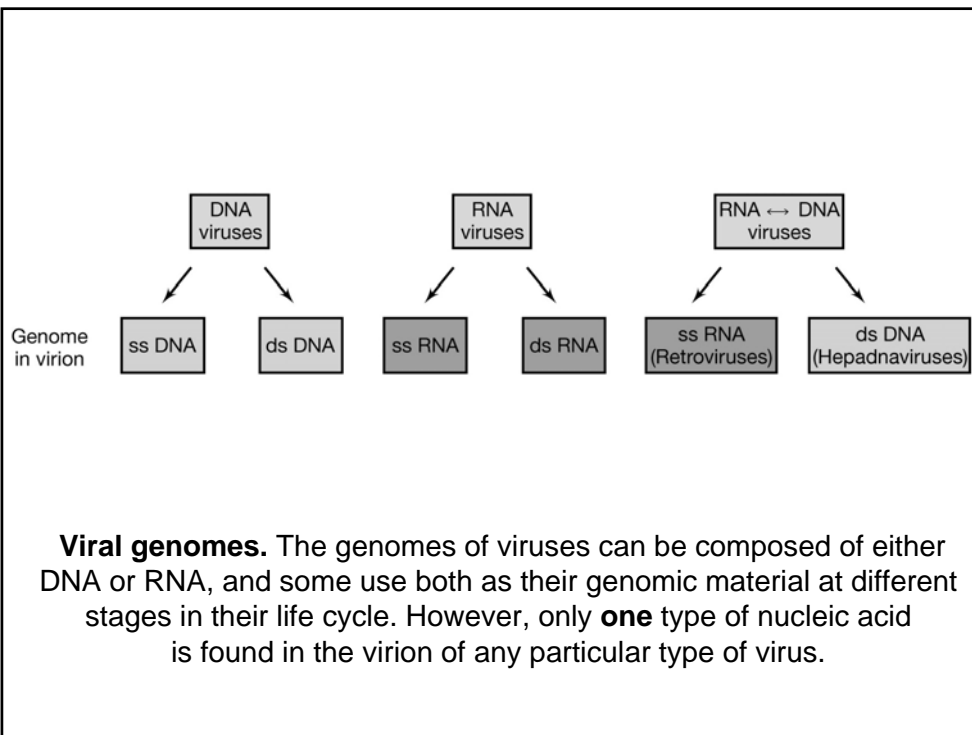
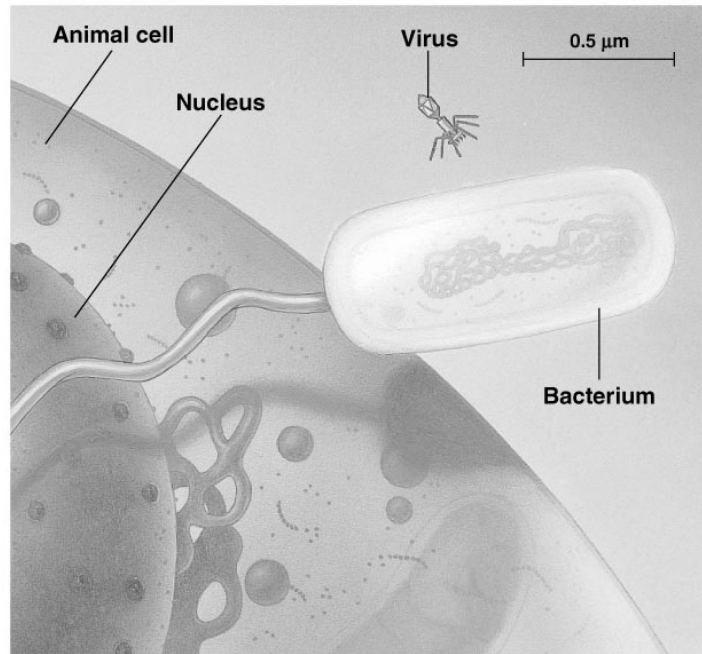


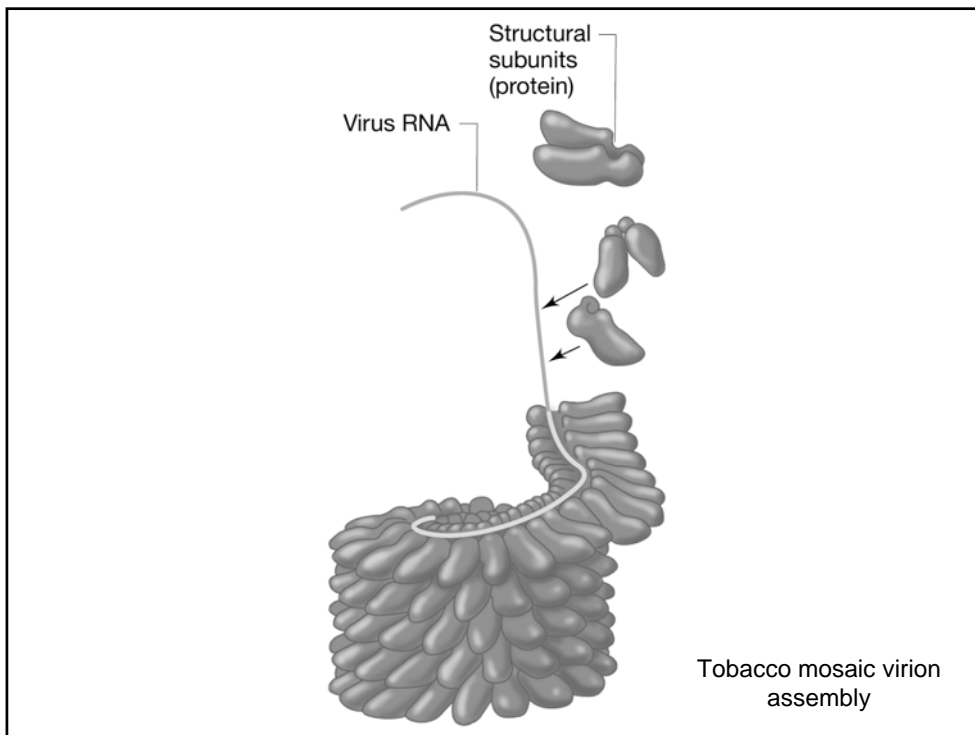
Comparing the size of a virus, a bacterium, and a eukaryotic cell



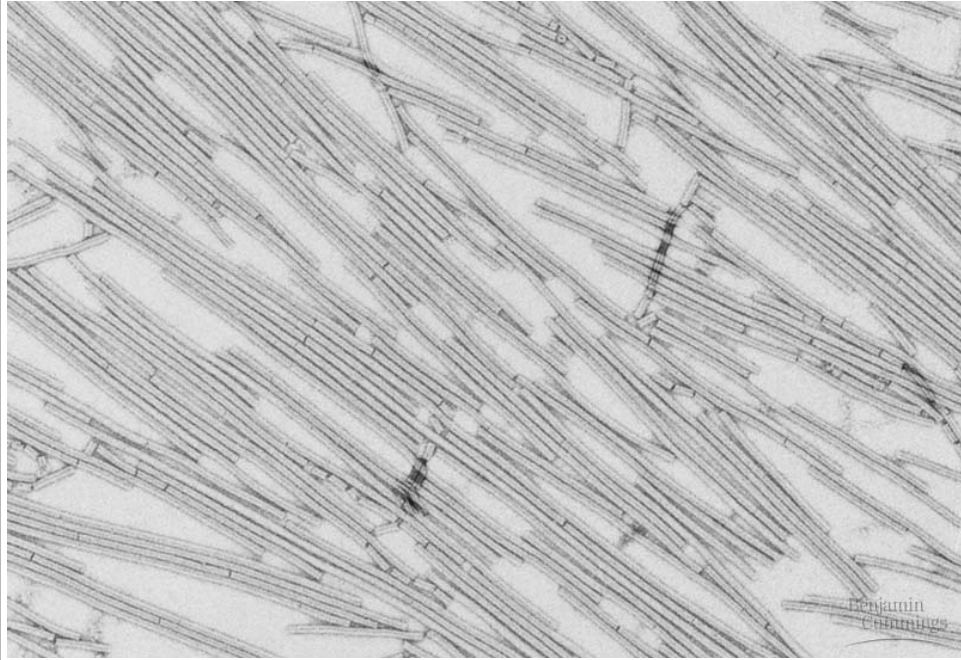
Classes of Animal Viruses, Grouped by Type of Nucleic Acid

| Table 18.1 Classes of Animal Viruses, Grouped by Type of Nucleic Acid | |
|---|--|
| Class* | Examples/Diseases |
| I. dsDNA** | |
| Papovavirus | Papilloma (human warts, cervical cancer); polyoma (tumors in certain animals) |
| Adenovirus | Respiratory diseases; some cause tumors in certain animals |
| Herpesvirus | Herpes simplex I (cold sores), herpes simplex II (genital sores); varicella zoster (chicken pox, shingles); Epstein-Barr virus (mononucleosis, Burkitt's lymphoma) |
| Poxvirus | Smallpox; vaccinia, cowpox |
| II. ssDNA | |
| Parvovirus | Roseola; most parvoviruses depend on co-infection with adenoviruses for growth |
| III. dsRNA | |
| Reovirus | Diarrhea; mild respiratory diseases |
| IV. ssRNA that can serve as mRNA | |
| Picornavirus | Poliovirus; rhinovirus (common cold); enteric (intestinal) viruses |
| Togavirus | Rubella virus; yellow fever virus; encephalitis viruses |
| V. ssRNA that is a template for mRNA | |
| Rhabdovirus | Rabies |
| Paramyxovirus | Measles; mumps |
| Orthomyxovirus | Influenza viruses |
| VI. ssRNA that is a template for DNA synthesis | |
| Retrovirus | RNA tumor viruses (e.g., leukemia viruses); HIV (AIDS virus) |

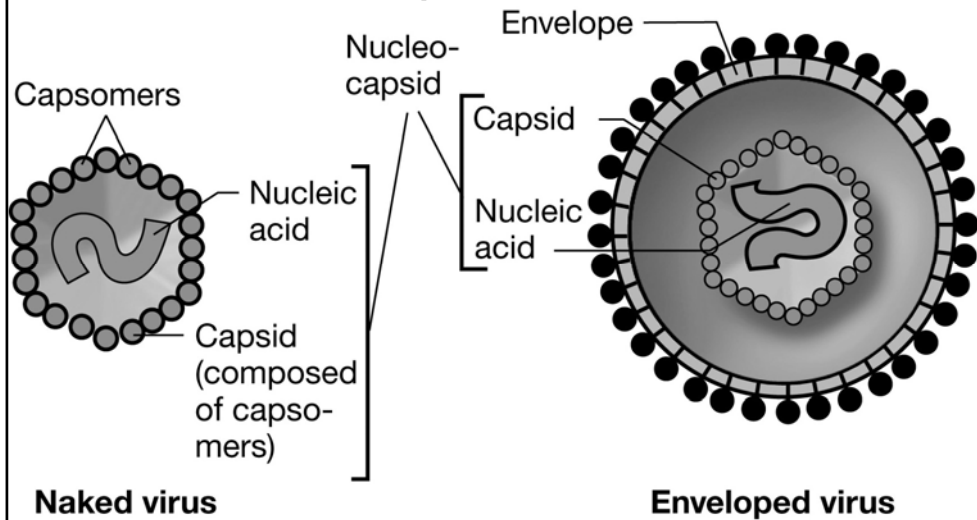
*The subclasses within each class differ mainly in capsid structure and in the presence or absence of a membranous envelope.
**ds = double-stranded; ss = single-stranded.

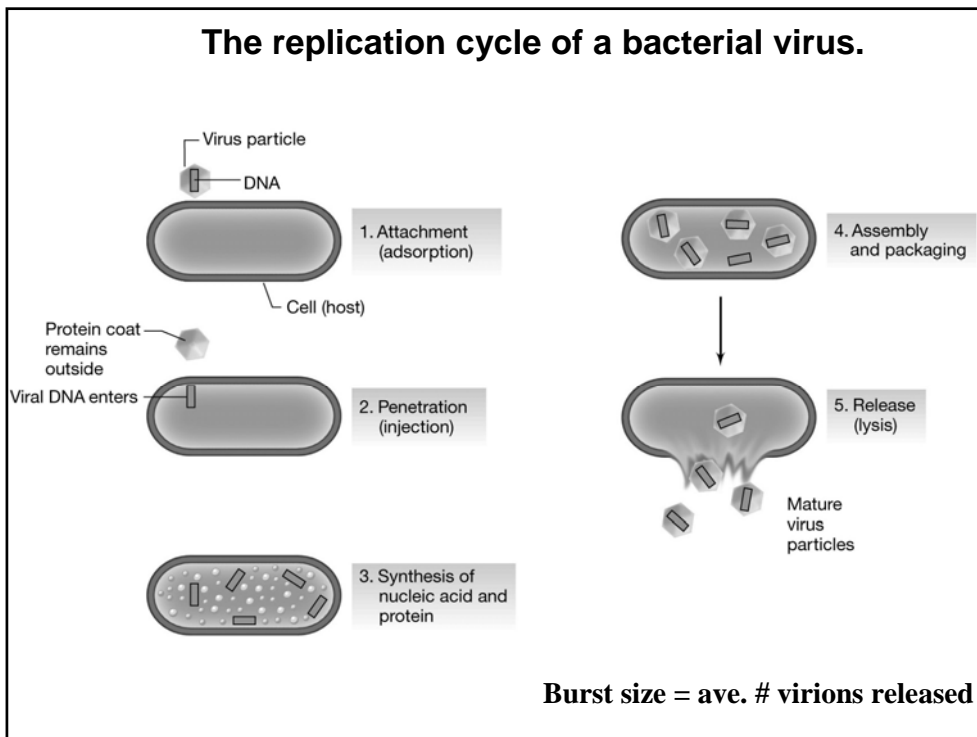
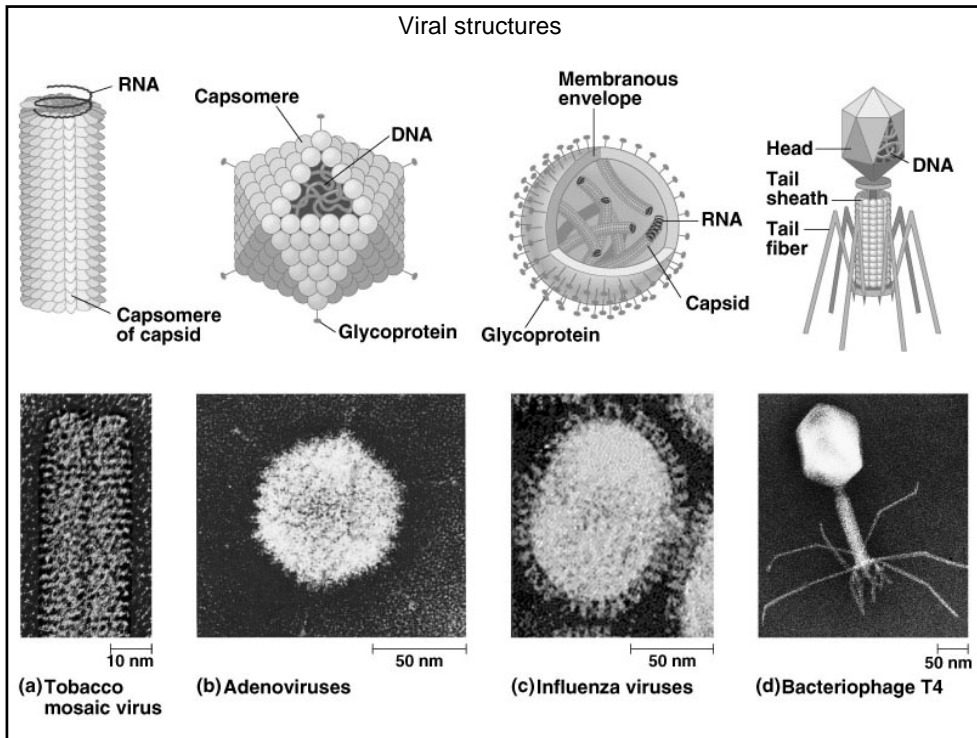


Tobacco mosaic virions

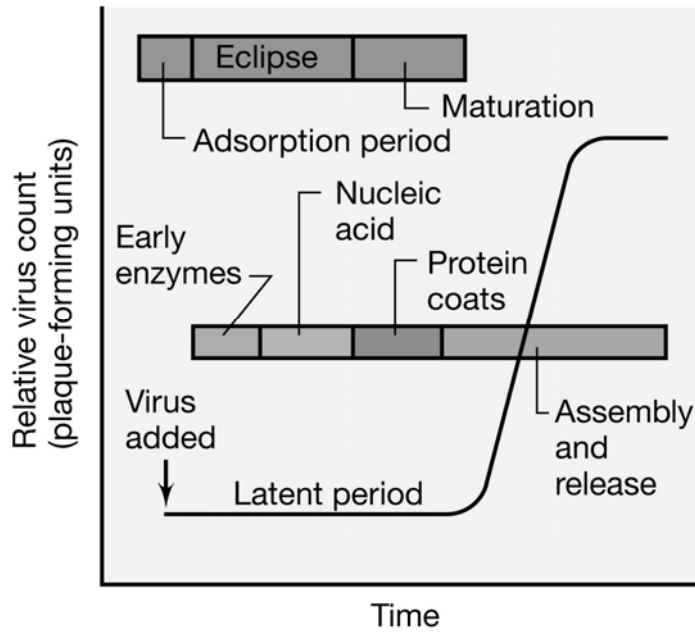


Comparison of naked and enveloped virus, two basic types of virus particles.

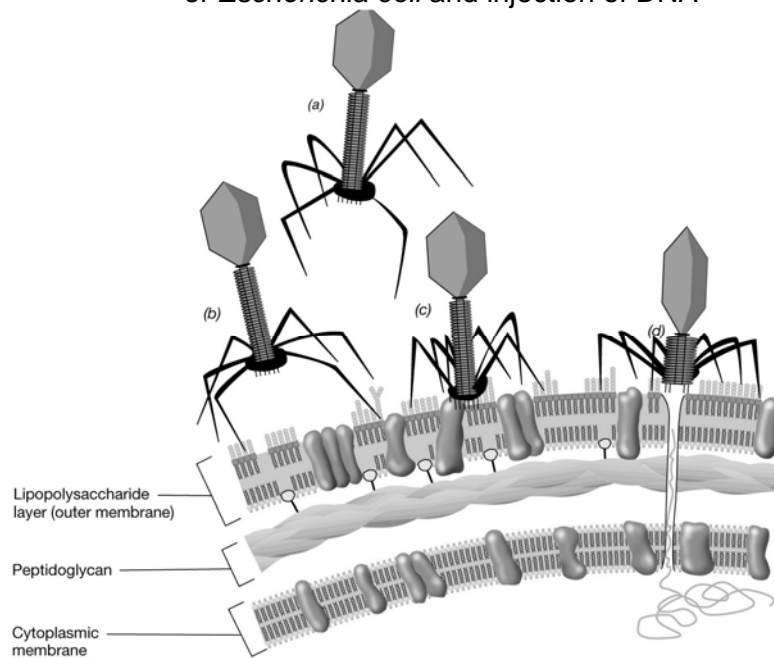




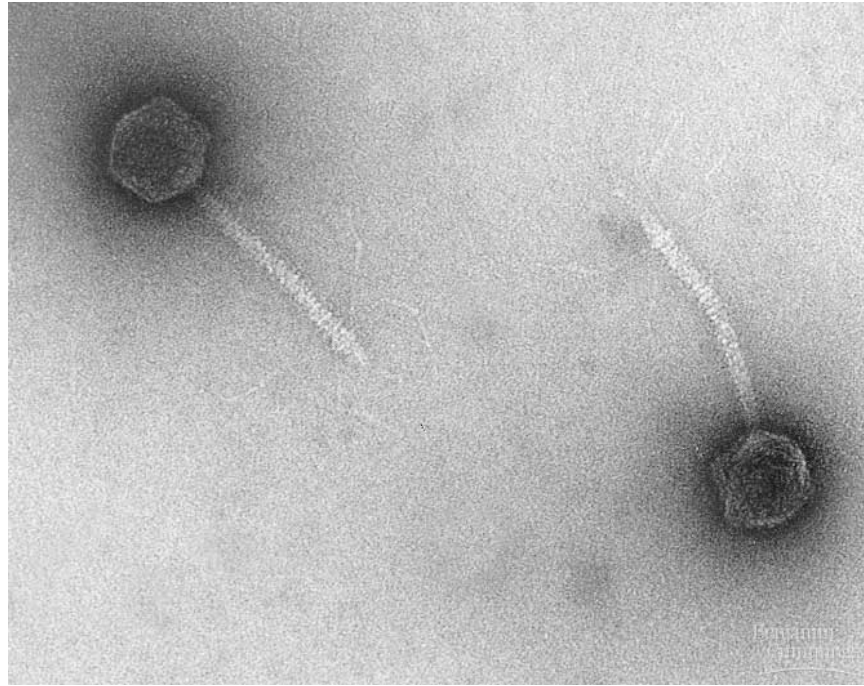
The one-step growth curve of virus replication.



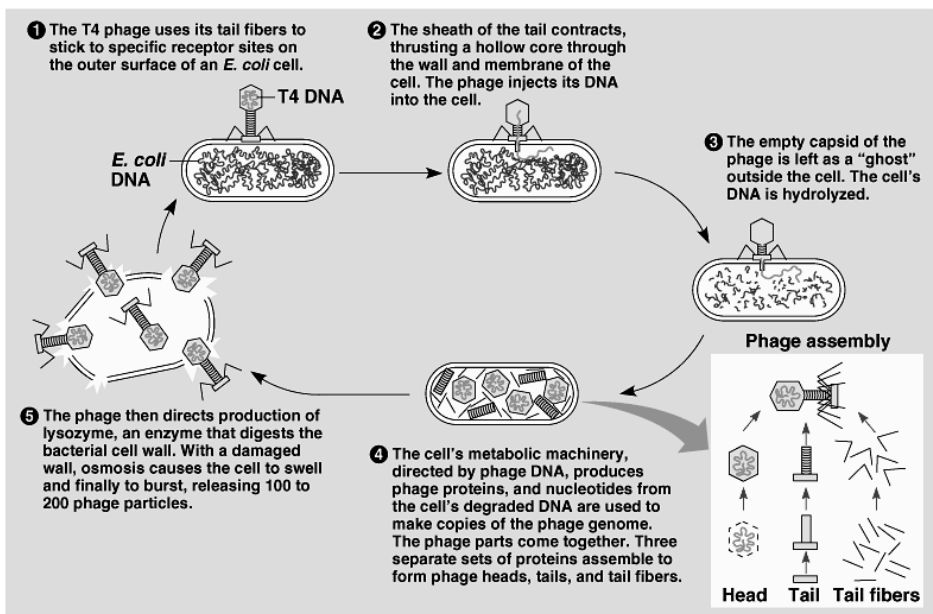
Attachment of T4 bacteriophage virion to the cell wall of *Escherichia coli* and injection of DNA



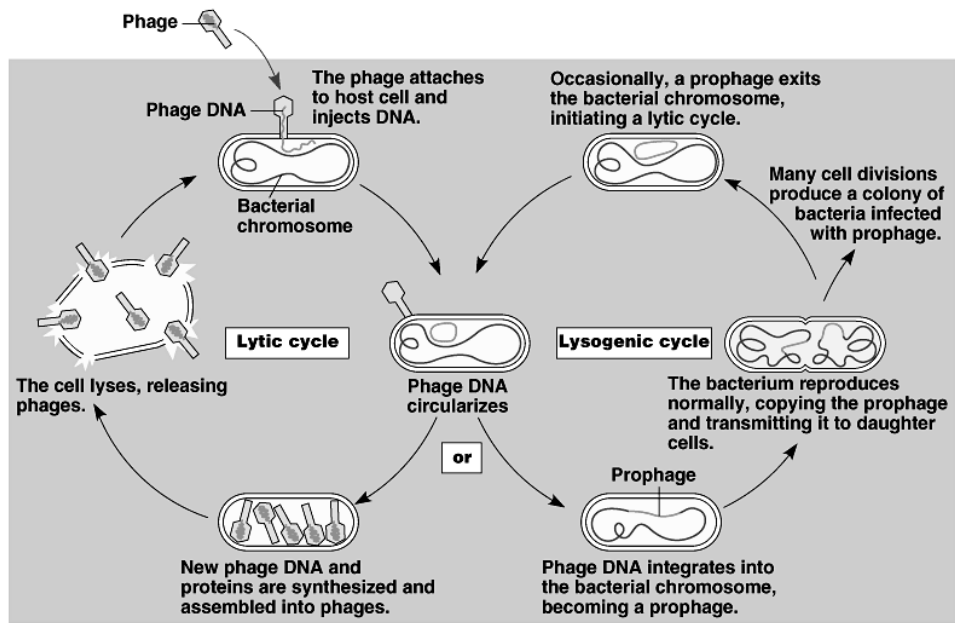
T-even Phages



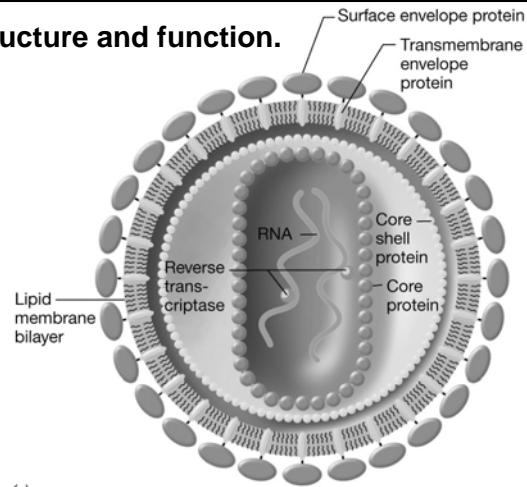
The lytic cycle of phage T4



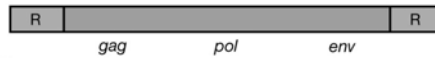
The lysogenic and lytic reproductive cycles of phage λ , a temperate phage



Retrovirus structure and function.



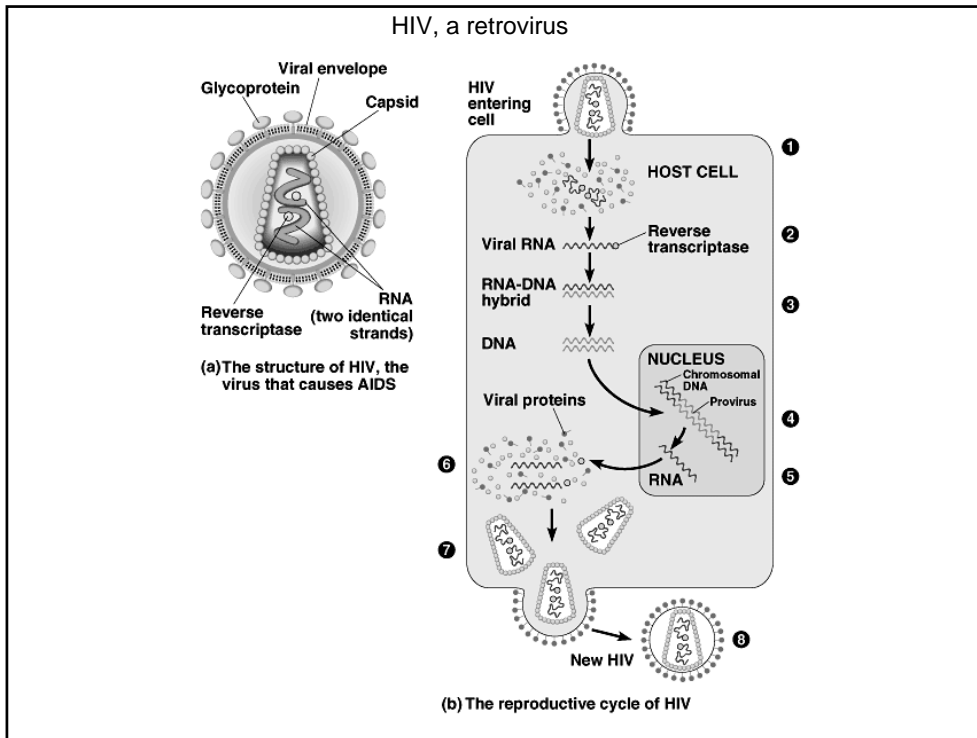
(a)



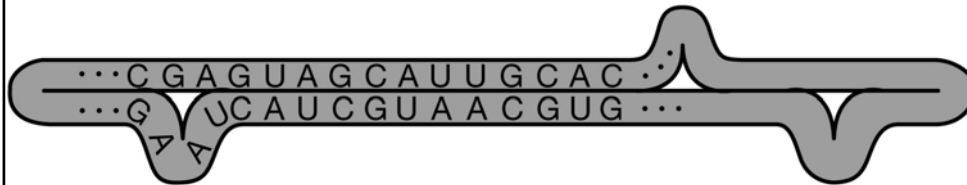
(b)



(c)

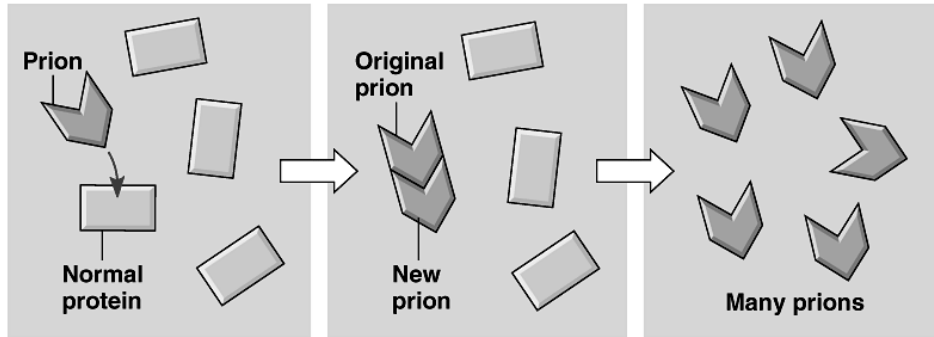


Structure of **viroids**, showing how single-stranded circular RNA can form a seemingly double-stranded structure by intrastrand base-pairing.

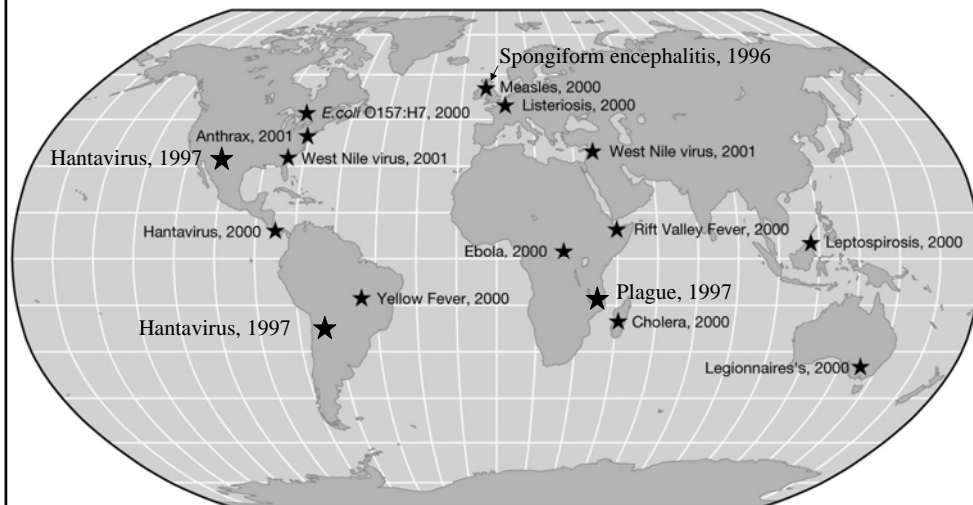


Hold-overs from an RNA world???

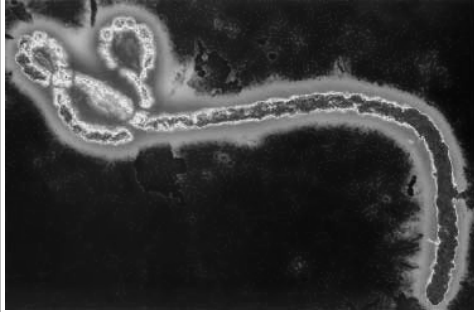
A hypothesis to explain how prions propagate



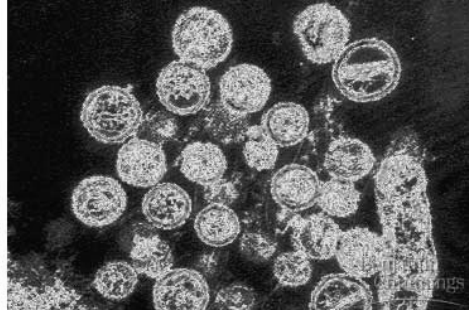
Recent outbreaks of emerging and reemerging infectious diseases.



Emerging viruses



Ebola virus: SS RNA



Hantavirus: SS RNA

Gram stain of *Bacillus anthracis*.



CDC/Public Health Image Library, PHIL

Table 30.1 Major bacterial diseases of humans, sources of infection, and potential control (Part 1)

| Disease | Primary Reservoir | Potential Means for Control |
|---|-------------------|---|
| Human Contact and Respiratorily Contracted | | |
| Streptococcal infections | Humans | Antibiotics; vaccine for pneumonia |
| Staphylococcal infections | Humans | Antibiotics; antiseptics |
| Meningitis | Humans | Specific antibiotics |
| Tuberculosis | Humans | Test and treat infected persons |
| Whooping cough | Humans | Vaccinate infants |
| Diphtheria | Humans | Vaccinate infants |
| Leprosy | Humans | Obtain proper treatment; vaccinate in endemic areas |
| Pneumonic plague | Humans | Eliminate rats and fleas |

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Table 30.1 Major bacterial diseases of humans, sources of infection, and potential control (Part 2)

| Disease | Primary Reservoir | Potential Means for Control |
|--------------------------------------|----------------------|--|
| Water-, Food-, and Soil-borne | | |
| Cholera | Humans | Treat sewage and water; observe proper sanitation |
| Typhoid fever | Humans | Pasteurize milk; proper treatment of sewage; inspect food handlers |
| Shigellosis (dysentery) | Humans | Observe proper sanitation |
| Salmonellosis | Beef, poultry | Cook meat and eggs properly |
| Campylobacter | Animals, poultry | Pasteurize milk; thorough cooking of food and water |
| Tetanus | Soil | Vaccinate |
| Brucellosis | Cattle | Immunize cattle and pasteurize milk |
| Botulism | Soil | Properly can and cook food |
| Staph food poisoning | Humans | Refrigerate food |
| Legionnaire's disease | Aquatic environments | Clean misting equipment or do not use |
| Pseudomonas infections | Dust | Clean air in burn wards |

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Table 30.1 Major bacterial diseases of humans, sources of infection, and potential control (*Part 3*)

| Disease | Primary Reservoir | Potential Means for Control |
|--|-------------------|---------------------------------------|
| Sexually Transmitted | | |
| Gonorrhea | Humans | Eliminate carriers; practice safe sex |
| Syphilis | Humans | Eliminate carriers; practice safe sex |
| Chlamydia | Humans | Eliminate carriers; practice safe sex |
| Herpes Simplex Virus | Humans | Same |
| Louse-borne, Human to Human | | |
| Trench fever | Humans | Proper sanitation; control lice |
| Relapsing fever | Humans | Control ticks and lice |
| Typhus (epidemic) | Humans | Proper sanitation; vaccinate |

MICROBIAL LIFE, Table 30.1 (Part 3) © 2002 Sinauer Associates, Inc.

Table 30.1 Major bacterial diseases of humans, sources of infection, and potential control (*Part 4*)

| Disease | Primary Reservoir | Potential Means for Control |
|------------------------------|-------------------|---|
| Vector-borne | | |
| Rocky Mountain spotted fever | Mammals, birds | Wear protective clothing and examine body for ticks |
| Tularemia | Rodents, rabbits | Observe proper care when cleaning wild rabbits |
| Lyme disease | Deer | Wear protective clothing |
| Bubonic plague | Rats | Control rats, proper sanitation |
| Typhus (endemic) | Rodents | Control rats, vaccinate |
| Scrub typhus | Mites | Control mites |
| Animal Contact | | |
| Leptospirosis | Vertebrates | Control rodents, vaccinate domestic animals |
| Anthrax | Soil | Sterilize wool, hair, other animal products |
| Psittacosis | Birds | Control bird imports |
| Q fever | Cattle | Vaccinate animal handlers |

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Table 30.4**The recommended immunization schedule for infants and young children in the United States**

| Age | Vaccine Employed |
|--------------|---|
| Birth | Hepatitis B |
| 2 months | Diphtheria; pertussis; tetanus (DPT) Hemophilus B (Hib) Poliomyelitis (OPV) |
| 4 months | DPT; OPV; Hib Hepatitis B |
| 6 months | Hepatitis B DPT; OPV; Hib |
| 12–15 months | DPT; Hib; chicken pox, measles, mumps, rubella (MMR) |
| 4–6 years | OPV; DTP; MMR |

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