**Introduction Questions**

***Genome Organization and Characterization of Mycobacteriophage Bxb1***

***Mediavilla et al., 2000***

1. What can be learned from studying mycobacteriophages? Why is this line of research important?
2. Cite the 3 most-characterized mycobacterophages.
3. Using the website <http://www.phagesdb.org>, locate the following information for the 3 phages cited above:
	1. Is the phage lytic or temperate?
	2. How large is the genome?
	3. Any tRNAs?
	4. How many putative genes?

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phage Name | Lytic or Temperate? | Size of genome? | tRNAs? | # of putative genes |
|  |  |  |  |  |
|  |  |  |  |  |
|  |  |  |  |  |

1. The authors describe genome structure (i.e how genes are arranged in the genome with respect to one another). Using information provided in the Introduction, describe the major role of genes located in the left arm and right arm of phage L5.
2. What is the “left arm” of the genome? The “right arm”? Draw a picture and label the left and right arms.
3. What is transcription?
4. What does it mean when a gene is expressed early or late in lytic growth? What types of genes may be required early on the lytic cycle of the phage? Later?
5. What is a stable lysogen?
6. Does the phage genome integrate randomly into the bacterium or is there a specific site of recombination?
7. Name the specific sequence (site) in the phage? In the bacterium?
8. Enzymes are often involved in phage integration and excision. Cite the enzymes involved in each.
9. Phage can be either temperate or lytic, yet even temperate phage will enter the lytic life cycle. How is a stable lysogen maintained? Which gene is the phage repressor in L5?
10. How does a phage repressor protein work?
11. Compare and contrast D29 to L5. How are they similar? How are they different?
12. Is it possible to have repressor binding sites and be lytic?
13. What would happen if D29 tried to infect L5 lysogens? Would you expect to see plaques or not?
14. The authors also discuss TM4. Compare/contrast TM4 with L5 and D29. What are some similarities? Differences?
15. What do you think might happen if the phage TM4 tried to infect L5 lysogens. Would you expect to see plaques or not?
16. Phage evolution is a very interesting field of study, but there is still much to be learned. Genomes are thought to evolve via 2 major mechanisms – vertical and horizontal gene transfer. In 1-2 sentences, describe horizontal gene transfer and vertical gene transfer.
17. In the last paragraph of the Introduction, the authors preview some of their new findings regarding the phage Bxb1. What makes Bxb1 interesting? List 5 reasons.