

Viruses and Bacteria

Section 1: Viruses

Viruses

- The word virus comes from the Latin language
 - “_____”
- About 100 years ago in what is now Ukraine, an epidemic of _____ occurred that seriously threatened the _____
- The disease-causing nature of the _____ from infected tobacco leaves was discovered by the Russian biologist _____

- A few years later, the Dutch scientist _____ determined that tiny particles in the juice caused the disease
 - _____

What is a Virus?

- Viruses have distinct structures that are complex and fascinating
- A virus is a _____ particle made up of _____ and _____ that can invade living cells

Structure of a Virus

- A typical virus is composed of a _____ of nucleic acid surrounded by a protein coat called a _____
- The capsid _____ the nucleic acid core
- The nucleic acid core is either _____ or _____ but never both
- A more complex structure occurs in certain viruses known as _____
 - Viruses that invade _____
- A bacteriophage has a _____ region, composed of a capsid (protein coat), a nucleic acid _____, and a _____
- Bacteriophages are interesting and relatively easy to study because their hosts _____
- Viruses come in a variety of _____

Specificity of a Virus

- Usually, specific viruses will infect specific organisms
- There are some viruses that will infect only _____
- Others may infect more than one animal group, such as rabies

Life Cycle of a Lytic Virus

- In order to reproduce, viruses must _____, or infect, a _____
- However, not all viruses invade living cells in exactly the same way
- When T4 bacteriophages invade living cells, they cause cells to _____, or burst
 - _____

Infection

- A virus is activated by chance contact with the right kind of host cell
- In the case of the T4, molecules on its _____ attach to the surface of a _____
- The virus then _____ into the cell
- In most cases, the complete virus particle itself never enters the cell

Growth

- Soon after entering the host cell, the DNA of the virus goes into action
- In most cases, the host cell _____ between its own DNA and the DNA of the virus
- Consequently, the very same enzyme _____ that makes mRNA from the cell's own DNA begins to make mRNA from the genes of the virus
 - _____ and _____ the infected host cell

Replication

- As the virus takes over, it uses the materials of the host cell to make _____ of its own protein coat and DNA
- Soon the host cell becomes filled with _____ of viral DNA molecules

- During the final stage of reproduction, the DNA molecules serve as the starting points around which new virus particles are assembled
- Before long, the infected cell lyses and releases hundreds of virus particles that may now _____
- Because the host cell is lysed and destroyed, this process is called a _____

Lysogenic Infection

- Another way in which a virus infects a cell is known as a _____

- In a lysogenic infection, the virus does not reproduce and lyse its host cell
- Instead, the DNA of the virus enters the cell and is _____

- Once inserted into the host cell's DNA, the viral DNA is known as a _____
- The prophage may remain part of the DNA of the host cell for _____

Prophage Activity

- The presence of the prophage can _____ of other viruses into the cell and may even add useful DNA to the host cell's DNA
- A virus may not stay in the prophage form indefinitely
- Eventually, the DNA of the prophage will become _____, remove itself from the DNA of the host cell, and direct the synthesis of _____
- A series of genes in the prophage itself maintains the lysogenic state
- Factors such as sudden changes in _____ and availability of _____ can turn on these genes and _____

Retroviruses

- One important class of viruses are the _____
- Retroviruses contain _____ as their genetic information

- When retroviruses infect a cell, they produce a _____ copy of their _____
- This DNA, much like a prophage, is inserted into the DNA of the host cell
- Retroviruses received their name from the fact that their genetic information is copied _____
 - From _____
- Retroviruses are responsible for some types of _____ in animals and humans
- One type of retrovirus produces a disease called _____

Viruses and Living Cells

- Viruses must infect _____ in order to carry out their functions of _____ and _____
- They also depend upon their hosts for respiration, nutrition, and all of the other functions that occur in living things
- Viruses are _____
 - Depends entirely upon another living organism for its existence in such a way that it _____ that organism
- Because it is possible to study the genes that viruses bring into cells when they infect them, viruses have been extremely valuable in _____
- Some viruses are now being used in _____
- It is possible that modified viruses may one day be routine medical tools

Origin of Viruses

- Although viruses are smaller and simpler than the smallest cells, they could not have been much like the _____
- Viruses are completely dependent upon living cells for growth and reproduction, and they _____ their host cells
- It seems more likely that viruses developed after living cells
- In fact, the first viruses may have evolved from the genetic material of living cells and have continued to evolve, along with the cells they infect, over _____

