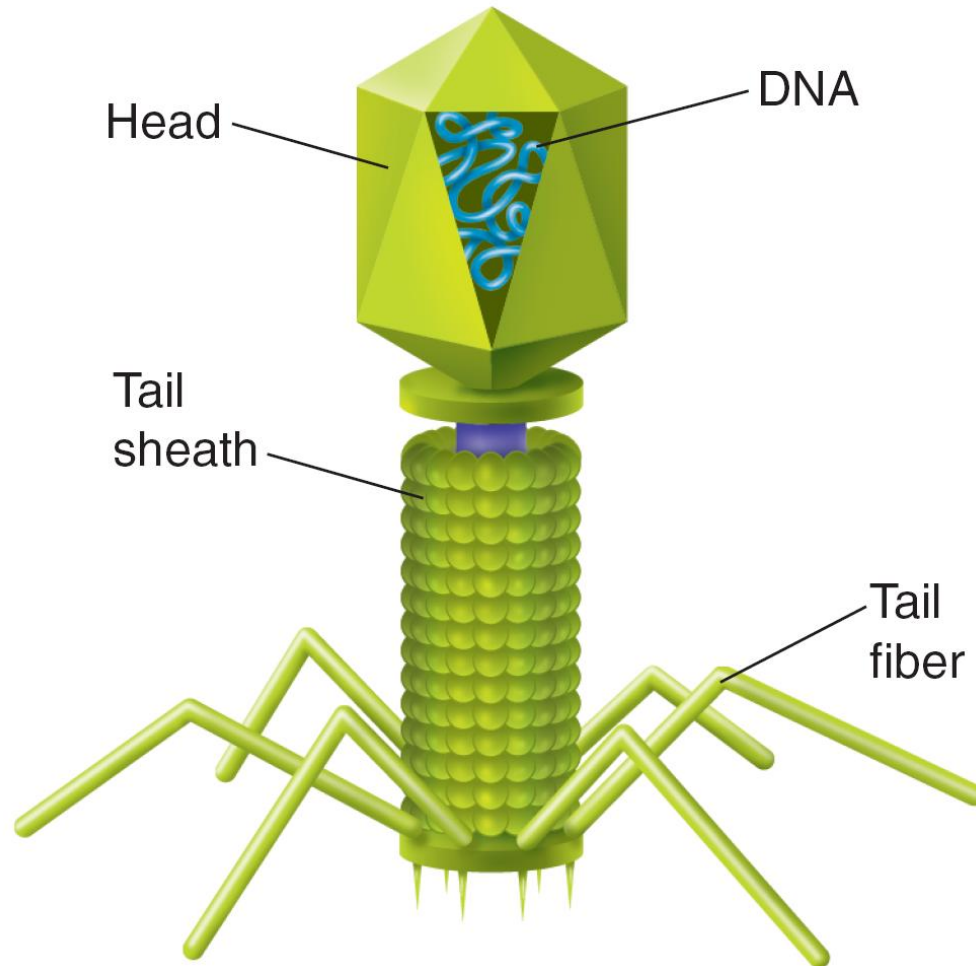
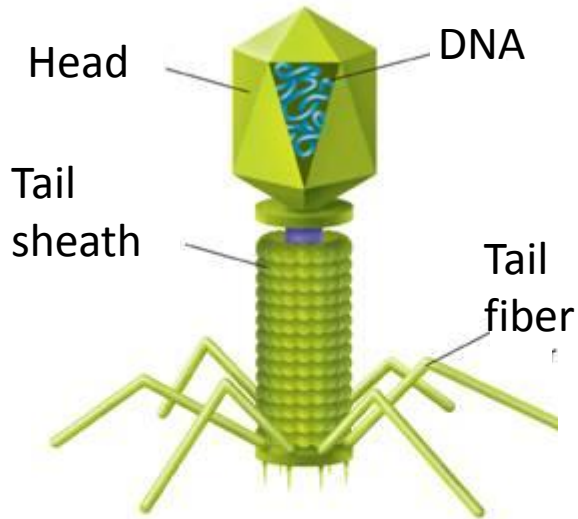


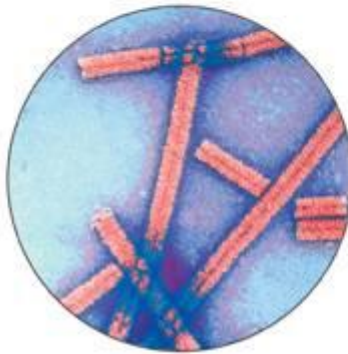
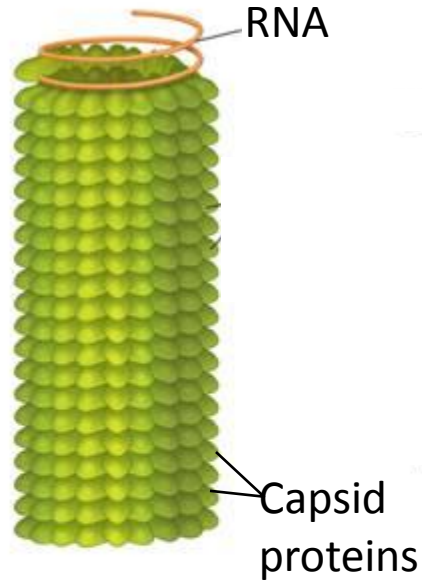
# T4 Bacteriophage



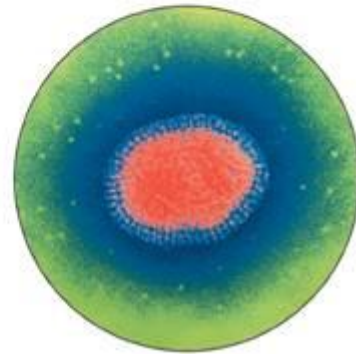
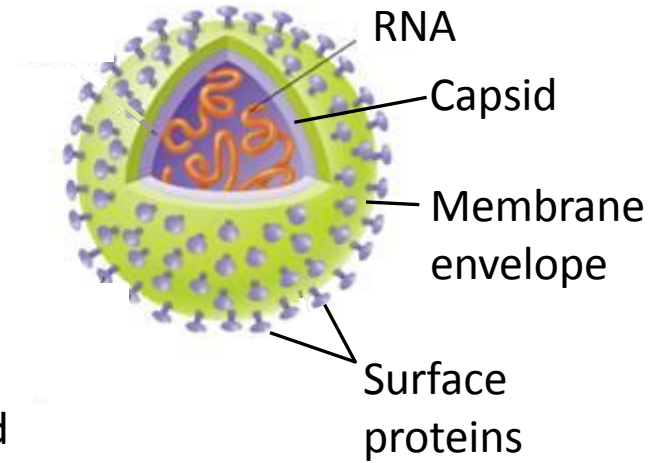
T4 Bacteriophage



Tobacco Mosaic Virus



Influenza Virus

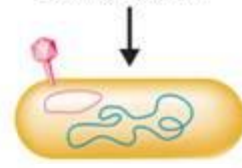


# What Is a Virus?

- A typical **virus** is composed of a **core of DNA or RNA** surrounded by a **protein coat**.
- A **capsid** is the virus's **protein coat**.
- Capsid proteins **bind to receptors on the cell surface** and “trick” the cell into allowing it inside.
- Once inside, **viral genes** are expressed and the cell **transcribes and translates** them into **viral capsid proteins**.
- The host cell may make copies of the virus, and be destroyed



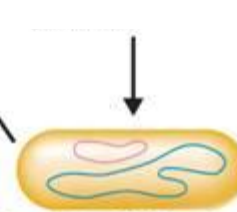
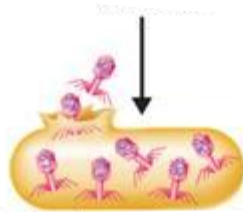
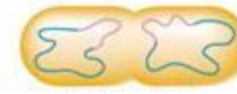
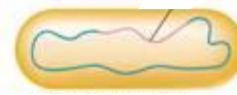
Bacteriophage injects DNA into bacterium



Bacteriophage DNA forms a circle

Lytic Infection

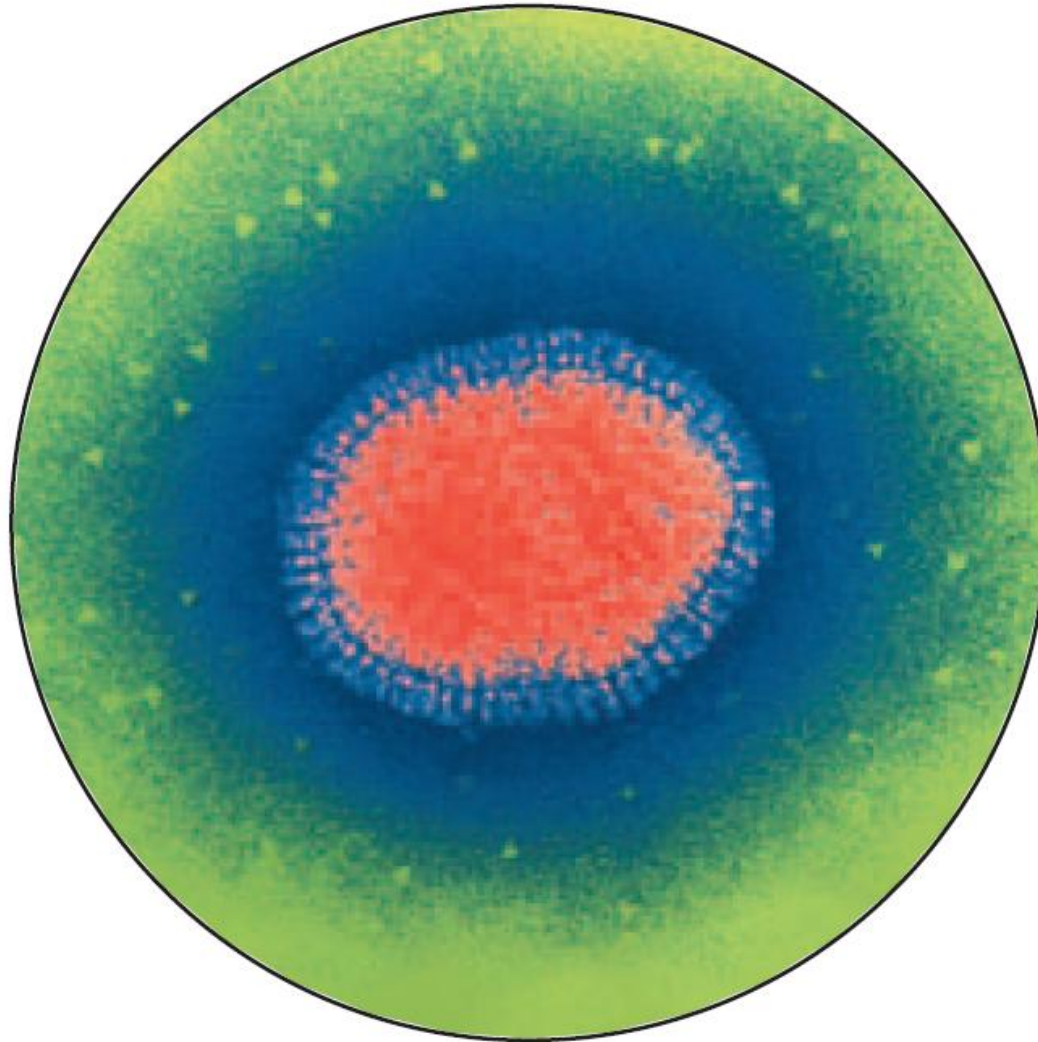
Lysogenic Infection



# Retroviruses

- **Retroviruses** contain **RNA** as their genetic information.
- When retroviruses infect cells, they **make a DNA copy** of their RNA.
- This DNA is **inserted into the DNA** of the host cell.
- A retrovirus' genetic information is **copied backward—from RNA to DNA**.
- The virus that causes **AIDS** is a retrovirus.

# 19–3 Diseases Caused by Bacteria and Viruses



- Bacteria produce disease in one of two general ways.
  - Some bacteria damage the cells and tissues of the infected organism directly by breaking down the cells for food.
  - Other bacteria release toxins (poisons) that travel throughout the body interfering with the normal activity of the host.



<b>Disease</b>	<b>Effect on Body</b>
<b>Lyme disease</b>	"Bull's-eye" rash at site of tick bite, fever, fatigue, headache
<b>Tetanus</b>	Lockjaw, stiffness in neck and abdomen, difficulty swallowing, fever, elevated blood pressure, severe muscles spasms
<b>Tuberculosis</b>	Fatigue, weight loss, fever, night sweats, chills, appetite loss
<b>Bacterial meningitis</b>	High fever, headache, stiff neck, nausea, fatigue
<b>Strep throat</b>	Fever, sore throat, headache, fatigue, nausea



# Bacterial Disease in Humans

- Many **bacterial diseases** can be **prevented by vaccines**.
- A **vaccine** is a **preparation of weakened or killed pathogens**.
- When injected into the body, a virus may **prompt the body's immunity** to the disease.
- **Immunity** is the body's **ability to destroy new pathogens**.

# Bacterial Disease in Humans

- If infection occurs, **drugs can be used** to destroy bacteria.
- These drugs include **antibiotics**, which are compounds that **block the growth and reproduction** of bacteria.
- A reason for increased human life expectancy is an increased understanding of how to prevent and cure bacterial infections.

# Controlling Bacteria

- **Sterilization by Heat**
  - Sterilization destroys bacteria by subjecting them to great heat.
  - Most bacteria are killed by **prolonged high temperatures**.
- **Disinfectants**
  - Disinfectants are **chemical solutions** that kill pathogenic bacteria.
  - They are used to clean rooms where bacteria may flourish
- **Food Storage and Processing**
  - Bacteria can cause food to spoil.
  - **Refrigerated food stays fresh longer** because the bacteria will **take longer to multiply**.
  - Boiling, frying, or steaming can sterilize certain foods.

<b>Disease</b>	<b>Effect on Body</b>
<b>Common cold</b>	Sneezing, sore throat, fever, headache, muscle aches
<b>Influenza</b>	Body aches, fever, sore throat, headache, dry cough, fatigue, nasal congestion
<b>AIDS</b>	Helper T cells, which are needed for normal immune system function, are destroyed
<b>Chicken pox</b>	Skin rash of blisterlike lesions
<b>Hepatitis B</b>	Jaundice, fatigue, abdominal pain, nausea, vomiting, joint pain
<b>West Nile</b>	Fever, headache, body ache

- **Viroids**

- Viroids are **single-stranded RNA** molecules that have **no surrounding capsids**.
- Viroids enter an infected cell and synthesize new viroids.
- They then **disrupt the cell's metabolism** and stunt the growth of the entire plant.
- Viroids **cause disease in plants**

- **Prions**

- Prions contain only protein—no DNA or RNA.
- Prions cause disease by forming protein clumps. These clumps induce normal protein molecules to become prions.
- Eventually, there are so many prions in the nerve tissue that cells become damaged.
- Mad cow disease may be caused by prions.
- Prions cause disease in animals