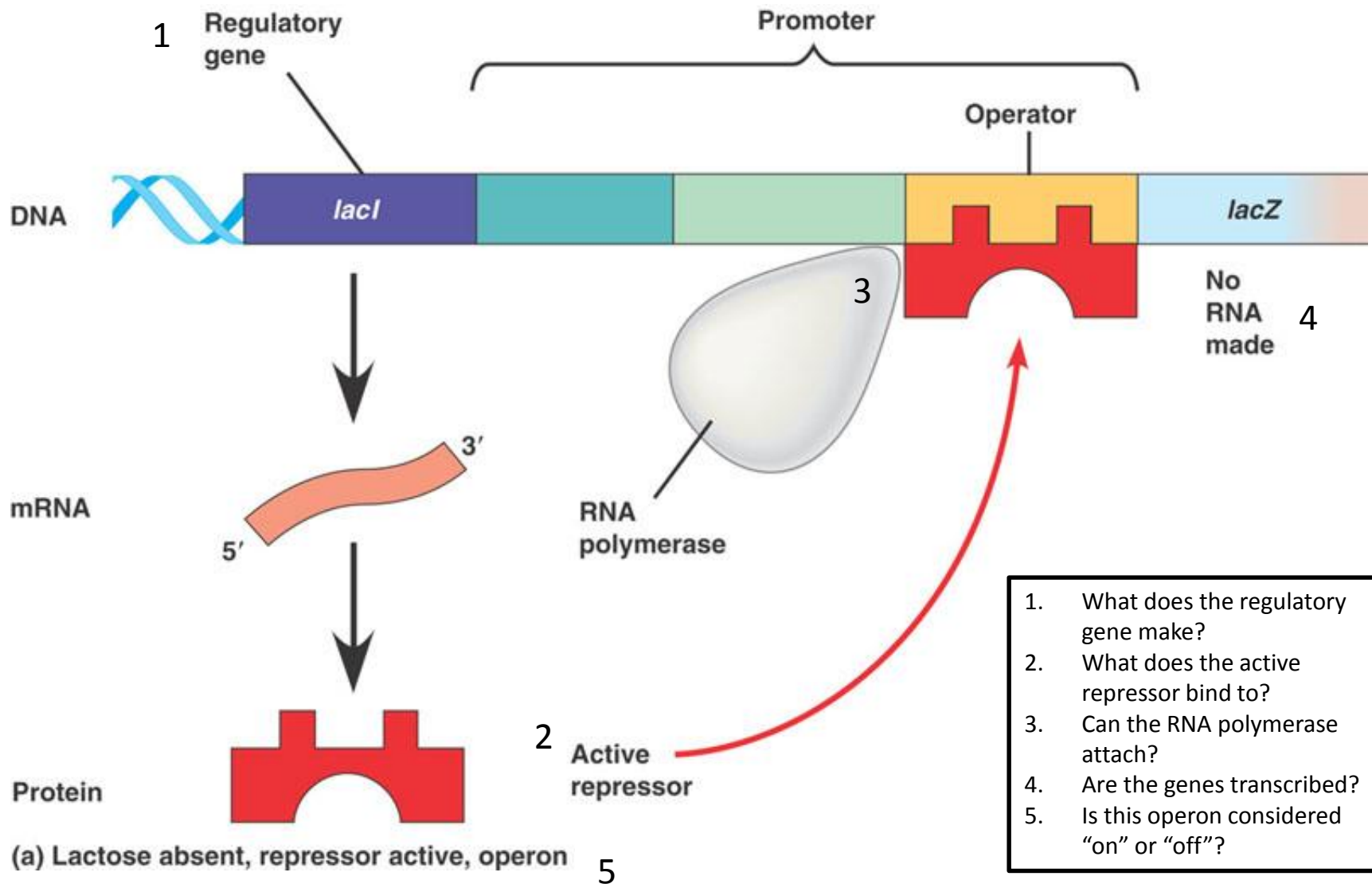


# Operon System

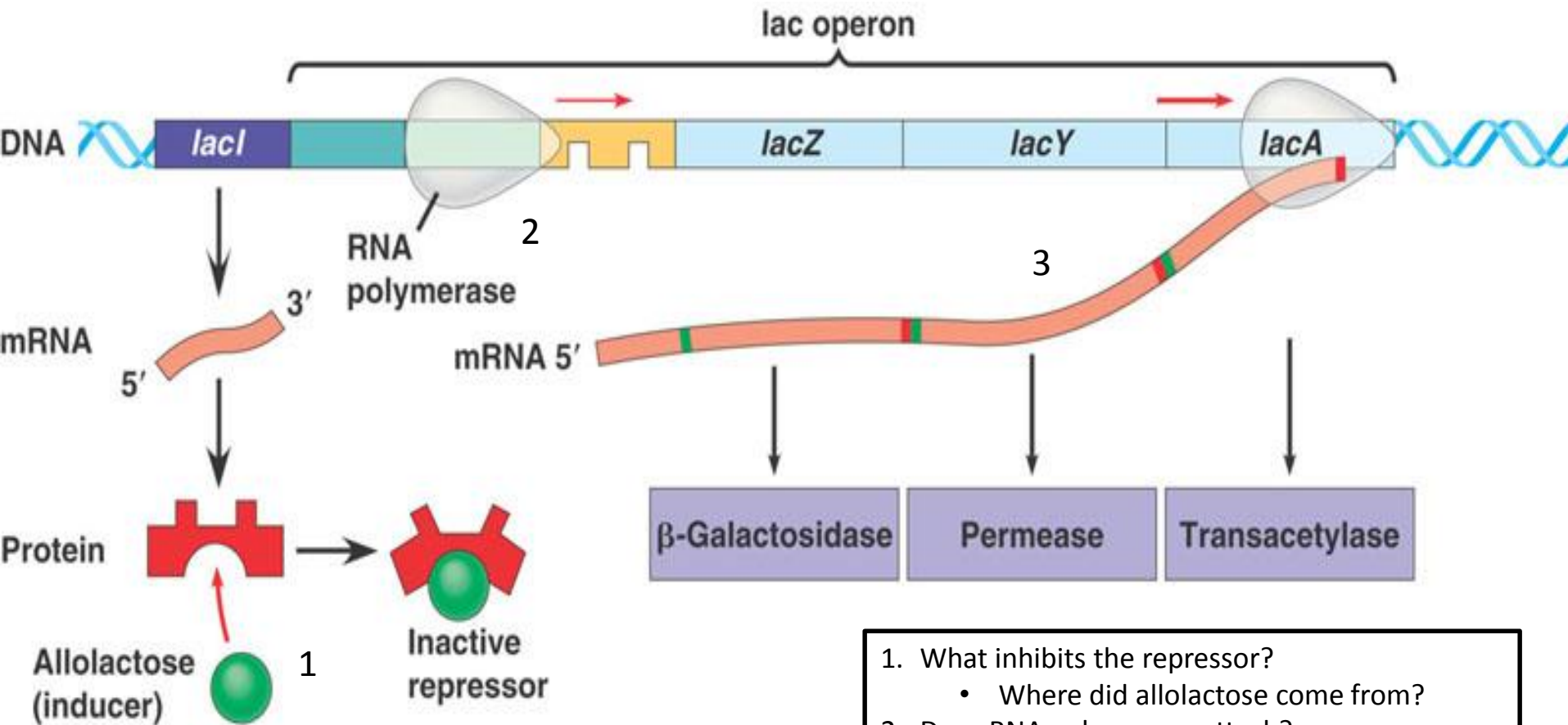
- an additional 4<sup>th</sup> component interacts with the operon but is not made of DNA
  - called a repressor



# Lac Operon — BEFORE a person drinks milk . . . .



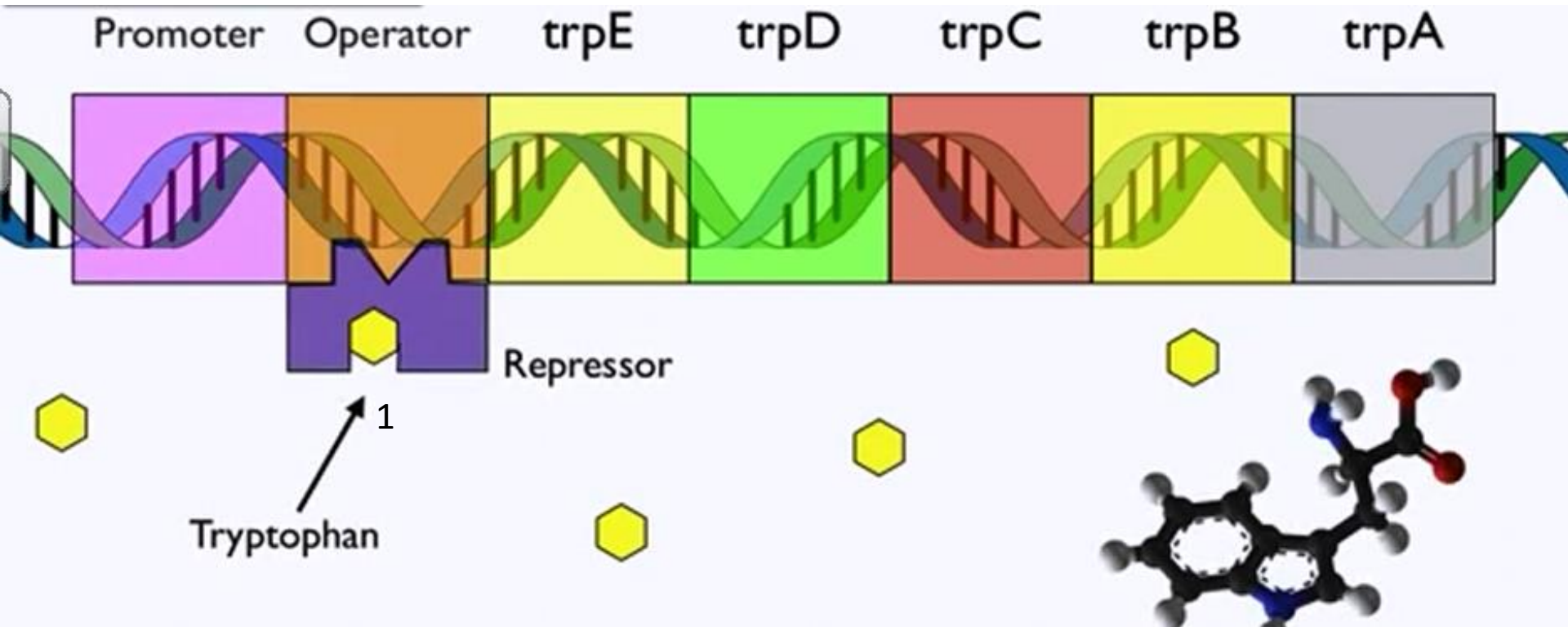
# Lac Operon — AFTER a person drinks milk . . . . .



(b) Lactose present, repressor inactive, operon 4

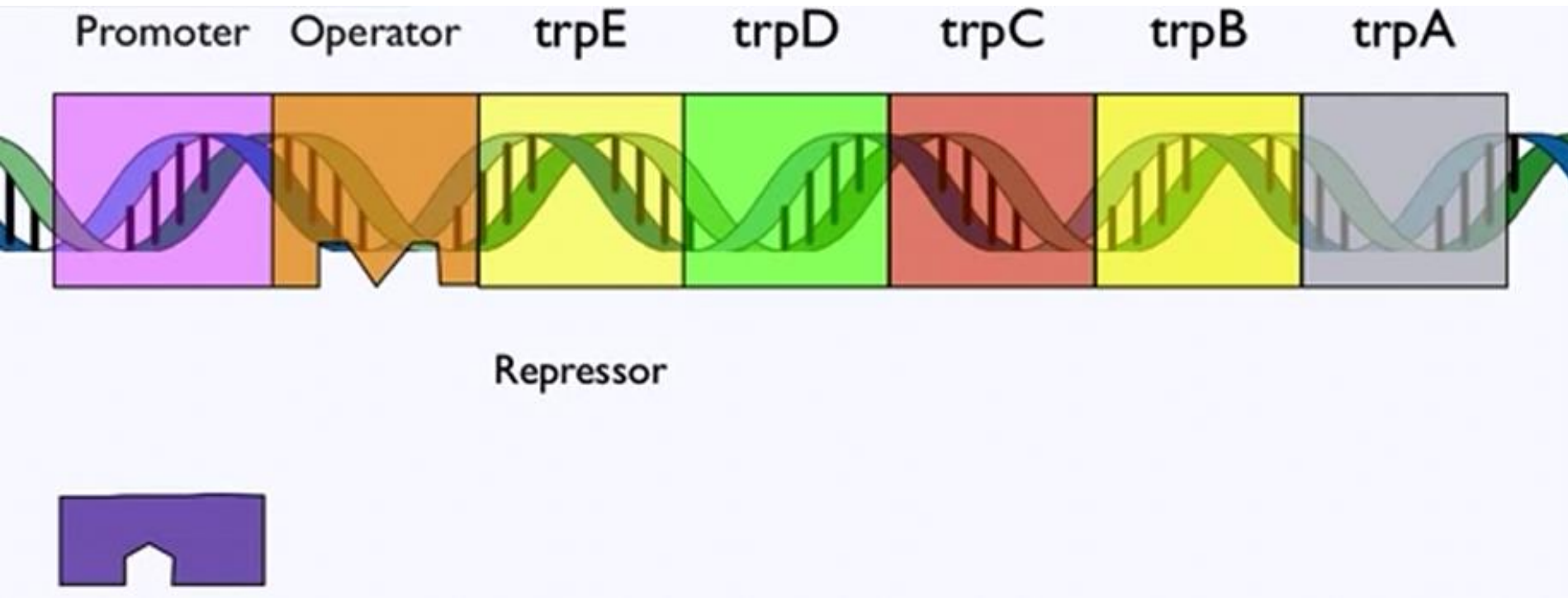
1. What inhibits the repressor?
  - Where did allolactose come from?
2. Does RNA polymerase attach?
3. Are the genes transcribed?
4. Is this operon considered "on" or "off"?

# Trp Operon – when tryptophan is present



1. Does tryptophan activate or inhibit the repressor protein from binding to the operator?
2. Based on your knowledge of repressor proteins, can RNA polymerase attach and transcribe the genes?
3. Is this operon currently “on” or “off”?

# Trp Operon – when tryptophan is absent



1. What happened to the repressor protein when the cell lacks tryptophan?
2. Based on your knowledge of operons, can the RNA polymerase now bind to the operator?
3. Is this trp operon considered “on” or “off”?