Gene Expression

Using your understanding of the operon model of the regulation of protein expression and the physical model you have constructed of the gene sequence that controls expression, work with your group to develop answers to these questions.

*Lac operon*

1. What happens if the promoter and operator in the lac operon are reversed? That is, does the rate of galactosidase increase, decrease, or remain unchanged, and why?

2. What happens if there is a silent mutation of the regulator gene in the lac operon?

3. What happens if there is a missense mutation of the regulator gene in the lac operon?

4. What happens if there is a nonsense mutation of the regulator gene in the lac operon?

5. Could a mutation of the regulator gene be present without producing a change in the rate at which protein is expressed?

6. What happens if there is a mutation in the operator gene in the lac operon?

7. If lactose is not broken down when it is present, how could one determine if the problem is one of regulation?

*Trp operon*

8. What happens if the promoter and operator trp operon are reversed? That is, does the rate of tyrptophan synthetase expression increase, decrease, or remain unchanged, and why?

9. What happens if there is silent mutation of the regulator gene in the trp operon?

10. What happens if there is missense mutation of the regulator gene in the trp operon?

11. What happens if there is nonsense mutation of the regulator gene in the trp operon?

12. What happens if there is a mutation in the operator gene in the trp operon?