

WORKSHEET #9 (Chapter 18) - Gene Expression

Due Date: _____

Contributing group members:

- 1) What is an operon?

- 2) Make a table that compares the trp operon with the lac operon. In this table, include the following comparisons:
 - a. Are the genes in the operon part of a catabolic or anabolic pathway?
 - b. The genes in the operon code for enzymes — what do the enzymes in each operon system do?
 - c. Does each operon contain an operator? What does an operator do? Where is it located?
 - d. What is the name of the regulatory gene for each operon?
 - e. Without regulation, is this gene usually on or off?
 - f. Without regulation, is the repressor usually in an active or inactive form?
 - g. What effect does the presence of tryptophan (or lactose) have on the repressor and the overall expression of the gene?
 - h. Why are both of these operons considered to be an example of negative gene control?

- 3) Altering patterns of gene expression in prokaryotes would most likely serve the organism's survival in which of the following ways?
 - A) allowing environmental changes to alter the prokaryote's genome
 - B) allowing the organism to adjust to changes in environmental conditions
 - C) allowing each gene to be expressed an equal number of times
 - D) allowing young organisms to respond differently from more mature organisms
 - E) organizing gene expression so that genes are expressed in a given order

Use the following scenario to answer the following questions.

Suppose an experimenter becomes proficient with a technique that allows her to move DNA sequences within a prokaryotic genome.

- 4) If she moves the operator to the far end of the operon, which of the following would likely occur when the cell is exposed to lactose?
 - A) The operon will never be transcribed.
 - B) The repressor protein will no longer be produced.
 - C) The repressor will no longer bind to the operator.
 - D) The inducer will no longer bind to the repressor.
 - E) The structural genes will be transcribed continuously.