

## 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.