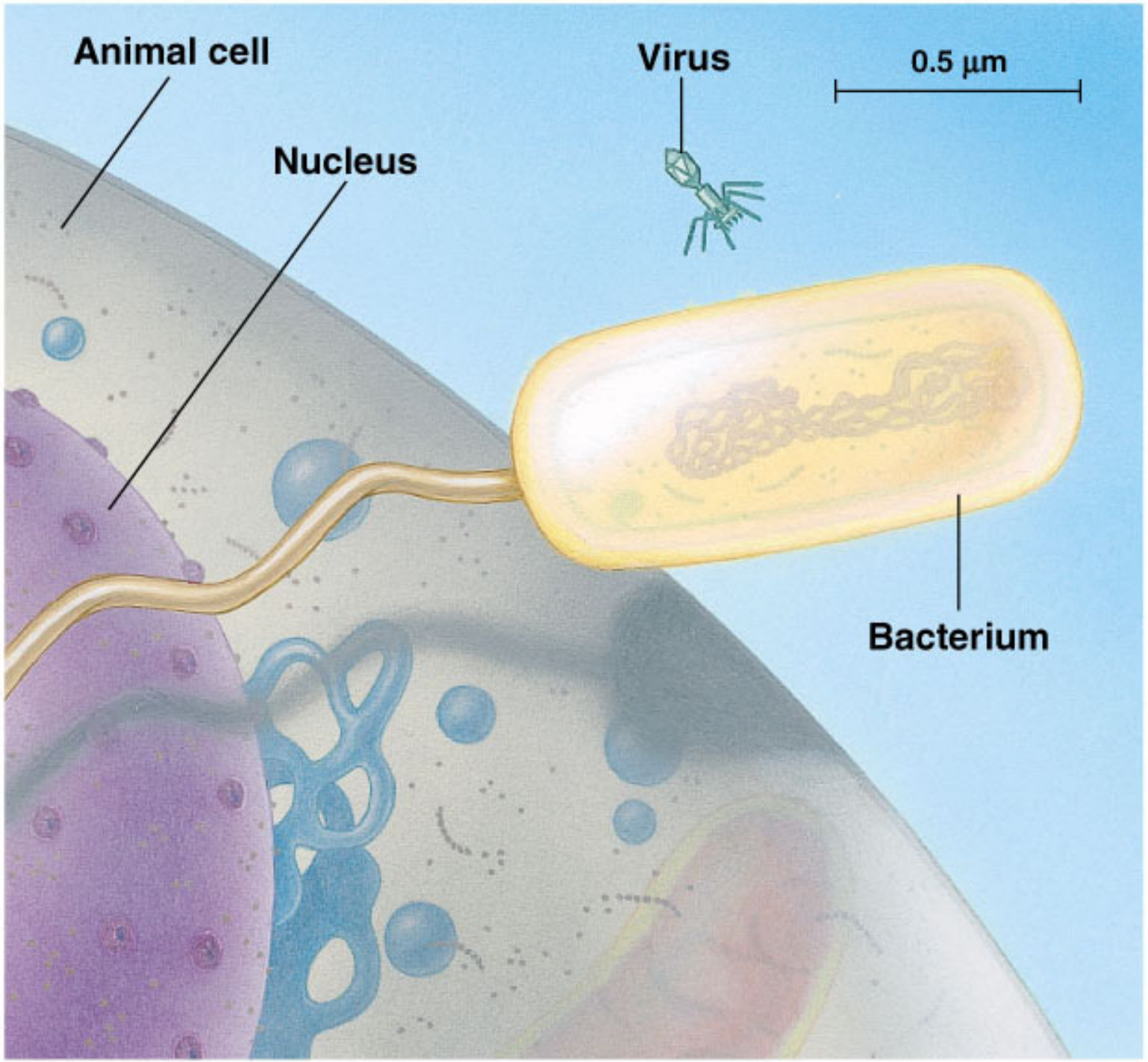
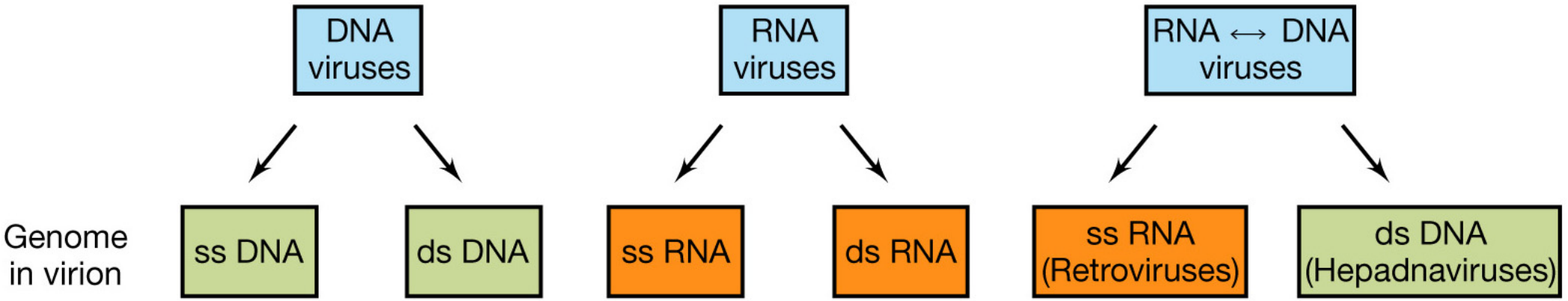
Comparing the size of a virus, a bacterium, and a eukaryotic cell





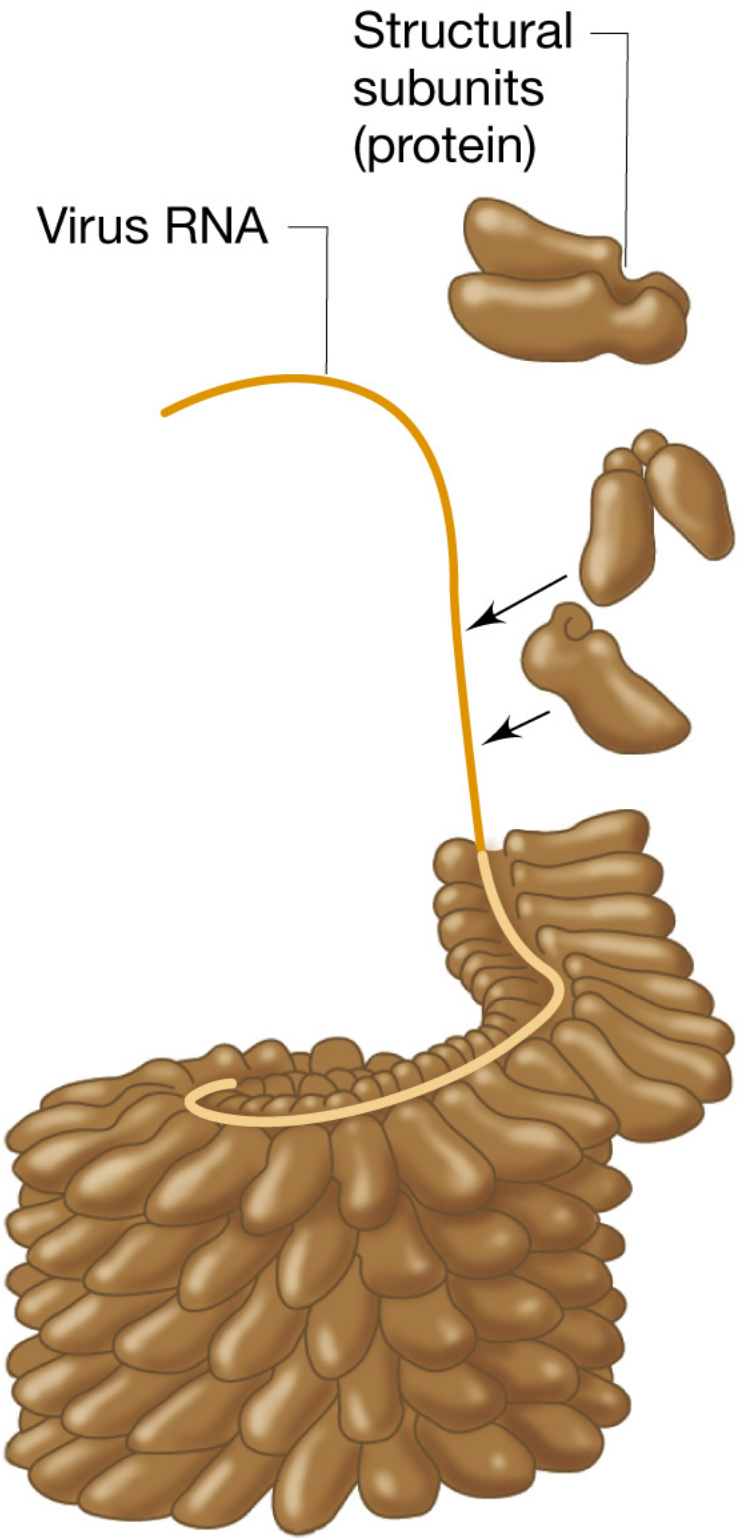
Viral genomes. The genomes of viruses can be composed of either DNA or RNA, and some use both as their genomic material at different stages in their life cycle. However, only **one** type of nucleic acid is found in the virion of any particular type of virus.

Classes of Animal Viruses, Grouped by Type of Nucleic Acid

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

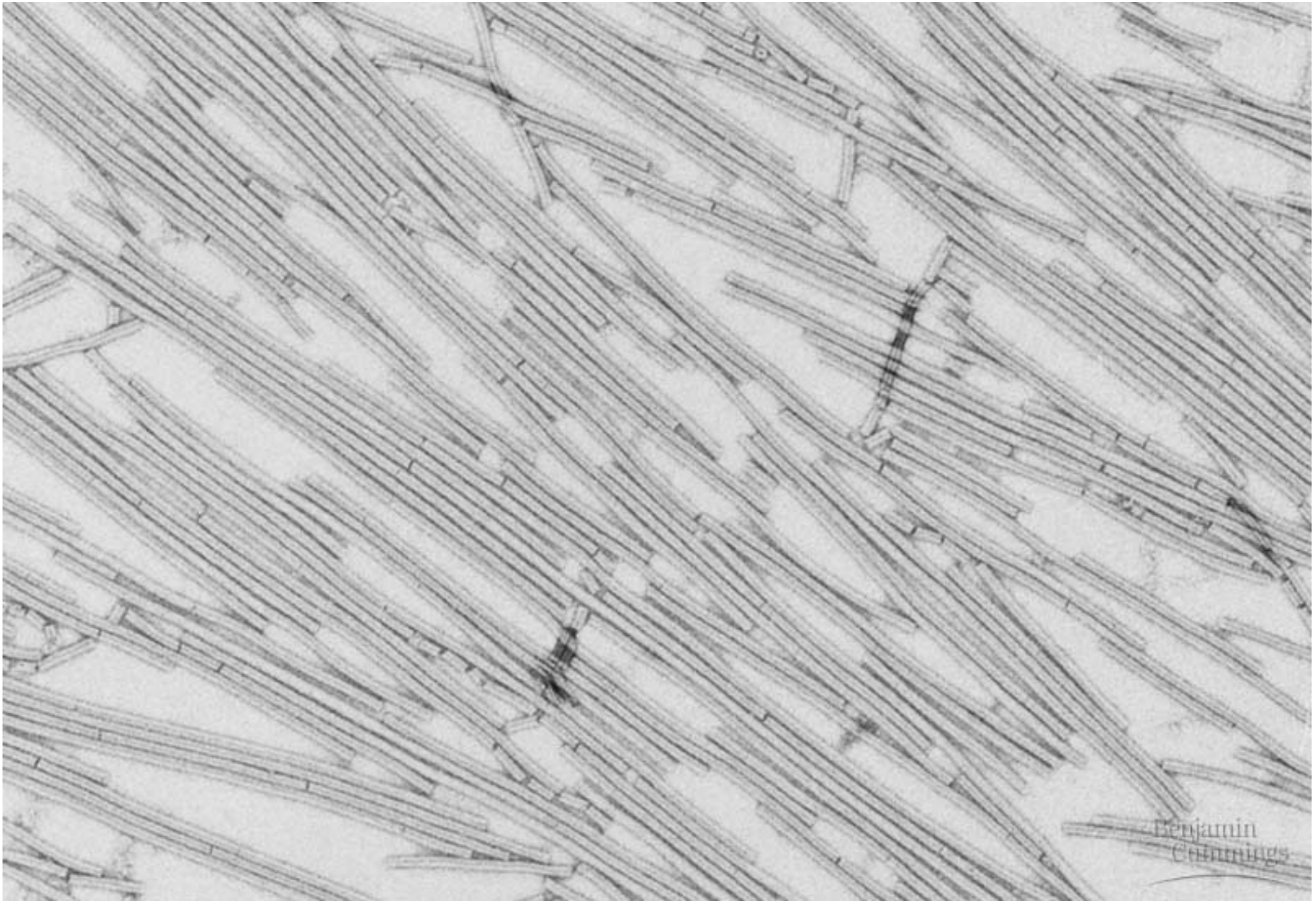
Class*	Examples/Diseases
I. dsDNA**	
Papovavirus	Papilloma (human warts, cervical cancer); polyoma (tumors in certain animals)
Adenovirus	Respiratory diseases; some cause tumors in certain animals
Herpesvirus	Herpes simplex I (cold sores), herpes simplex II (genital sores); varicella zoster (chicken 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.

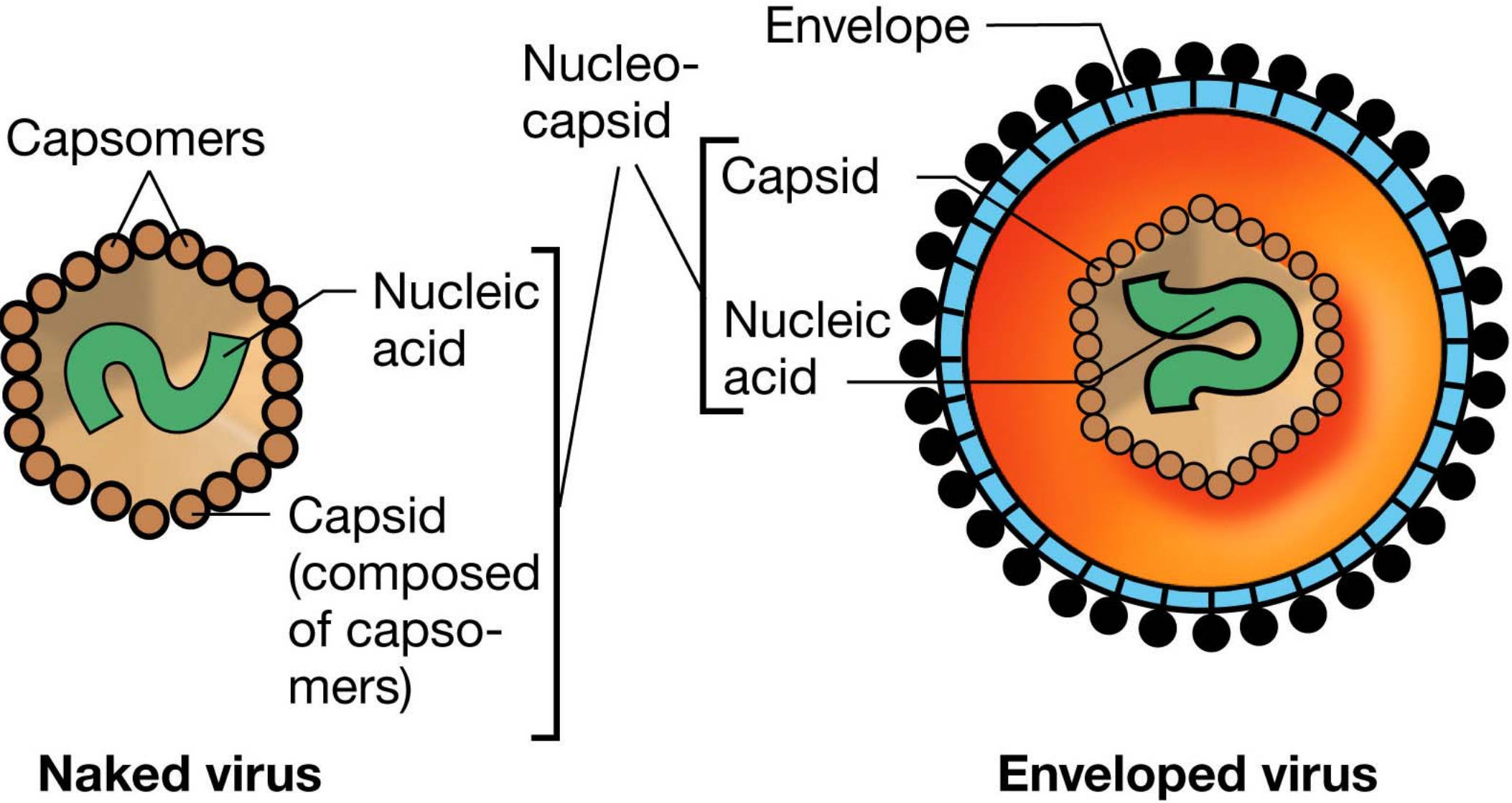


Tobacco mosaic virion assembly

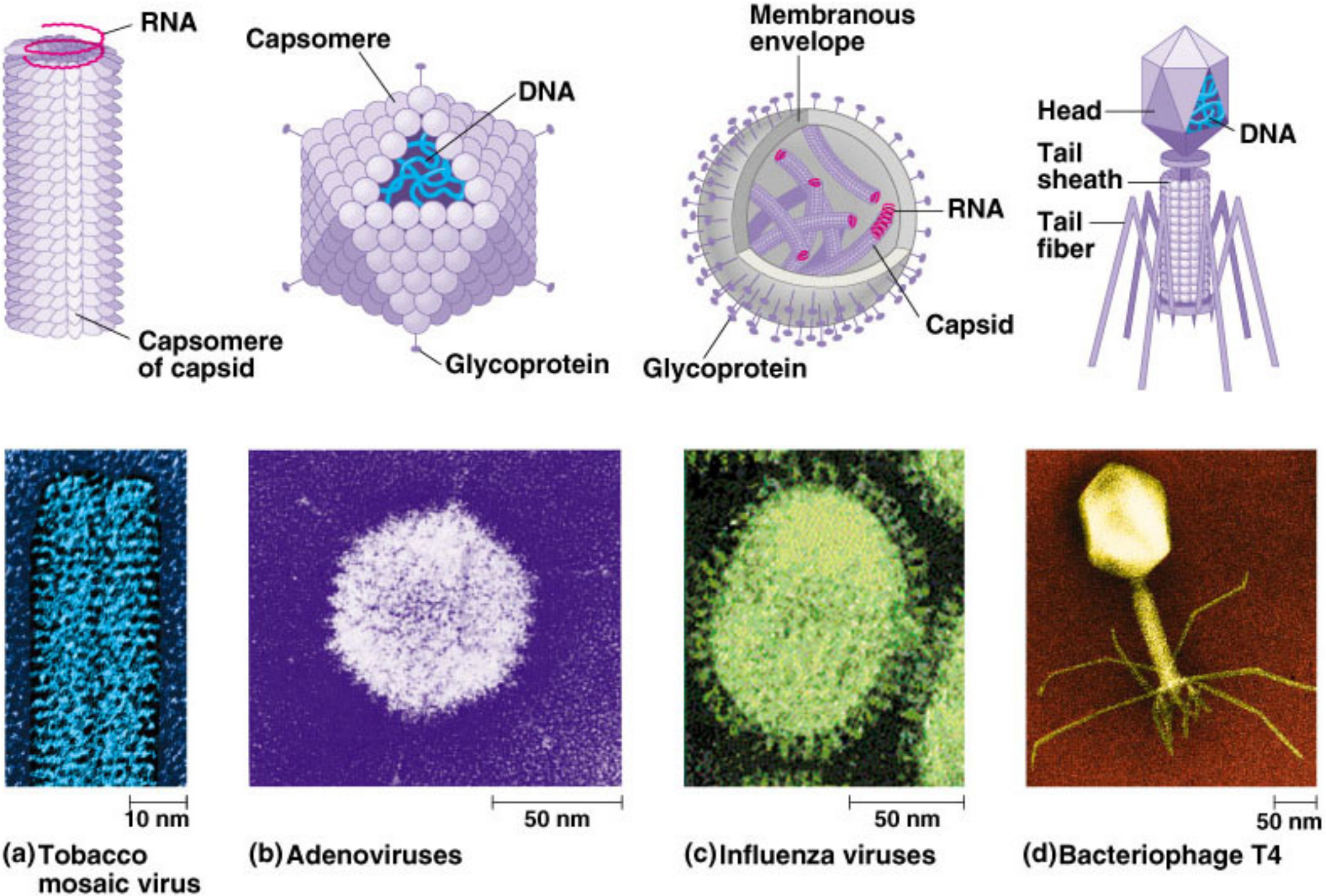
Tobacco mosaic virions



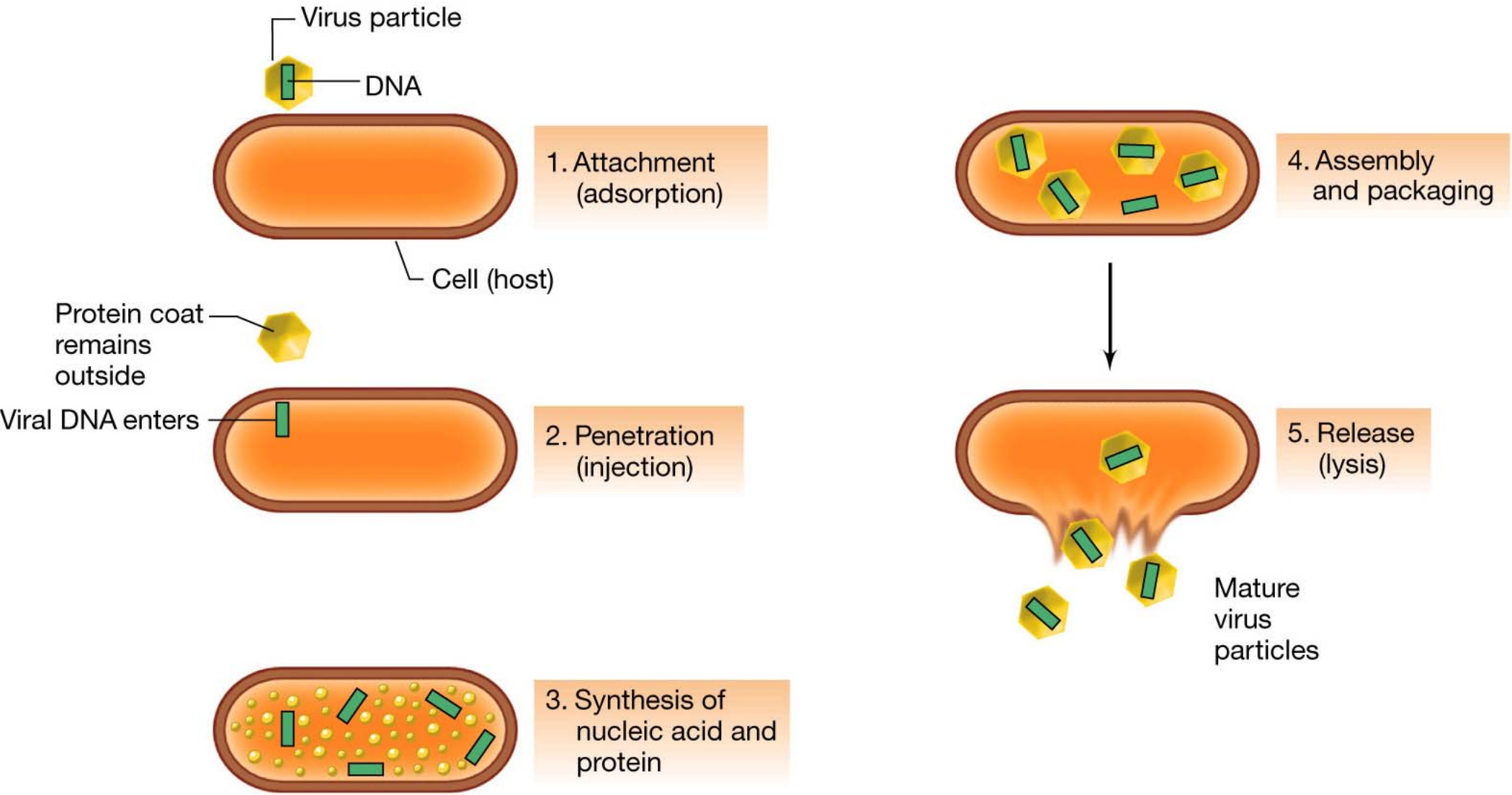
Comparison of naked and enveloped virus, two basic types of virus particles.



Viral structures

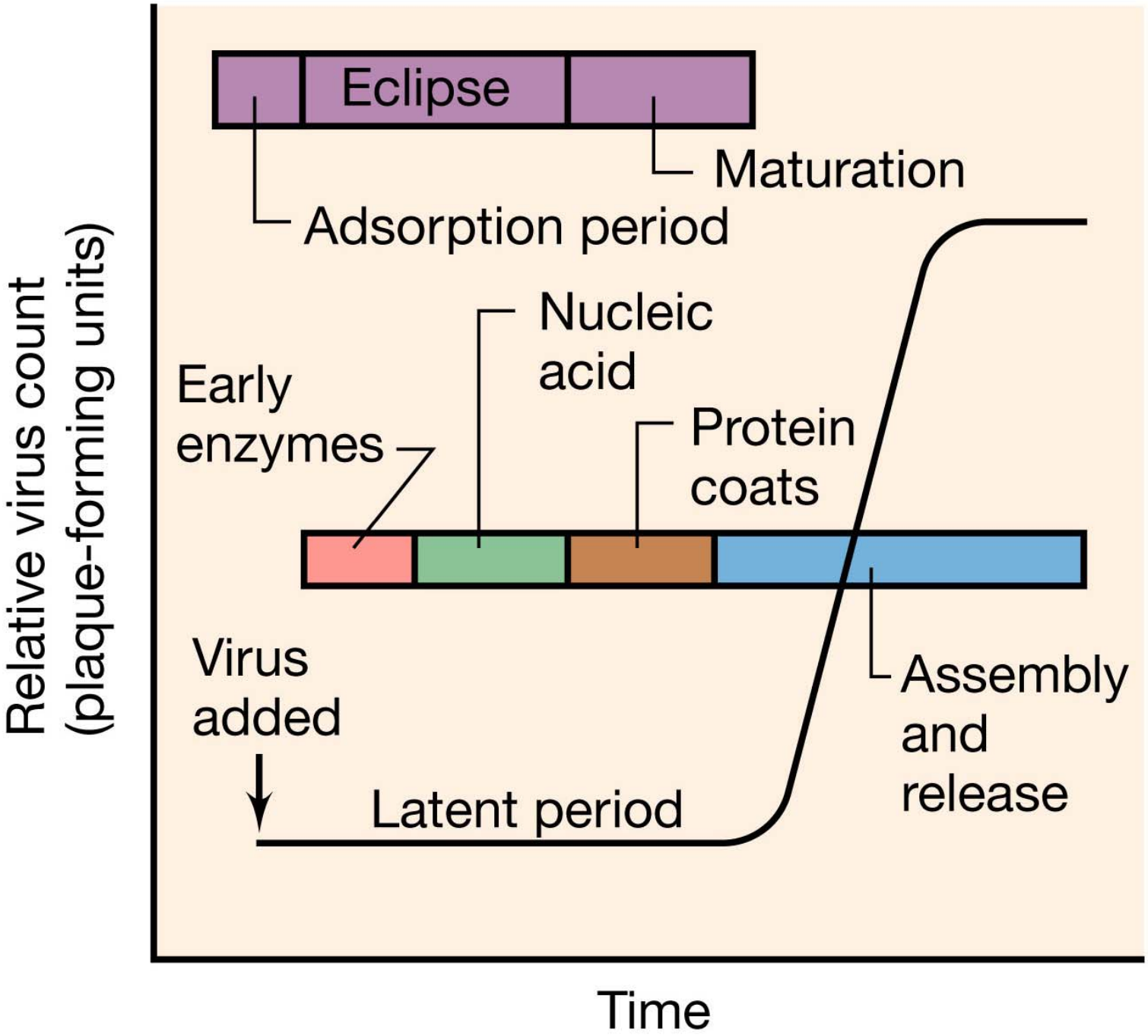


The replication cycle of a bacterial virus.

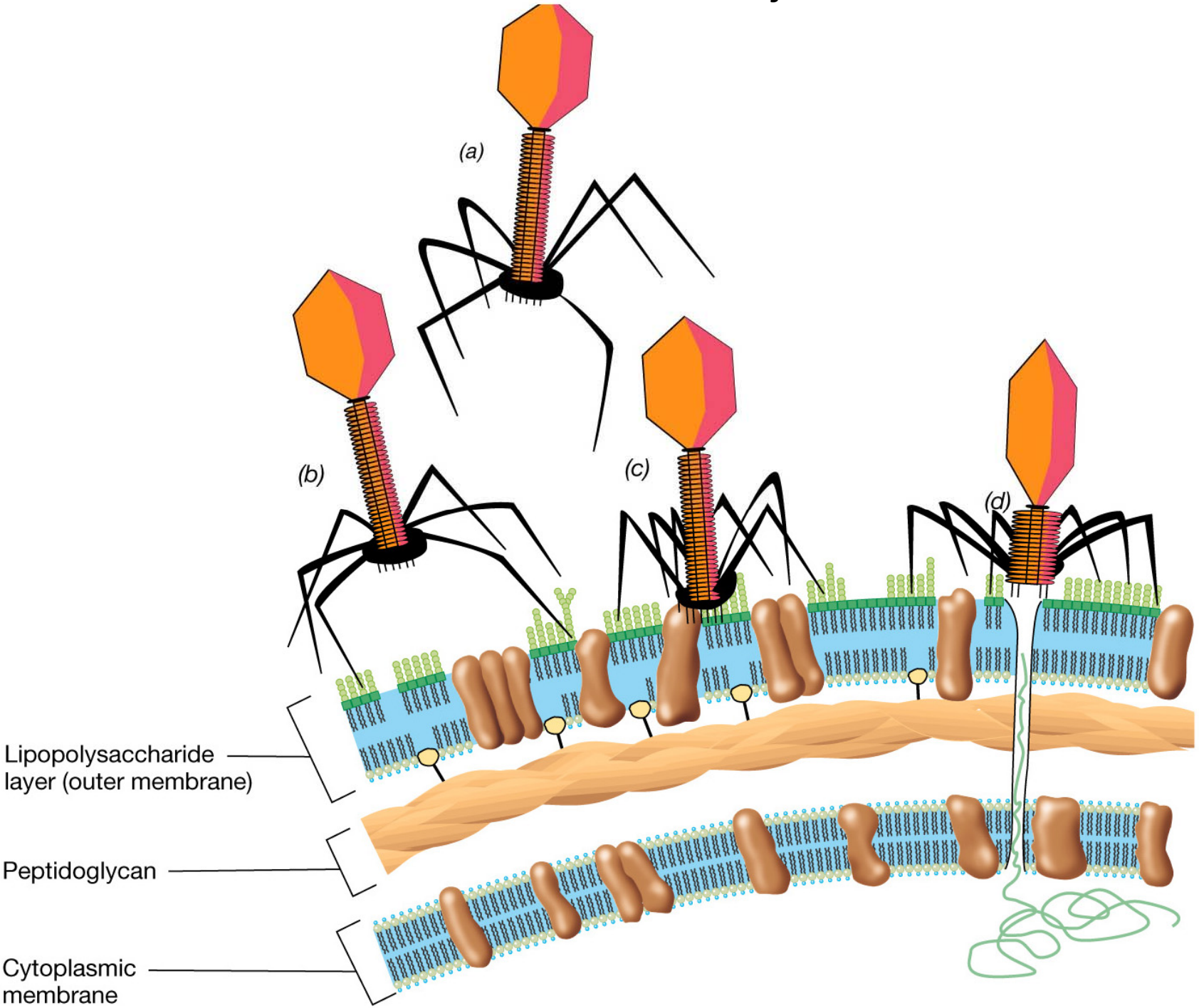


Burst size = ave. # virions released

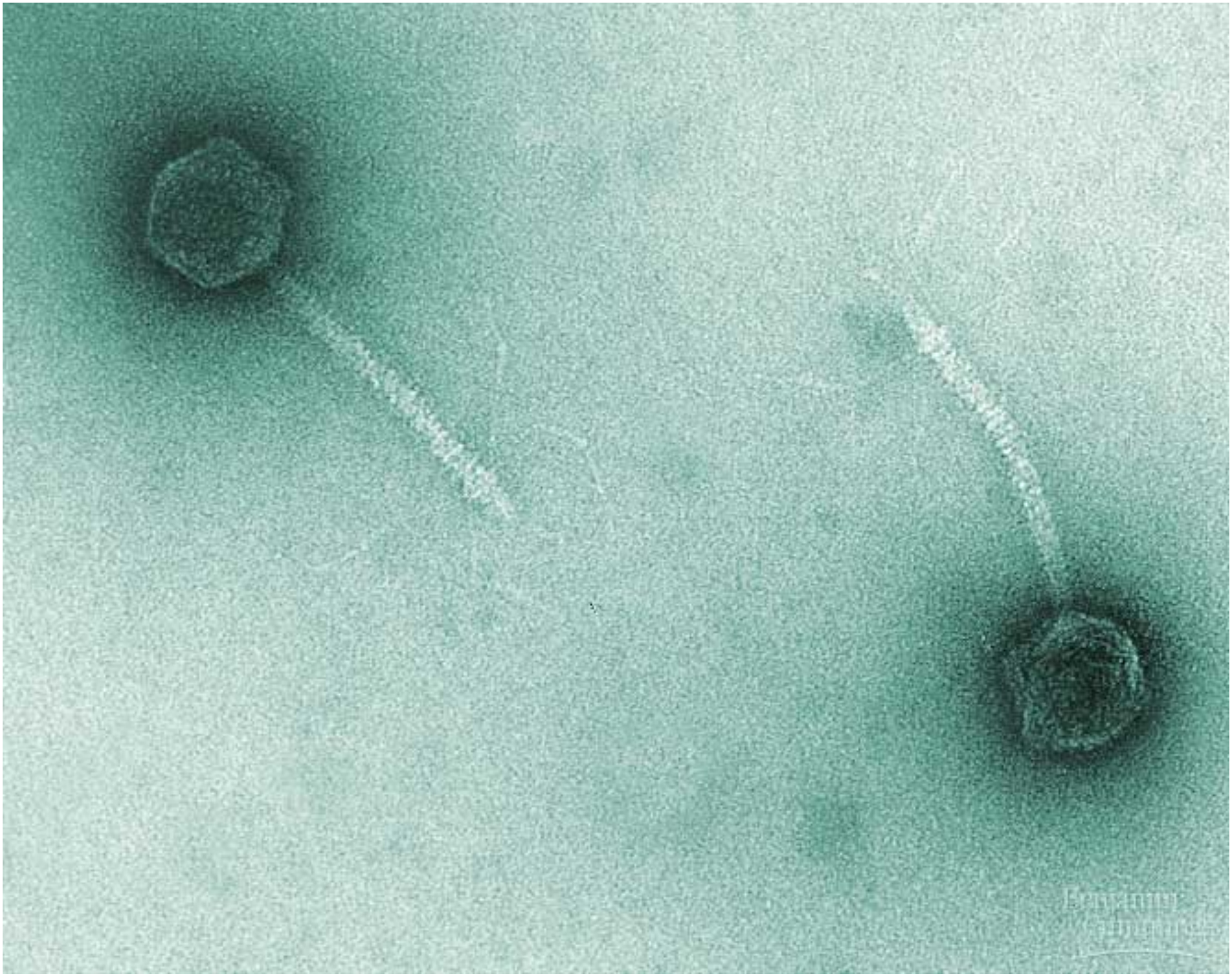
The one-step growth curve of virus replication.



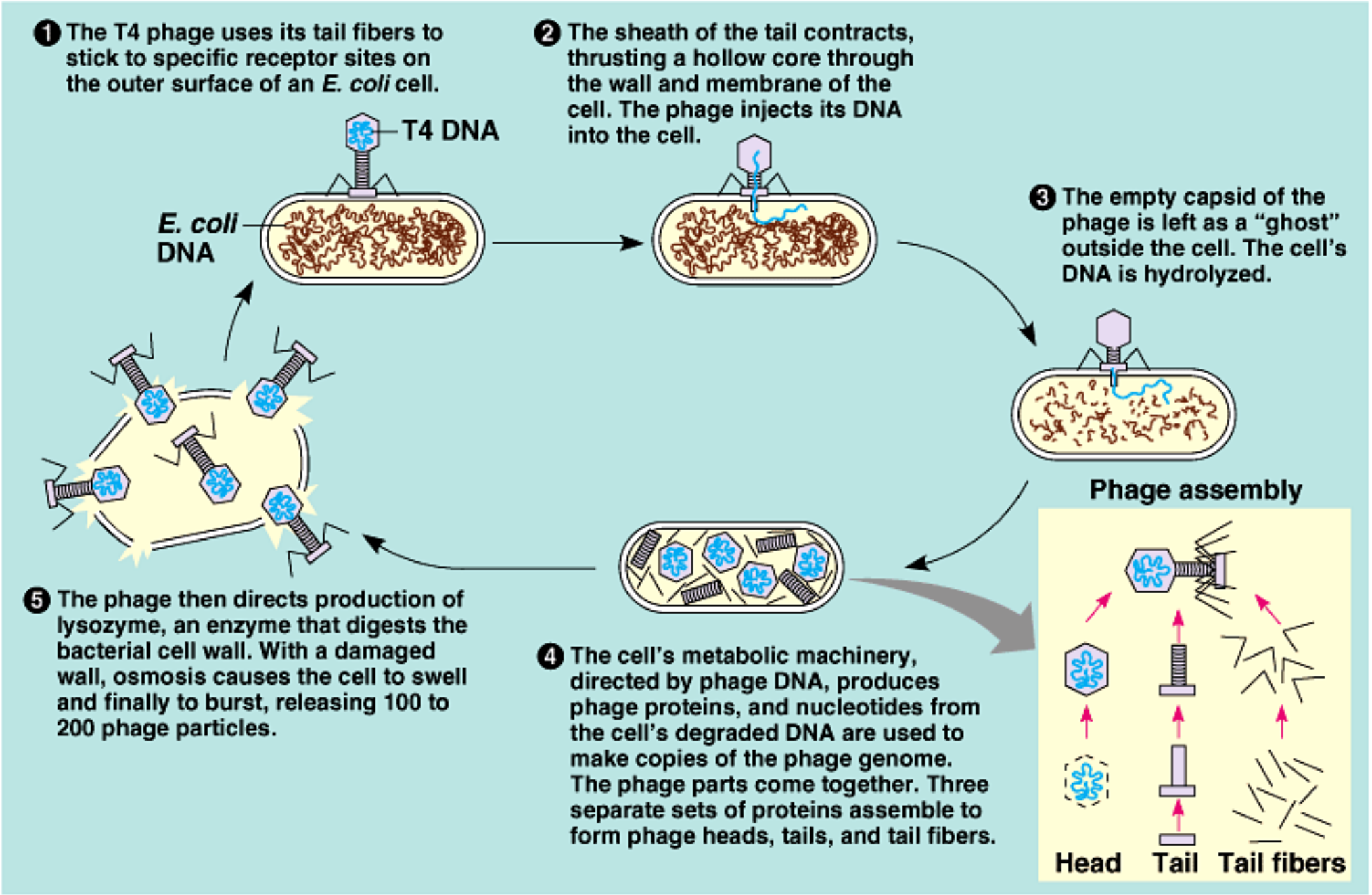
Attachment of T4 bacteriophage virion to the cell wall of *Escherichia coli* and injection of DNA



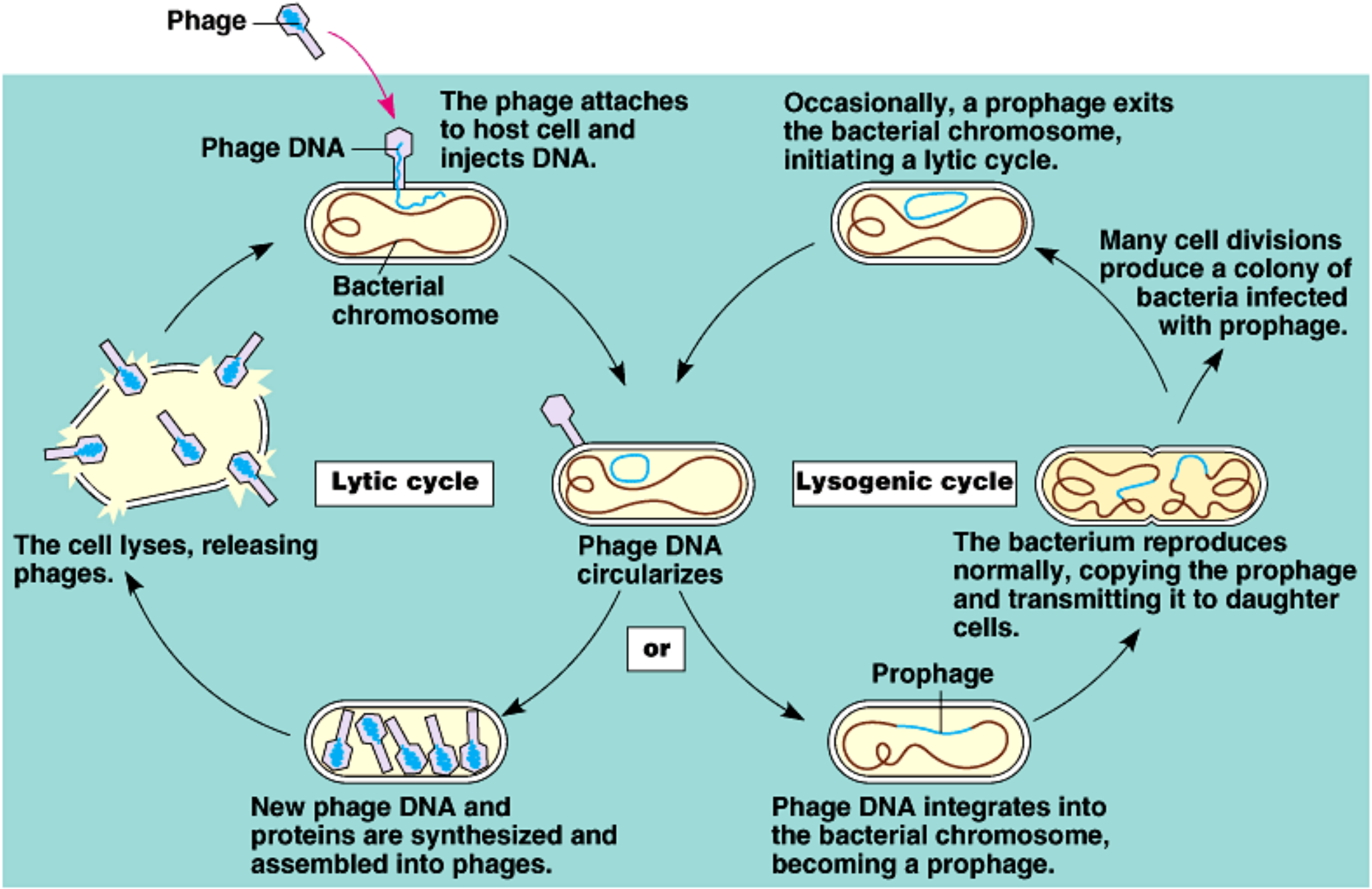
T-even Phages



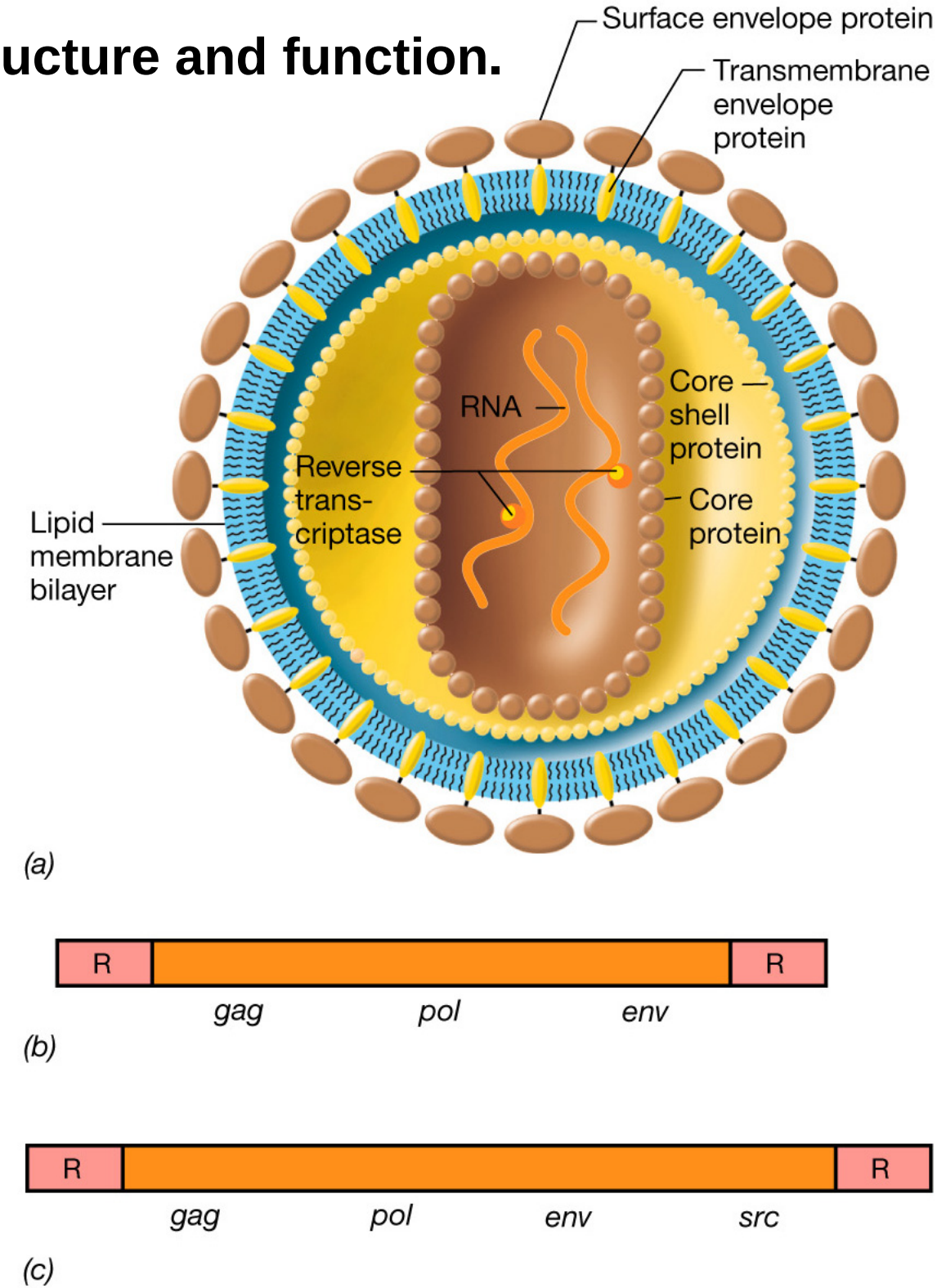
The lytic cycle of phage T4



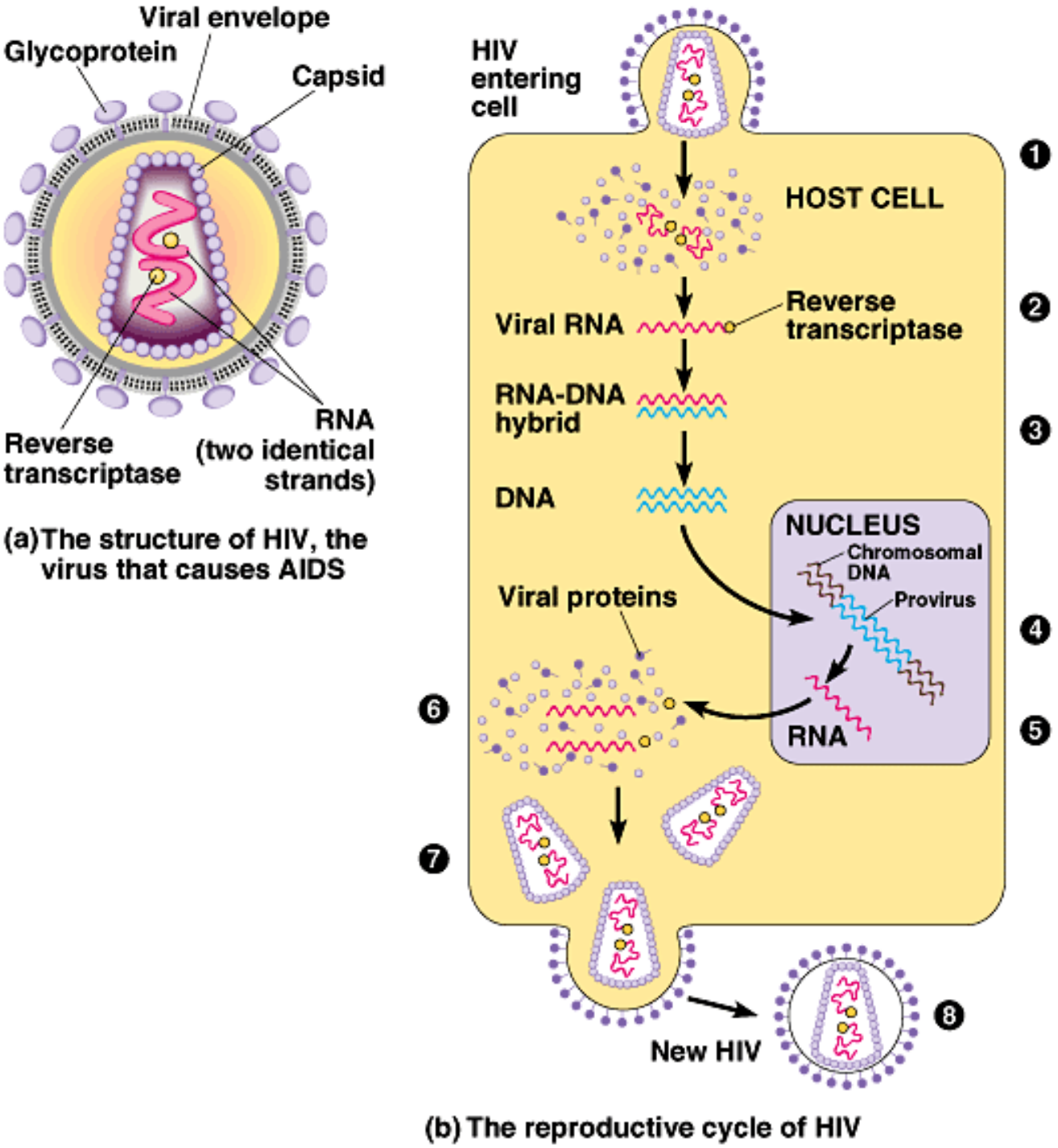
The lysogenic and lytic reproductive cycles of phage λ, a temperate phage



Retrovirus structure and function.



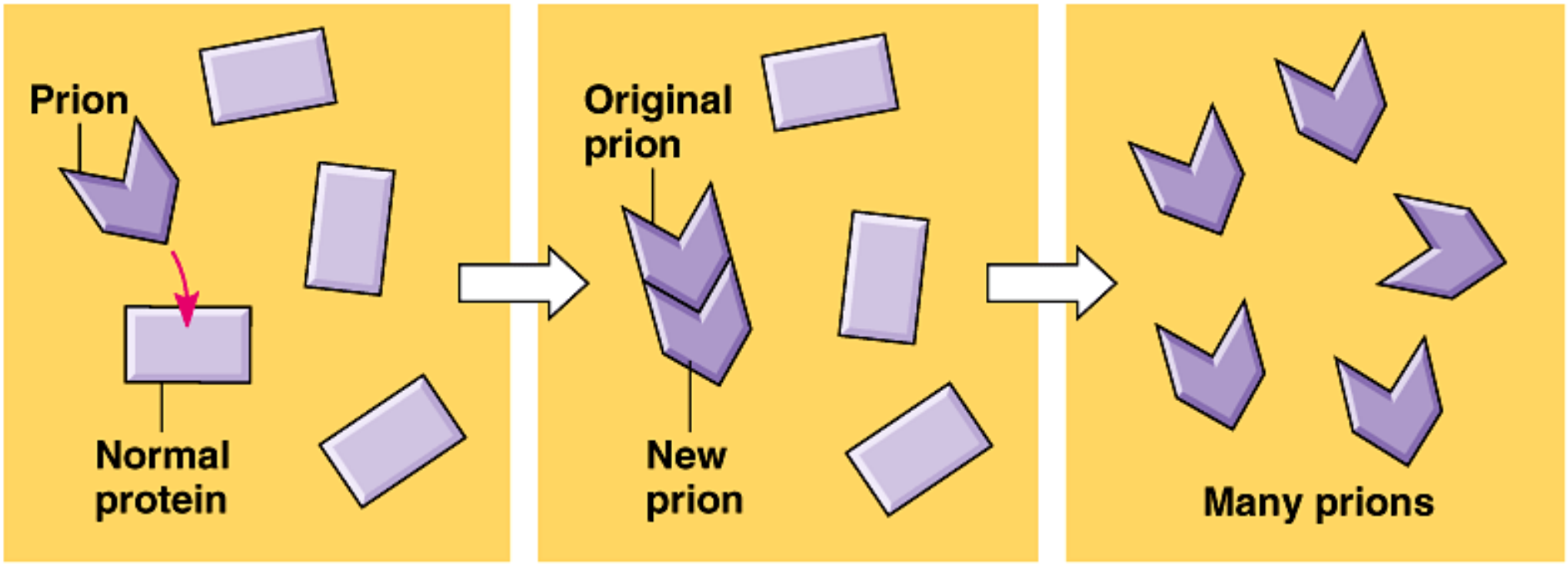
HIV, a retrovirus



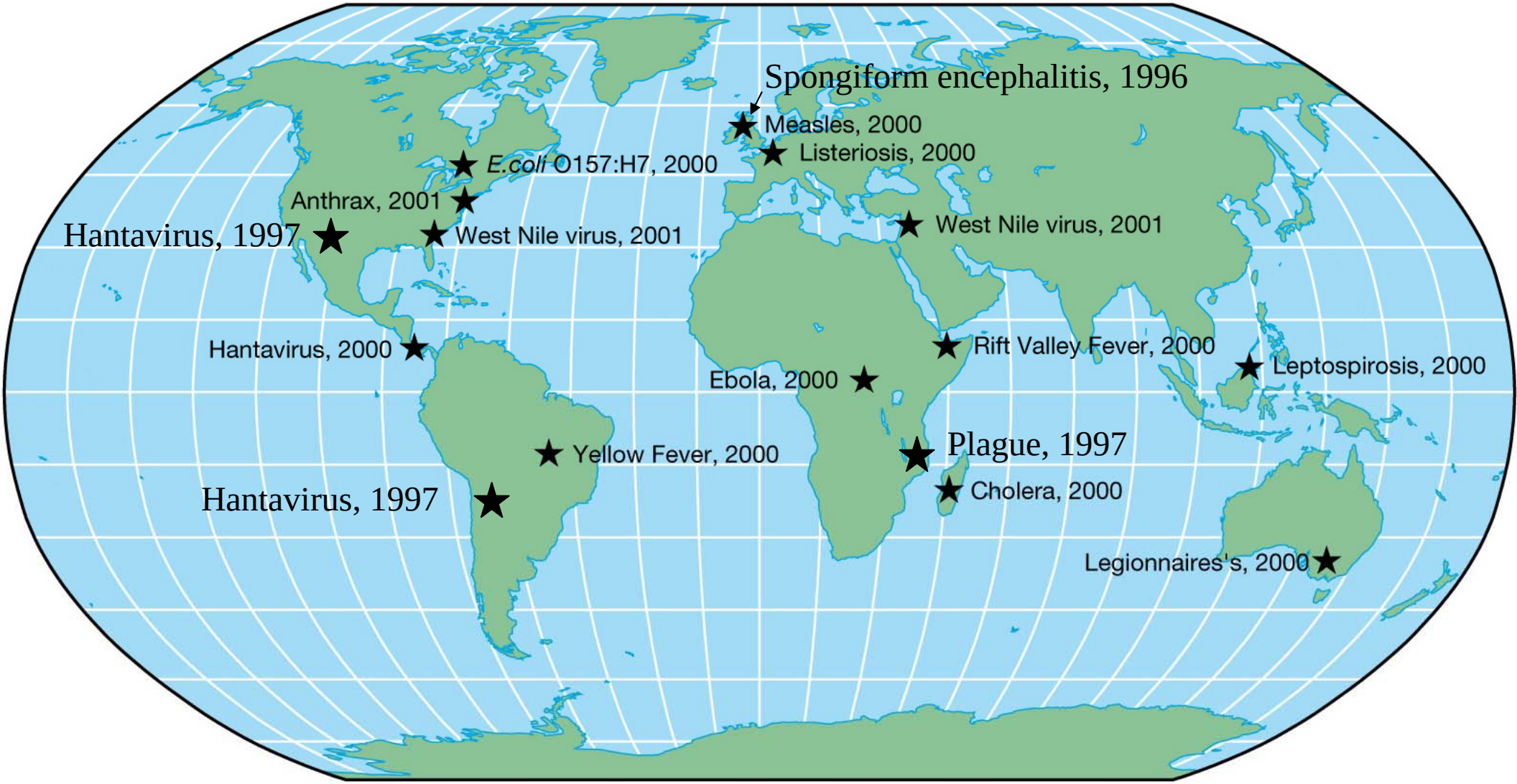
Structure of **viroids**, showing how single-stranded circular RNA can form a seemingly double-stranded structure by intrastrand base-pairing.

Hold-overs from an RNA world???

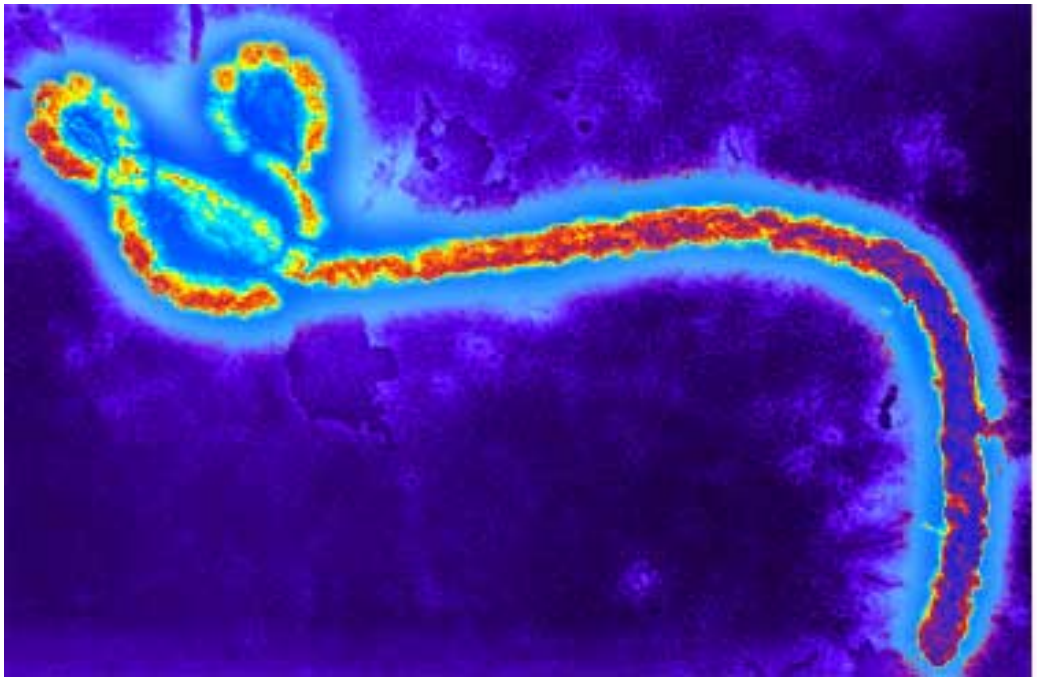
A hypothesis to explain how prions propagate



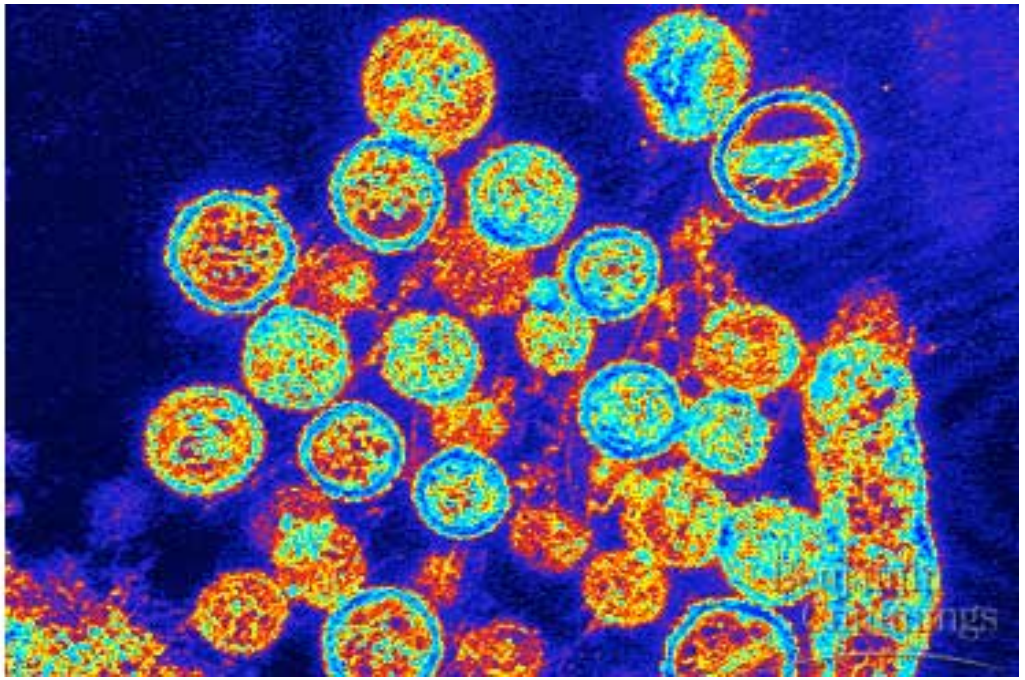
Recent outbreaks of emerging and reemerging infectious diseases.



Emerging viruses



Ebola virus: SS RNA



Hantavirus: SS RNA

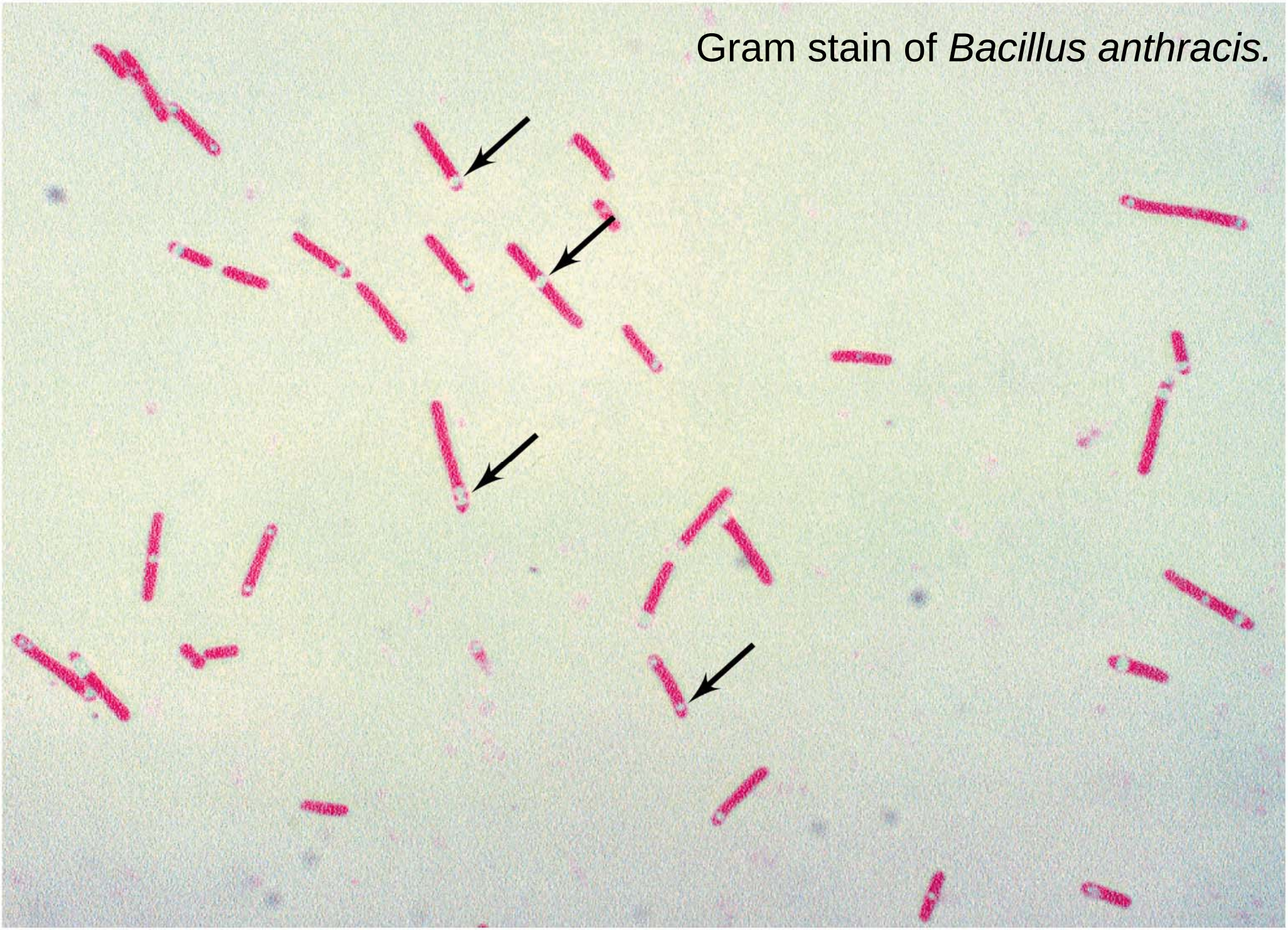

Gram stain of *Bacillus anthracis.*
CDC/Public Health Image Library, PHIL

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

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

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

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		
Leptospira	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

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