

- Fill out the following statements that are ALWAYS true about lac and trp operons.
    - Because these are negatively controlled systems, a \_\_\_\_\_ protein is present.
    - Whenever the \_\_\_\_\_ protein is bound to its binding site on the DNA, gene expression is turned \_\_\_\_\_; therefore, transcription (can/cannot) take place.
1. Fill in the blanks below about the lac operon.
- Because the lac operon is negative \_\_\_\_\_, the lac operon is normally \_\_\_\_\_, but can be turned \_\_\_\_\_.
  - Under normal circumstances, the \_\_\_\_\_ protein is (bound/not bound) to the DNA. This turns transcription \_\_\_\_\_. When lactose enters the cell, it is converted to \_\_\_\_\_ and binds to the \_\_\_\_\_, which allows the repressor protein to (bind to/release) the DNA. This allows transcription to be turned \_\_\_\_\_. When all of the lactose is metabolized in the cell, the \_\_\_\_\_ protein (binds to/release) the DNA, allowing transcription to be turned \_\_\_\_\_.
  - When glucose levels are high, there is a low concentration of \_\_\_\_\_ which (increases/decreases) the level transcription and translation and vice versa.
2. Fill in the blanks below about the trp operon.
- Because the trp operon is negative \_\_\_\_\_, the trp operon is normally \_\_\_\_\_, but can be turned \_\_\_\_\_.
  - Under normal circumstances, the \_\_\_\_\_ protein is (bound/not bound) to the DNA. This causes transcription to be turned \_\_\_\_\_. When tryptophan, a(n) (inducer/corepressor) is present in the cell, it binds to the repressor protein and creates the \_\_\_\_\_ which (binds to/releases) the DNA. This allows transcription to be turned \_\_\_\_\_. When all of the tryptophan is used in the cell, the \_\_\_\_\_ protein (binds to/releases) the DNA, allowing transcription to be turned \_\_\_\_\_.
3. Explain the conditions needed for attenuation to occur. What regions of the mRNA pair when attenuation does NOT occur?