Operon Structure

- **Regulatory Region**
  - Promoter (P) – where RNA polymerase binds and begins transcription
  - Operators (O) – where regulatory proteins (activators and repressors) bind

- **Structural Genes**
  - Protein producing genes under shared regulation
  - A, B, and C in this example

Regulatory Proteins

- **Activator** – stabilizes polymerase binding

- **Repressor** – blocks polymerase binding/progression
**Induction of Transcription**

- Inducer – small molecule that binds to an activator or repressor and allows transcription to occur

**Inhibition of Transcription**

- Inhibitor – small molecule that binds to an activator or repressor and prevents transcription
- Corepressor – small molecule that binds to a repressor and prevents transcription
What are the small molecules that regulate operons?

- The genes of an operon encode proteins that function in a common pathway.

Substrate $\rightarrow$ Intermediate 1 $\rightarrow$ Intermediate 2 $\rightarrow$ Product

Protein A $\rightarrow$ Protein B $\rightarrow$ Protein C

+++ Substrate $\rightarrow$ Reaction Necessary $\rightarrow$ Transcription ON $\rightarrow$ Substrate = Inducer

+++ Product $\rightarrow$ Reaction Unnecessary $\rightarrow$ Transcription OFF $\rightarrow$ Substrate = Corepressor/Inhibitor