

# VIRAL STRUCTURE

- Pathogen list:
  - Bacteria
  - Protists
  - Helminths
  - Fungi
  - Prions
  - **Viruses**
- Viruses are also known as **Phages**.
- A virus that infects a bacterial cells is called a **bacteriophage**.
- Viruses are obligate intracellular parasites, which means they have to (are “obligated”) to live inside living cells (“intracellular”) and they are considered parasites because they use our ribosomes and amino acids to build their capsids without giving us anything good in return.
  - This means that to grow viruses to study and make vaccines, they need to be grown in living cells.
  - Chicken eggs are frequently used, meaning there will be traces of egg protein in many vaccines.
- All viruses have a:
  - nucleic acid in the form of DNA or RNA that contains genes to build the capsid
    - ❖ RNA viruses are most common (examples: coronaviruses, rotavirus, and influenza)
    - ❖ DNA viruses are capable of integrating into our DNA (examples: Herpesviruses, Hepatitis B, and papilloma viruses)
      - ✓ Increased risk of mutation, turning on cancer genes
      - ✓ Latent infections (can cause disease years down the road)
    - ❖ Retroviruses (example: HIV)
      - ✓ Contain polymerase that converts their RNA into DNA and they are also able to integrate into the host DNA (example: HIV)
  - polymerase enzyme capable of replicating their nucleic acid
  - capsid
    - ❖ composed of many small capsomere proteins. The capsid is assembled within the host cell using host amino acids and ribosomes.
    - ❖ Often have beautiful geometric shapes (unfortunately, sometimes deadly, as in the case of the *Ebola* virus)
- Most animal viruses have a:
  - Lipid coat
    - ❖ Acquired as the virus leaves host cell; it takes some membrane with it
    - ❖ “spikes” on influenza viral envelope are key for entering host cells
- Viruses are known for antigenic drift