

The Genetics of Viruses and Bacteria

Chapter 18

1. TMV has been isolated from virtually all commercial tobacco products. Considering this, why is TMV infection not a risk faced by smokers?
2. Compare the effect on the host cell of a lytic (virulent) phage and a lysogenic (temperate) phage.
3. Why have bacteria not been driven to extinction by phages?
4. Scientists have discovered how to put together a bacteriophage with the protein coat of phage T2 and the DNA of T4. If this composite phage were allowed to infect an *E. coli*, then phages produced by this cell would have what type of DNA and what type of protein?
5. Distinguish between a capsid and an envelope.
6. RNA viruses have a viral RNA polymerase that differs from cellular RNA polymerase. Describe how they are different in terms of template and function.
7. Why is HIV called a retrovirus?
8. Describe two ways in which a preexisting virus can become an emerging virus.
9. Describe the benefit of transformation and conjugation to bacterial cells.
10. A microbiologist found that some bacteria infected by a particular phage had developed the ability to produce a particular enzyme which they could not make before they were infected. How did this occur? What is the term used for this phenomenon?
11. What are transposons?
12. Explain how the tryptophan operon allows a bacterial cell to regulate the synthesis of tryptophan.
13. Using the *trp* and *lac* operons as examples, explain why bacteria might sometimes need a repressible operon and at other times need an inducible operon.
14. How does binding of the tryptophan corepressor to the *trp* repressor alter repressor function and transcription? What about the binding of the *lac* inducer to the *lac* repressor?
15. Describe the binding of RNA polymerase, repressors, and activators to the *lac* operon when both lactose and glucose are scarce. What is the effect of these scarcities on transcription of the *lac* operon?
16. A certain mutation in *E. coli* changes the *lac* operator so that the active repressor cannot bind. How would this affect the cell's production of β -galactosidase? Would this be good or bad for the cell.