Viral Infections

Heather Walls

Purpose

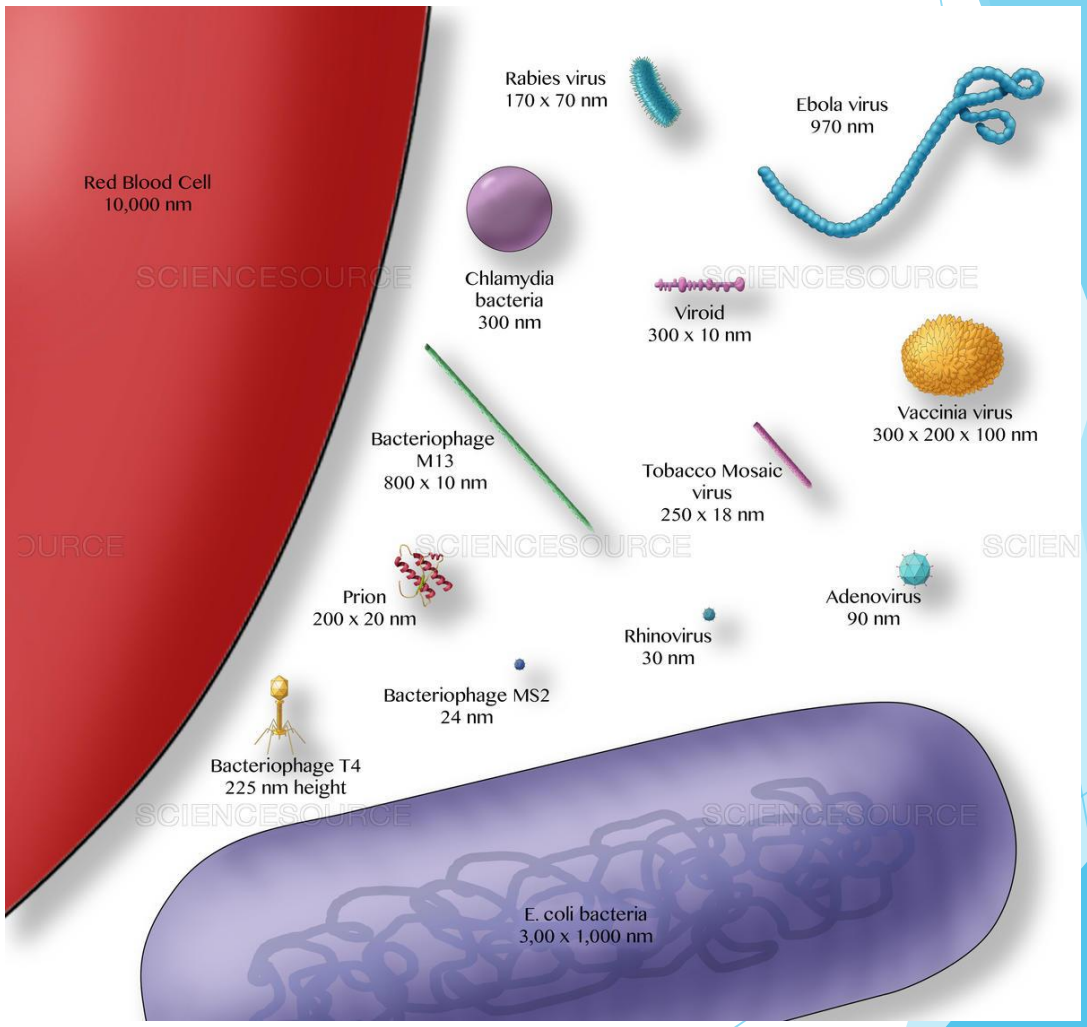
- I can compare the structures of viruses to cells, describe viral reproduction, and describe the role of viruses in causing diseases such as human immunodeficiency virus (HIV) and influenza.
- I can compare and contrast the lytic and lysogenic cycles of viral reproduction.

Why Should I Care?

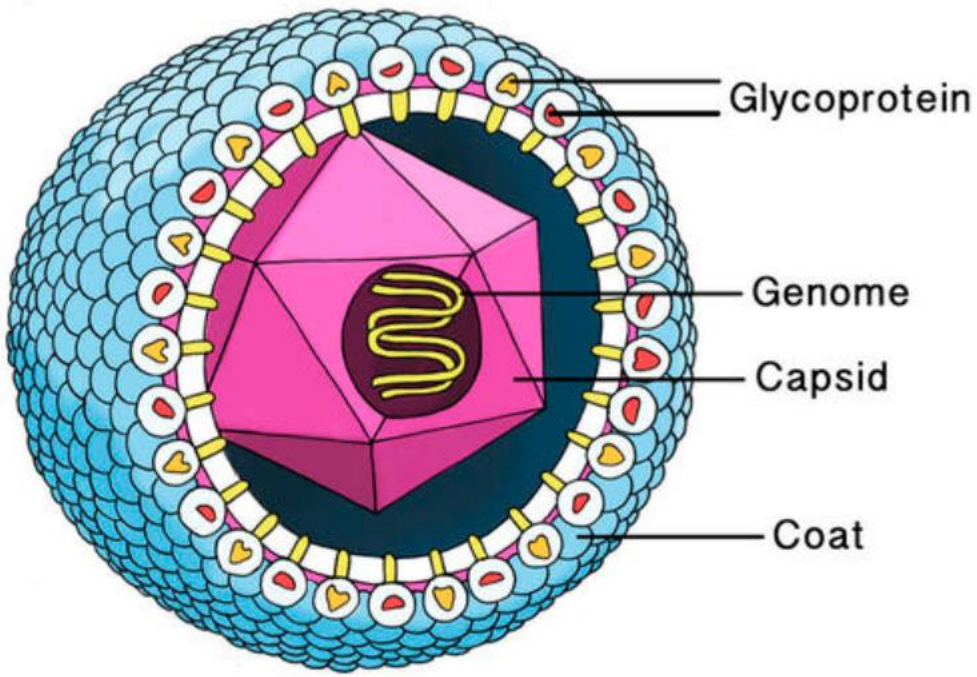
- Viruses cause many diseases that range from mildly irritating to life-threatening.
- Some viruses will cause birth defects in unborn children.
- Viral diseases don’t have a cure. We can treat the symptoms, but the immune system must fight the invaders on their own.
- Viruses can mutate and scientists must constantly try to stay ahead of that with effective vaccines.
- Scientists are working on genetically engineering viruses to be used for medical treatments.

Viruses

- Not truly living cells
- Cannot reproduce on their own; must have a host cell
- Consists of DNA or RNA surrounded by a capsid
- DNA can change as it is replicated; this allows viruses to evolve
- Very small compared to bacteria
- Symptoms and damage depends on the type of cell the virus infects

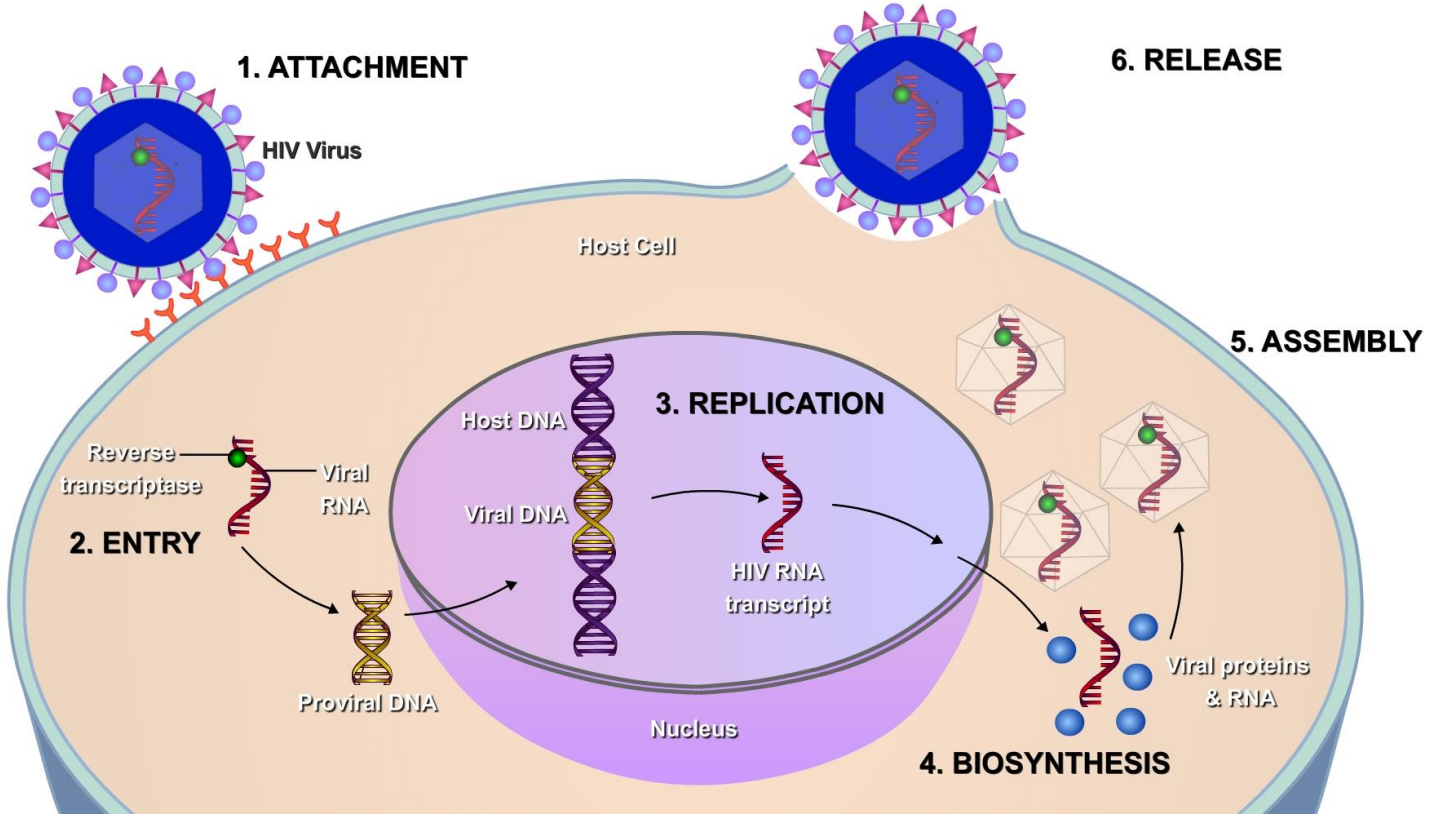


Basic Viral Structure

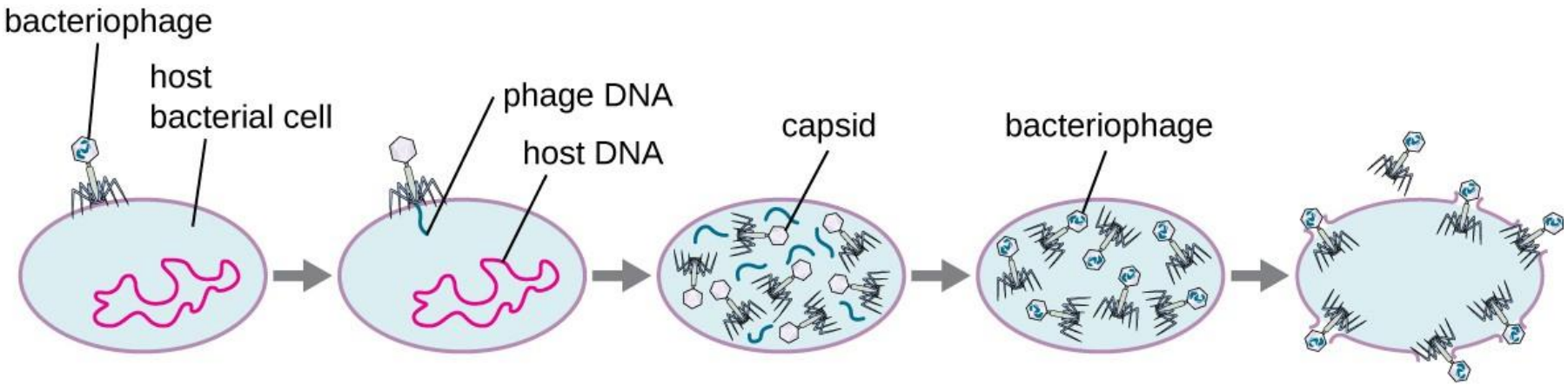


- Genome-DNA or RNA that contains the instructions for making viruses
- Capsid-protective protein coat around the genome
- Glycoprotein & coat-some viruses have another layer

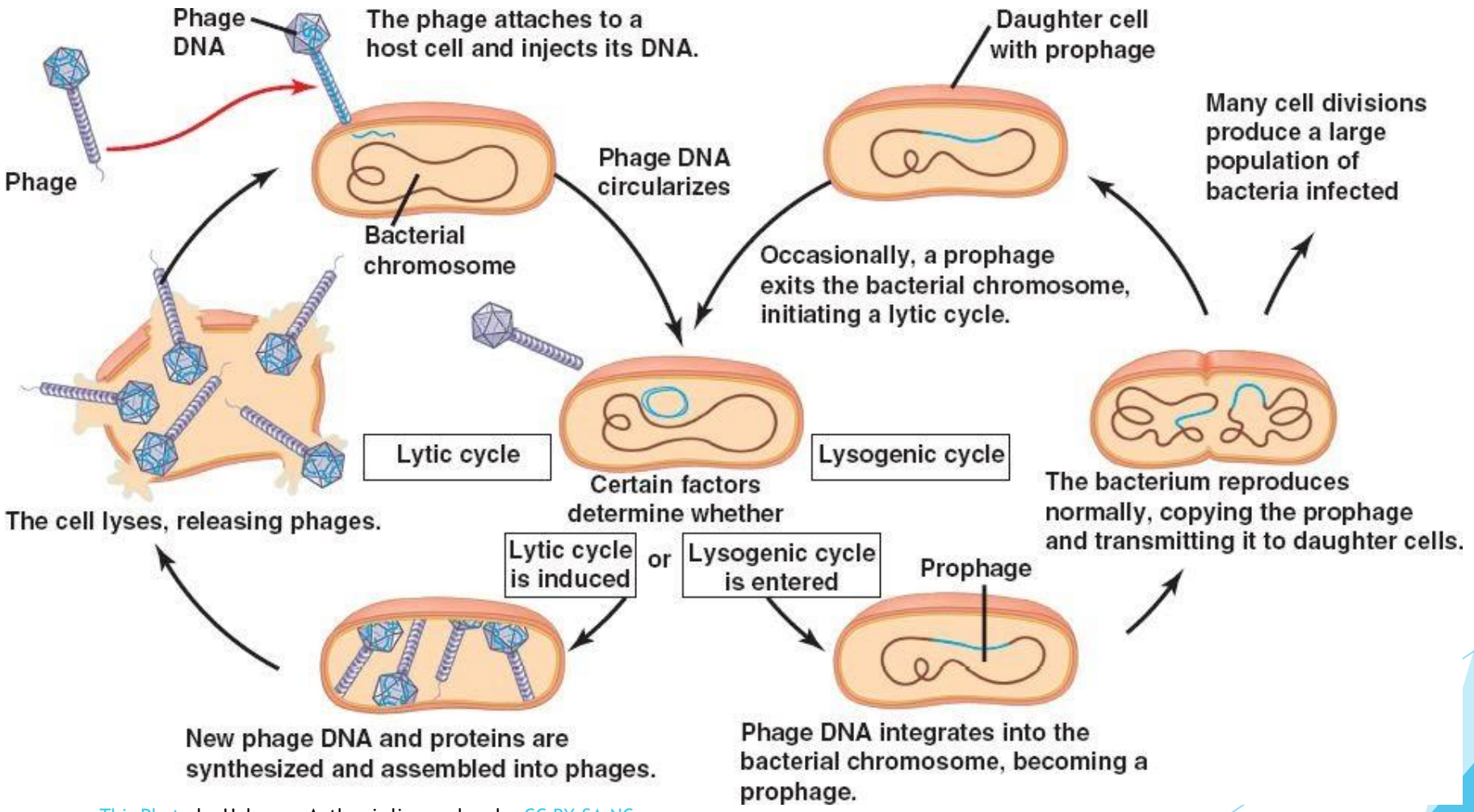
Basic Virus Reproduction



Lytic Cycle



Lysogenic Cycle



Treating Viruses

Viruses are not living and cannot be killed by antibiotics in the body.

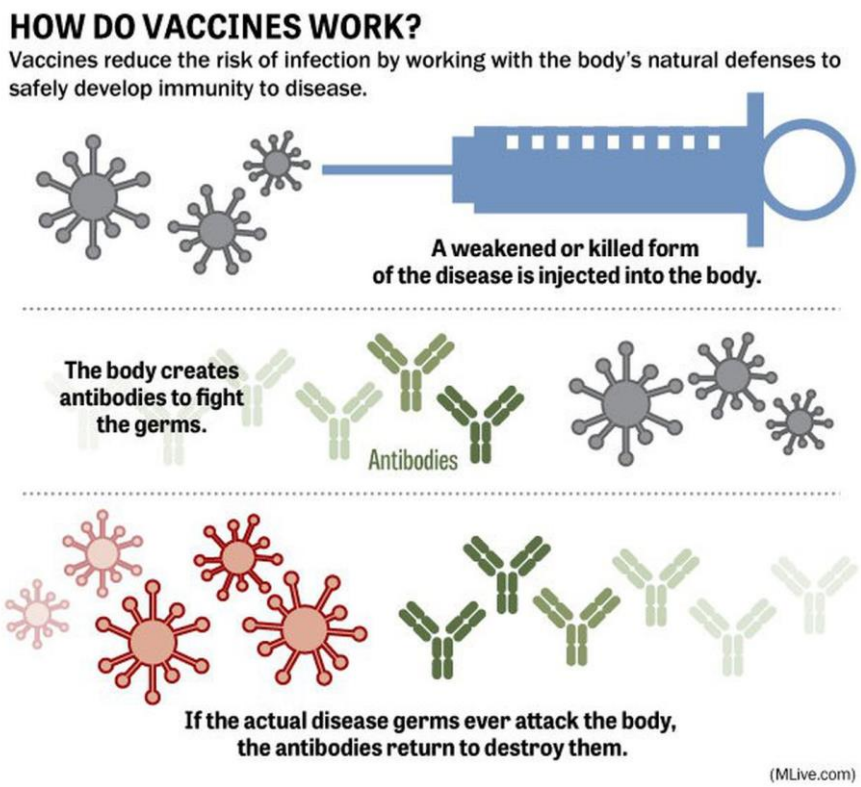
Viral protein coats can be broken down by common cleaners on surfaces; so cleaning and washing hands can prevent the spread.

Recently antiviral drugs have been developed to combat HIV, herpes, hepatitis, and influenza viruses.

Most treatments for viruses are focused on treating the symptoms and keeping a person comfortable

How Vaccines Work

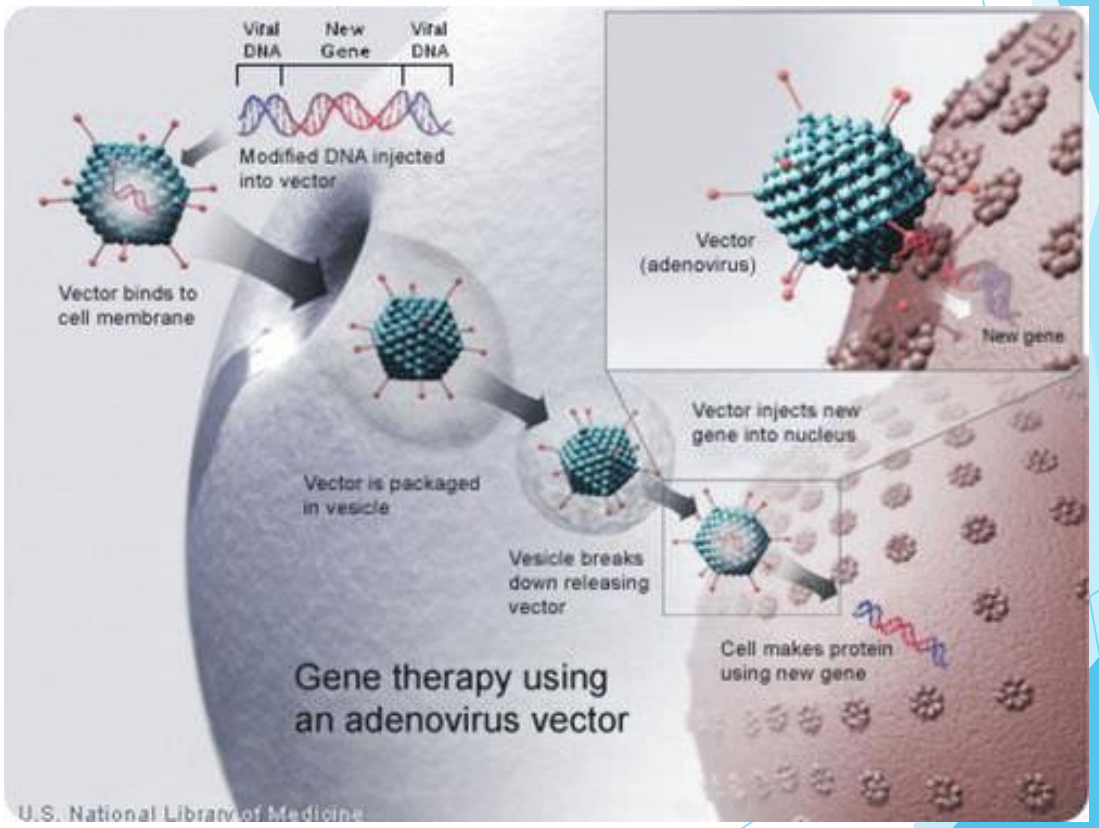
- Vaccines introduce some part of the virus (antigens) to create an immune response in the body.
- The body produces antibodies to help protect them against future infections.
- If the body is exposed to the pathogen again, the body is ready to fight it and prevent illness.
- Vaccines have greatly reduced the number of illnesses or deaths caused by polio, measles, mumps, and rubella.
- Smallpox has been eradicated from nature since 1979 thanks to vaccines



Viral Evolution

Viruses in Medicine

- Gene therapy
- Cancer treatments
- Alternative to antibiotics to fight antibiotic resistant bacteria



Follow-up Questions

- How do viruses cause disease?
- How can we prevent the spread of diseases?
- How does the lytic cycle compare to the lysogenic cycle?
- Why don’t we have a vaccine for all viruses?
- How can viruses be used in future research?