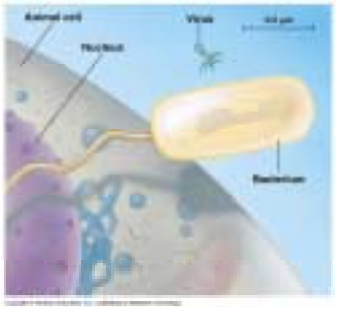
CHAPTER 18
MICROBIAL MODELS: VIRUSES

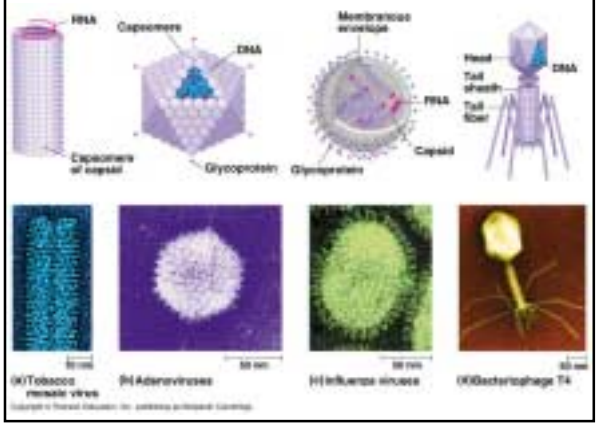
Figure 18.1 Comparing the size of a virus, a bacterium, and a eukaryotic cell



VIRUS STRUCTURE

- TOBACCO MOSAIC VIRUS/VARIOUS SHAPES.
- INFECTIOUS AGENTS/PLANTS/ANIMALS
- VIRUSES CONTAIN: PROTEIN CAPSID, EITHER DNA OR RNA, +,- ENVELOPE/NEED HOST CELL.
- BACTERIOPHAGE OR PHAGE, T4, INFECTS BACTERIA. RETROVIRUSES HAVE RNA AND USE REVERSE TRANSCRIPTASE TO CHANGE TO DNA

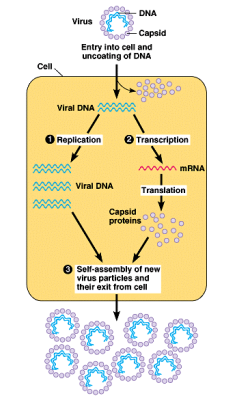
Figure 18.2 Viral structure



VIRAL REPRODUCTION

- HOST CELL/NUCLEUS
- HOST RANGE/SPECIFICITY
- LYTIC/LYSOGENIC CYCLE
- VIRAL ENVELOPE/GLYCOPROTEIN OR PHOSPHOLIPID.
- DOES NOT HAVE TO HAVE ENVELOPE
- SOME VIRUSES ARE FOLDED INTO HOST CELL

Figure 18.3 A simplified viral reproductive cycle



MODE OF VIRAL INFECTION

- DNA VIRUS/INFLUENZA: C-DNA MADE, INSTRUCTS HOST TO COPY VIRUS AND THEN REASSEMBLE VIRAL PARTS.HIV INFECTION/RNA/REVERSE TRANSCRIPTASE CONVERTS RNA TO C-DNA.
- VIRAL CYCLE THEN THE SAME AS DNA VIRUSES
- VIROIDS: NAKED DNA, NO PROTEIN

Figure 18.4 The lytic cycle of phage T4

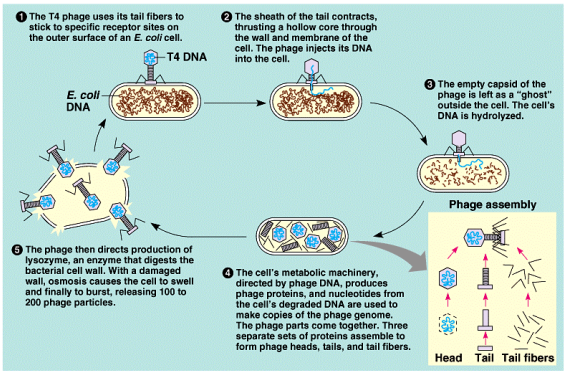


Figure 18.02x1 Adenovirus

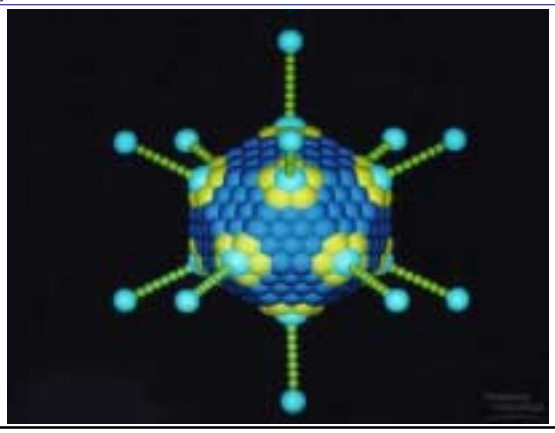


Figure 18.02x2 Phages

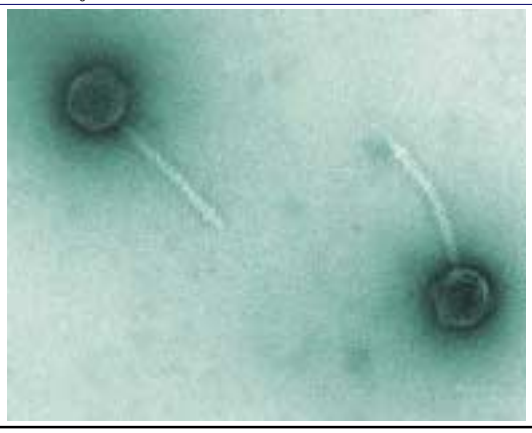


Figure 18.5 The lysogenic and lytic reproductive cycles of phage λ, a temperate phage

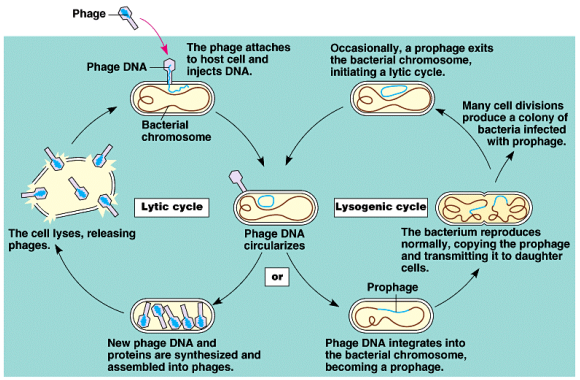


Table 18.1 Classes of Animal Viruses, Grouped by Type of Nucleic Acid

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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.

Figure 18.6 The reproductive cycle of an enveloped virus

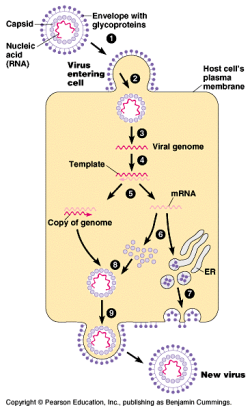

Figure 18.7 HIV, a retrovirus

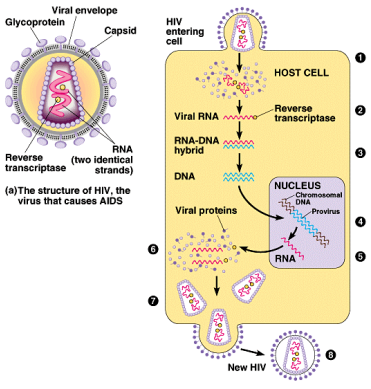

Figure 18.7x2 Couple at AIDS quilt

Figure 18.x2 Measles

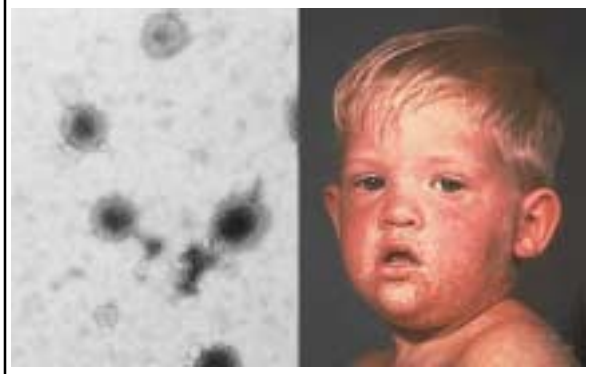

Figure 18.x6 Herpes

VIRUS CAUSING DISEASES

"They are so small, so inconspicuous, causing many diseases and so much suffering and ultimate death. This is evolution at its worst".