

# GENE REGULATION IN PROKARYOTES

☞ is most often mediated by regulator proteins that react to environmental signals by raising or lowering the transcription rates of specific genes

## Some definitions:

- 1. negative regulation:** genes under negative regulation are transcribed *unless* they are turned off by the regulator protein.
- 2. positive regulation:** genes under positive regulation are not transcribed *unless* they are turned on by a regulator protein.
- 3. constitutive genes:** genes that are expressed continually. Constitutive genes are sometimes called household genes since they are expressed in all cells at a low level.
- 4. operon:** a unit of bacterial gene expression & regulation; a *cluster* of genes whose expression is controlled by a *single* operator.
- 5. induction:** refers to switching on transcription (inducer interacts with the regulatory protein).
- 6. repression:** refers to inhibition of transcription by binding of repressor protein to a specific site on DNA.

## Operon (Regulon) Negative Control:

### Repressible

- trp operon
- Switched **ON** until corepressor activates
- Anabolic pathways
- Endproduct switches **OFF** own production

### Inducible

- lac operon
- Switched **OFF** until inducer activates
- Catabolic pathways
- Enzyme synthesis is switched **ON** by nutrient