

## Mastery Series: Viral Life Cycles

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1. Before a virus can cause any harm, it must \_\_\_\_\_ to a host cell and somehow get its \_\_\_\_\_ inside.
  - a. Bacteriophages \_\_\_\_\_ their DNA.
  - b. Animal viruses trigger \_\_\_\_\_ into the host cell.
2. The virus can only attach to cells that it matches to a \_\_\_\_\_ on the host cell surface.
3. \_\_\_\_\_ is an antiviral that inhibits viral attachment.
4. Give three viral names that imply the virus is typically found in a different animal than humans.
5. What substance do virally-infected cells release?
6. What is the effect of this substance?
7. Describe the lytic cycle.
8. Describe the lysogenic cycle.
9. What triggers a lysogenic virus to enter the lytic cycle?
10. What triggers virus to enter a lysogenic (latent) phase.... Assuming it is able to do so.
11. Why can't an RNA virus be lysogenic?
12. Why can a retrovirus (made of RNA) be lysogenic?
13. For the following, which can be lysogenic?
  - a. Rhinoviruses
  - b. Chickenpox
  - c. Genital Herpes
  - d. Hepatitis B
  - e. Enteroviruses (which cause a short-term diarrhea)
14. What is an oncogene?
15. How could a virus turn on an oncogene?
16. Which viruses are strongly associated with which type of cancers?
17. Based on your knowledge thus far, what is the relationship between varicella (chickenpox) and shingles?

## Mastery Series ANSWERS: Viral Life Cycles

- Before a virus can cause any harm, it must **ATTACH** to a host cell and somehow get its **nucleic acid** inside.
  - Bacteriophages **inject** their DNA.
  - Animal viruses trigger **endocytosis** into the host cell.
- The virus can only attach to cells that it matches to a **receptor** on the host cell surface.
- Acyclovir** is an antiviral that inhibits viral attachment.
- Give three viral names that imply the virus is typically found in a different animal than humans. **Avian Bird Flu; Swine Flu; Chickenpox; Cowpox**
- What substance do virally-infected cells release? **Interferon**
- What is the effect of this substance? **Communicates to other cells to limit endocytosis**
- Describe the lytic cycle. **Virus immediately uses the host cell machinery to produce thousands of copies of itself, which then burst from the host cell to infect nearby cells.**
- Describe the lysogenic cycle. **DNA viruses may incorporate into the DNA of the host cell, where they could lie dormant for months or years.**
- What triggers a lysogenic virus to enter the lytic cycle? **Immunocompromise: physical (temperature, exercise, injury, fatigue); or emotional stress**
- What triggers a virus to enter a lysogenic (latent) phase.... assuming it is able to do so.? **active threat of the host immune system**
- Why can't an RNA virus be lysogenic? **It cannot incorporate into the DNA, so it runs its course quickly (in general)**
- Why can a retrovirus (made of RNA) be lysogenic? **It can make DNA from its RNA, then use that to incorporate into our DNA.**
- For the following, which can be lysogenic?
  - Rhinoviruses: **NO**
  - Chickenpox: **YES**
  - Genital Herpes: **YES**
  - Hepatitis B: **YES**
  - Enteroviruses (which cause a short-term diarrhea): **NO**
- What is an oncogene? **A gene that is commonly found to be mutated in cancer. These genes had a normal function in the body, but then a virus or other genomic effect caused them to over-or-under perform, leading to cancer. For example, an over-performing mitosis gene could be an oncogene; an under-performing DNA repair gene could be an oncogene.**
- How could a virus turn on an oncogene? **By incorporating into the regulatory part of the gene, it may increase or decrease gene activity.**
- Which viruses are strongly associated with which type of cancers? **Epstein-Barr; Hep B (both DNA viruses); HPV**
- Based on your knowledge thus far, what is the relationship between varicella (chickenpox) and shingles? **Varicella goes latent, reappearing during later immunosuppression to cause shingles**