

Fig. 27-1



Fig. 27-UN3

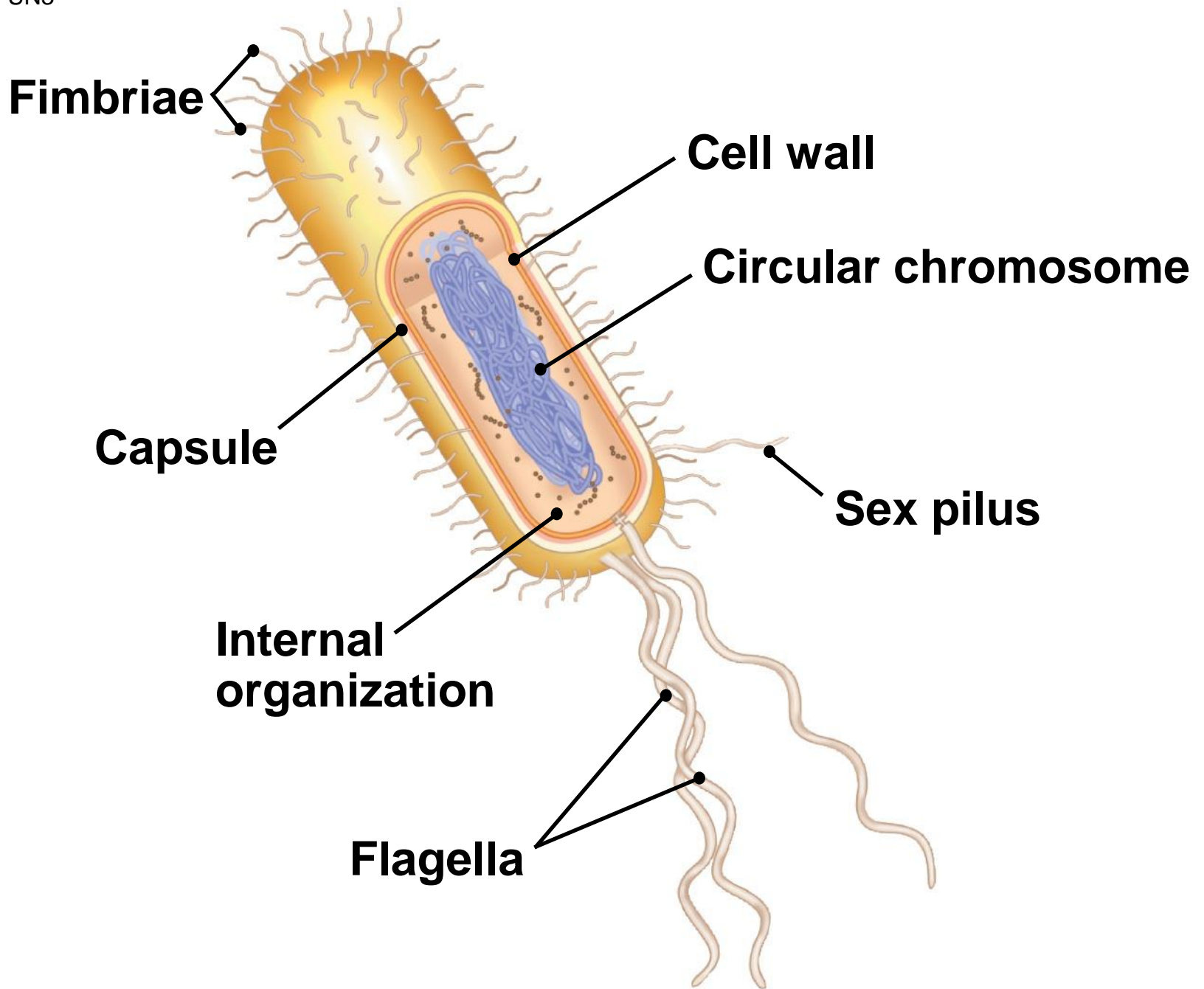


Fig. 27-4

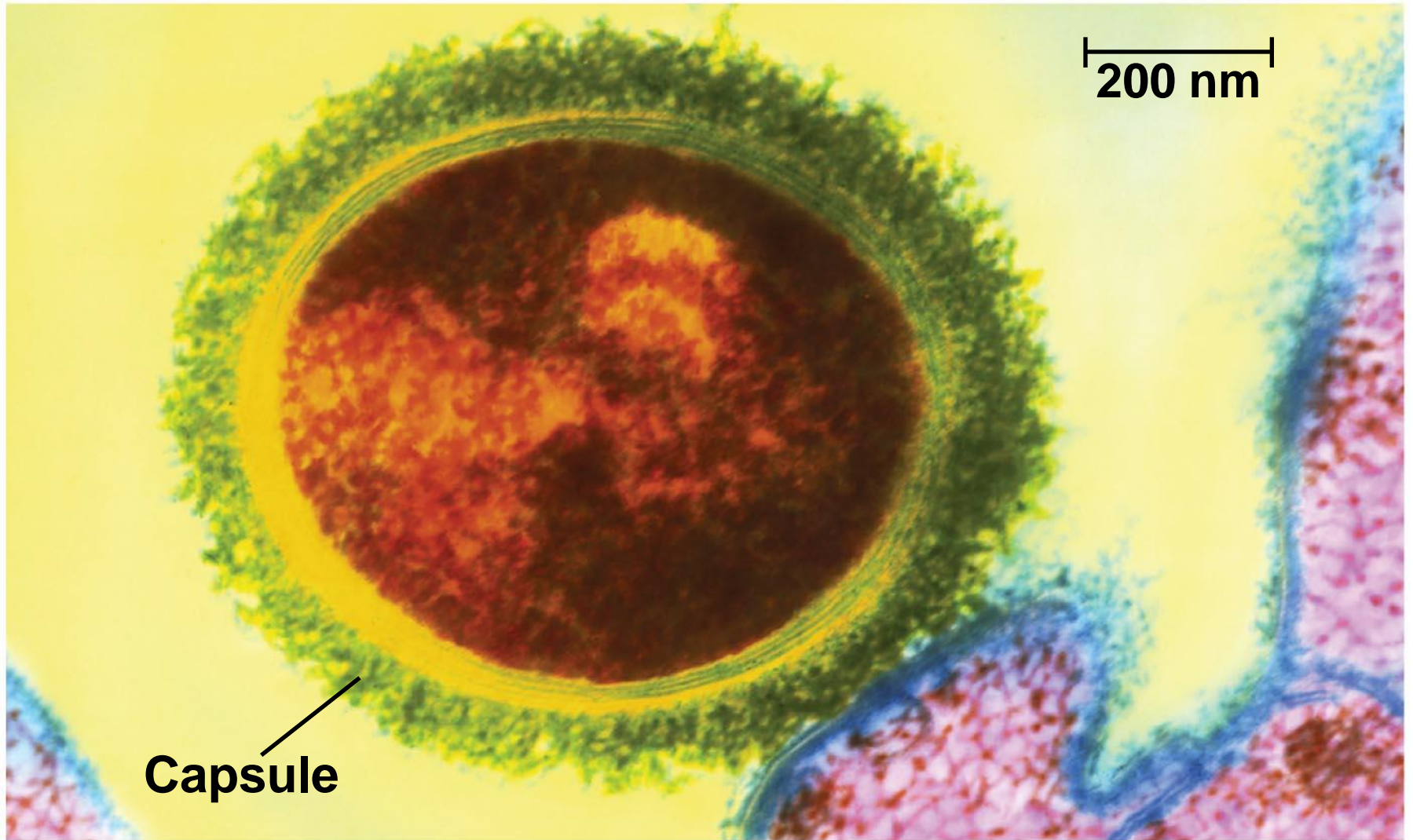


Fig. 27-5

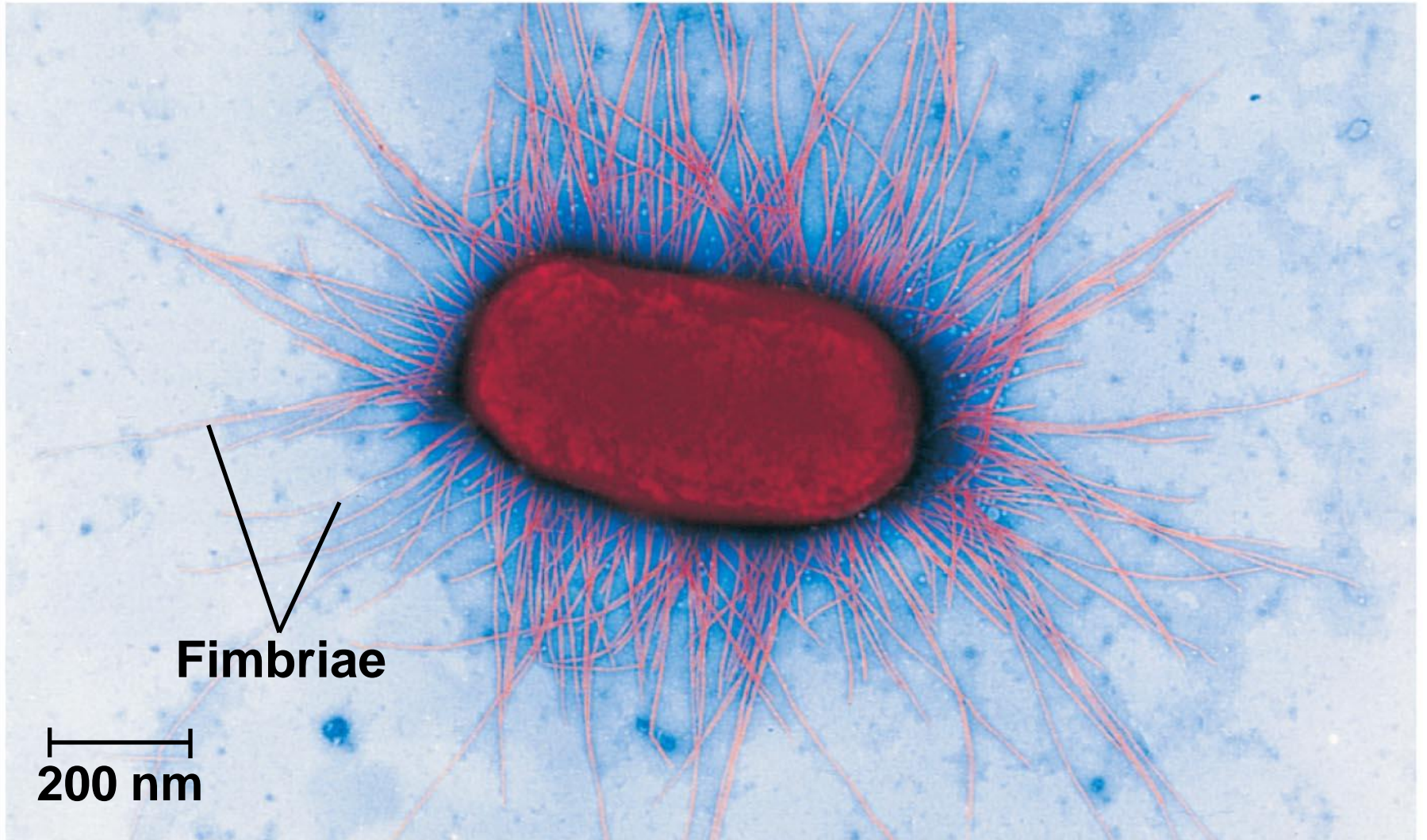
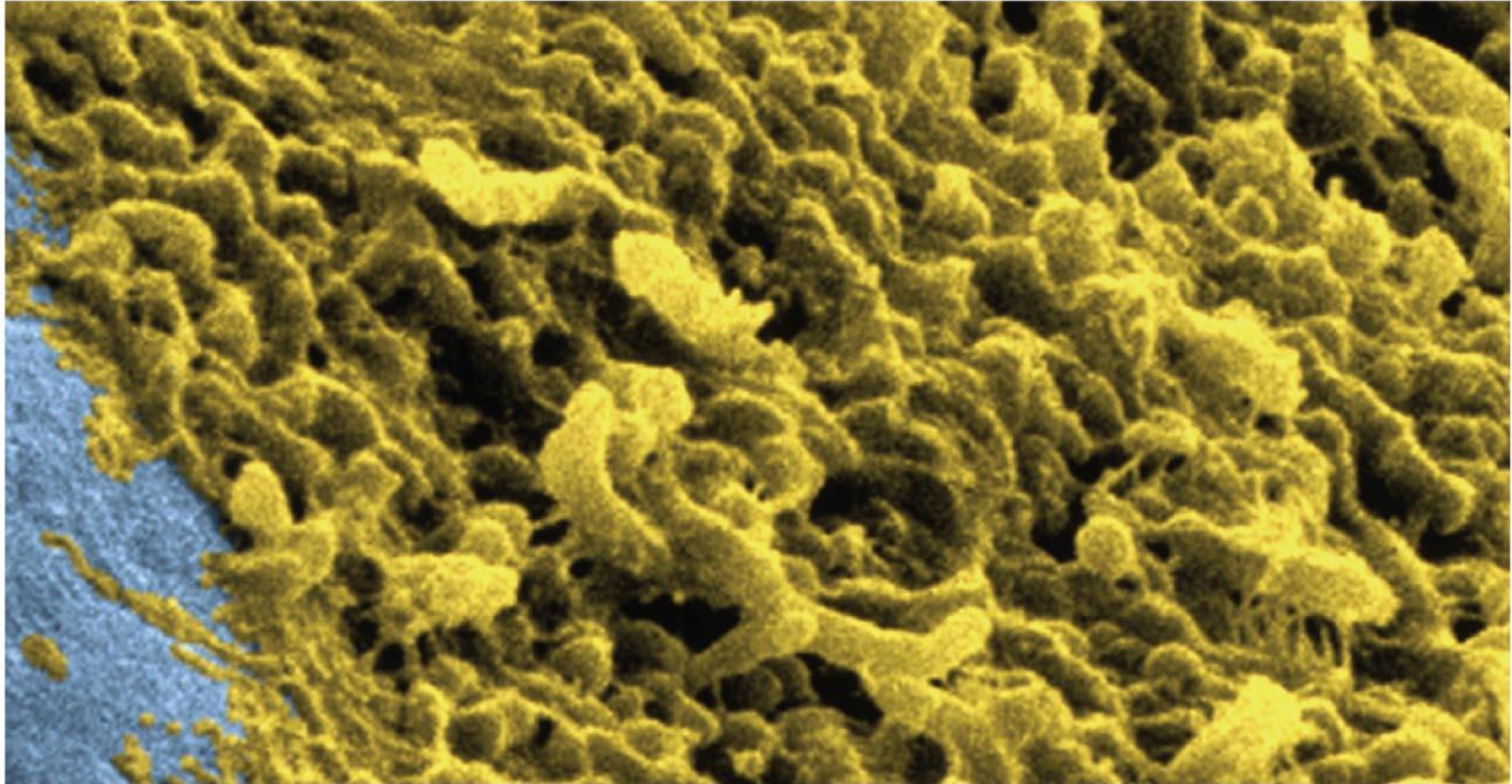


Fig. 27-17



Fig. 27-15

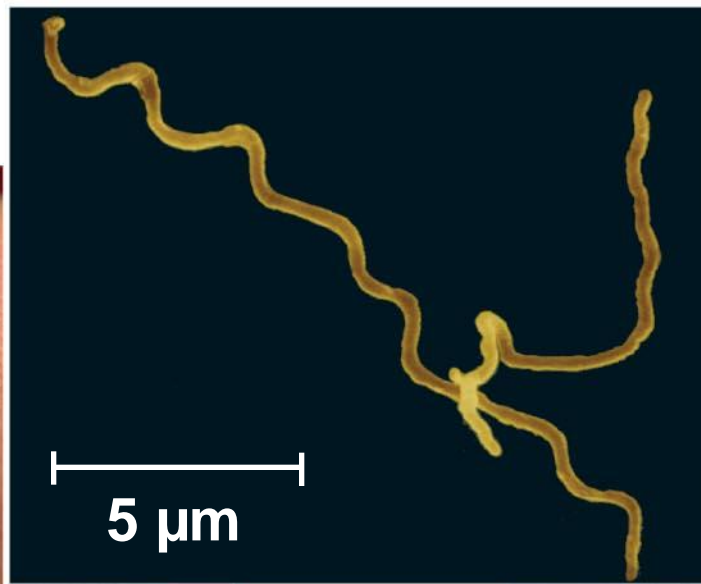


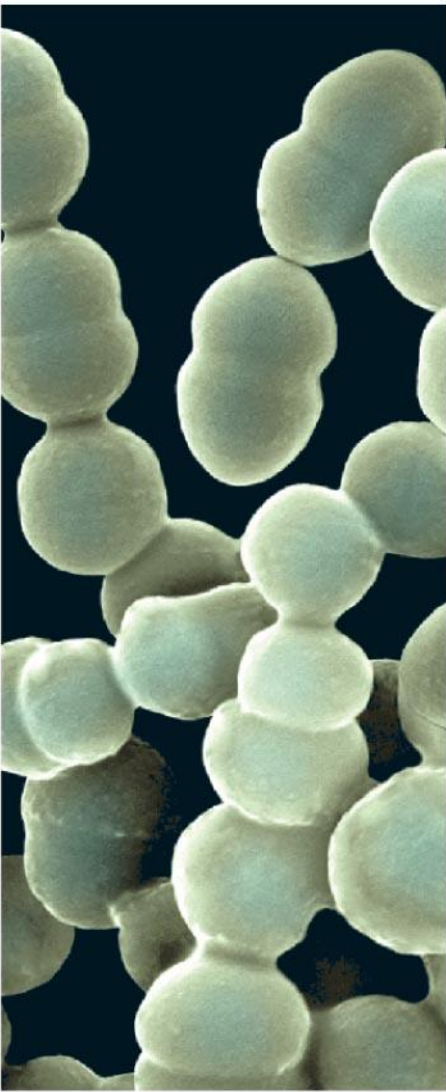
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Table 27.2 A Comparison of the Three Domains of Life

CHARACTER	DOMAIN		
	Bacteria	Archaea	Eukarya
Nuclear envelope	Absent	Absent	Present
Membrane-enclosed organelles	Absent	Absent	Present
Peptidoglycan in cell wall	Present	Absent	Absent
Membrane lipids	Unbranched hydrocarbons	Some branched hydrocarbons	Unbranched hydrocarbons
RNA polymerase	One kind	Several kinds	Several kinds
Initiator amino acid for protein synthesis	Formyl-methionine	Methionine	Methionine
Introns in genes	Very rare	Present in some genes	Present
Response to the antibiotics streptomycin and chloramphenicol	Growth inhibited	Growth not inhibited	Growth not inhibited
Histones associated with DNA	Absent	Present in some species	Present
Circular chromosome	Present	Present	Absent
Growth at temperatures > 100°C	No	Some species	No

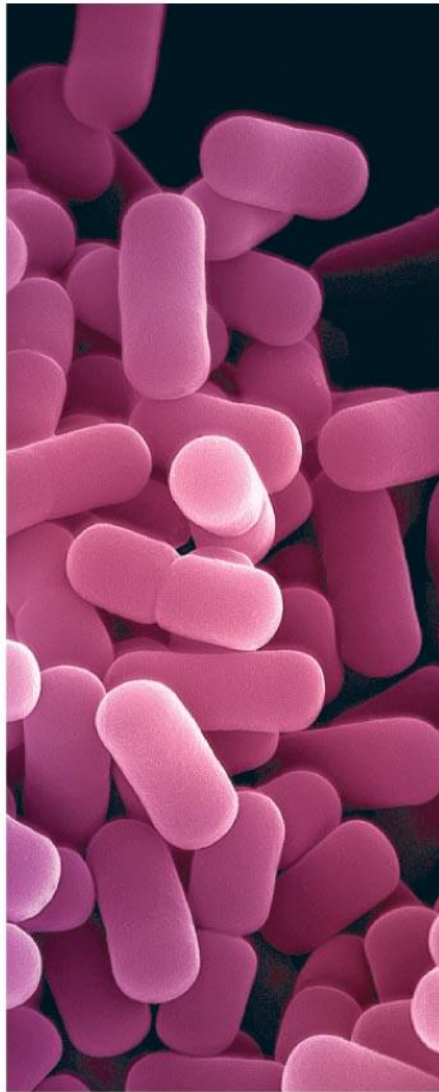
Fig. 27-21





1 μm

**(a) Spherical
(cocci)**



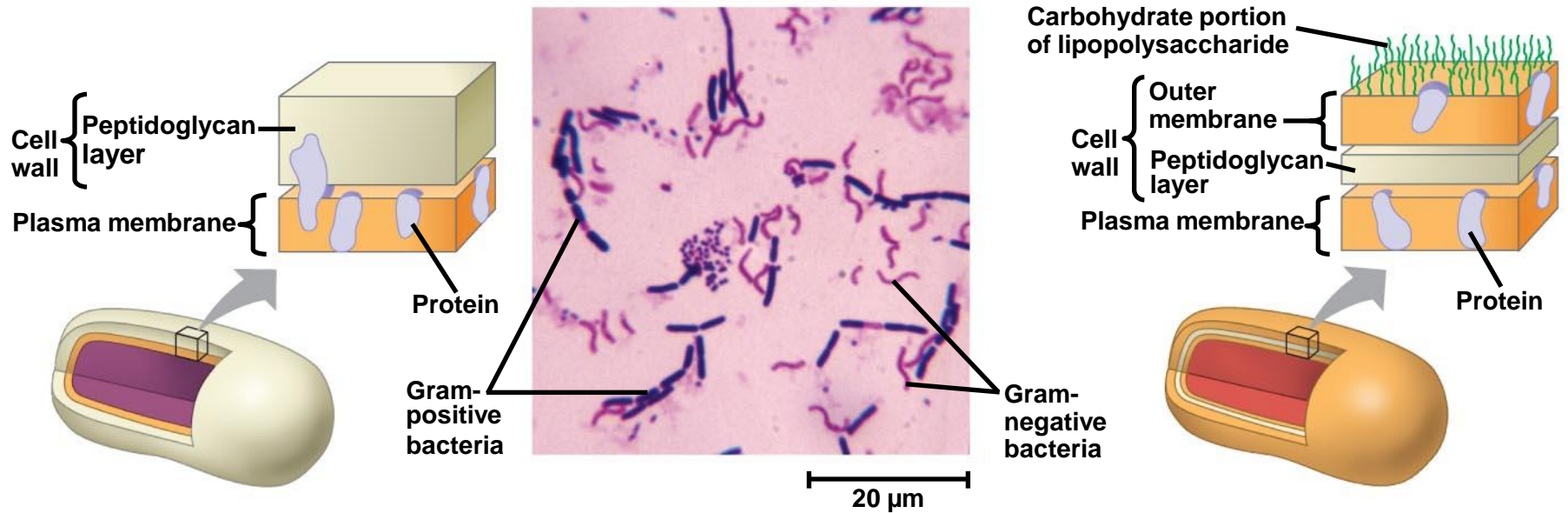
2 μm

**(b) Rod-shaped
(bacilli)**



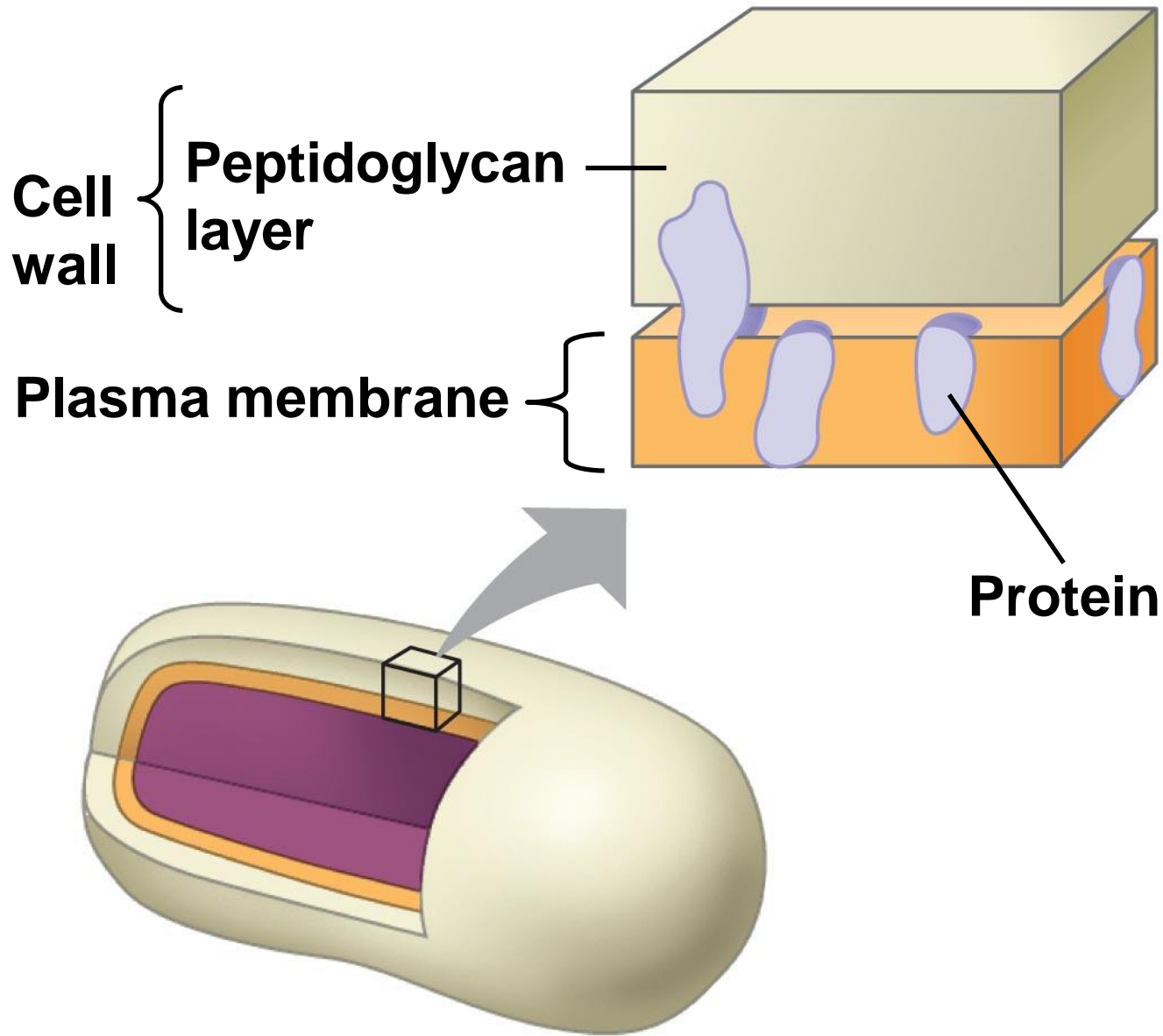
5 μm

(c) Spiral



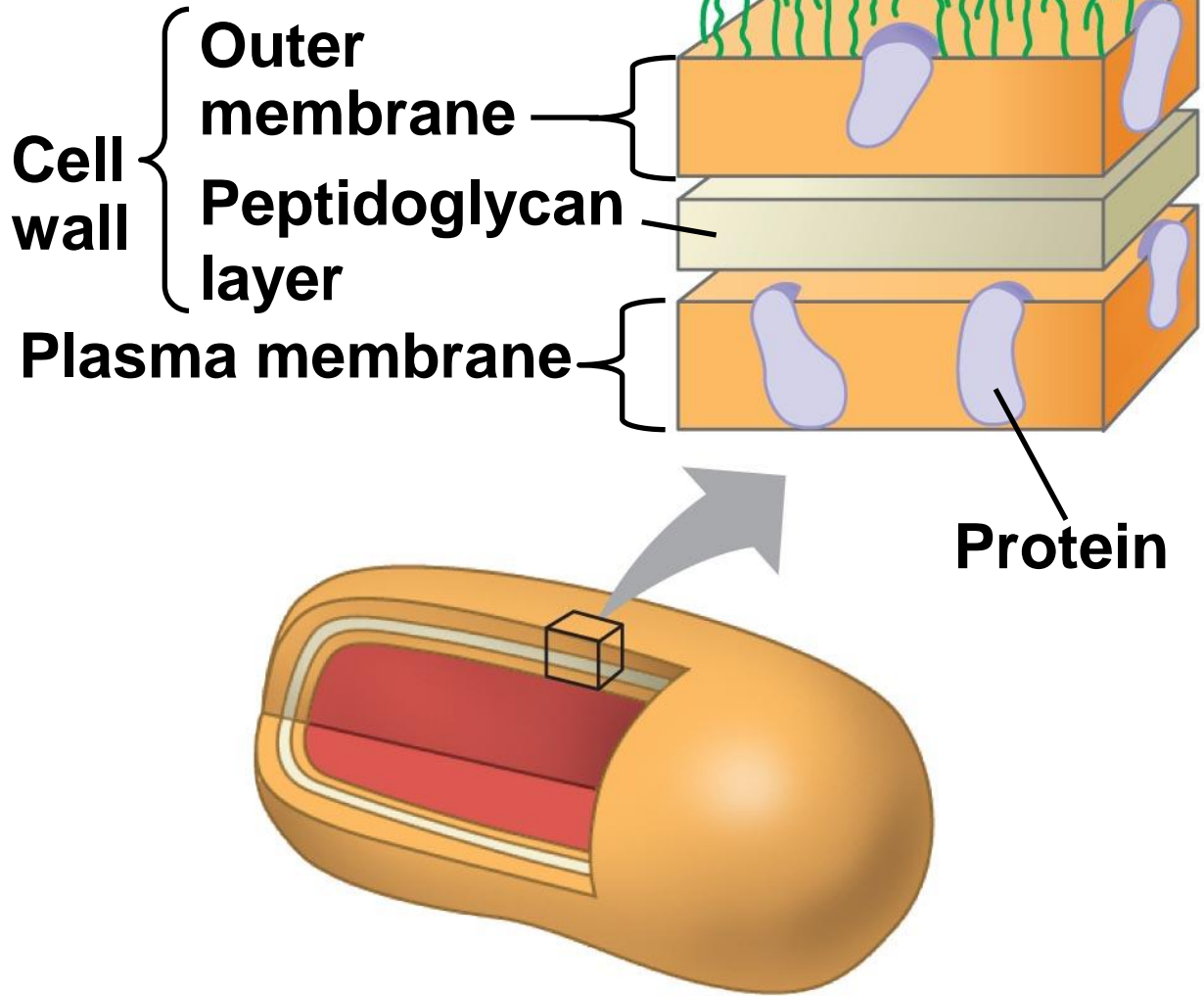
(a) Gram-positive: peptidoglycan traps crystal violet.

(b) Gram-negative: crystal violet is easily rinsed away, revealing red dye.



(a) Gram-positive: peptidoglycan traps crystal violet.

Carbohydrate portion of lipopolysaccharide



(b) Gram-negative: crystal violet is easily rinsed away, revealing red dye.

Fig. 27-3c



**Gram-
positive
bacteria**

**Gram-
negative
bacteria**

20 μm

Table 27.1 Major Nutritional Modes

Mode of Nutrition	Energy Source	Carbon Source	Types of Organisms
Autotroph			
Photoautotroph	Light	CO ₂	Photosynthetic prokaryotes (for example, cyanobacteria); plants; certain protists (for example, algae)
Chemoautotroph	Inorganic chemicals	CO ₂	Certain prokaryotes (for example, <i>Sulfolobus</i>)
Heterotroph			
Photoheterotroph	Light	Organic compounds	Certain prokaryotes (for example, <i>Rhodobacter</i> , <i>Chloroflexus</i>)
Chemoheterotroph	Organic compounds	Organic compounds	Many prokaryotes (for example, <i>Clostridium</i>) and protists; fungi; animals; some plants

Fig. 27-22

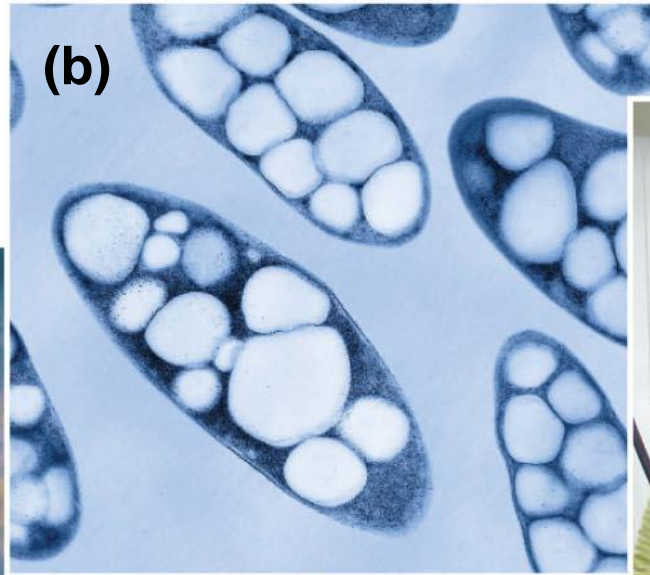
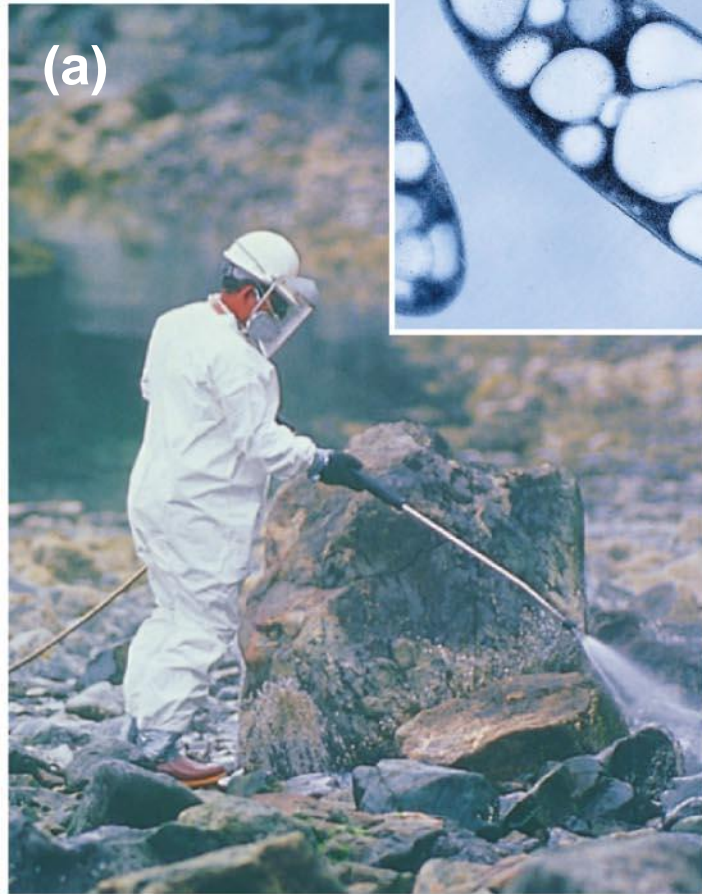


Fig. 27-14

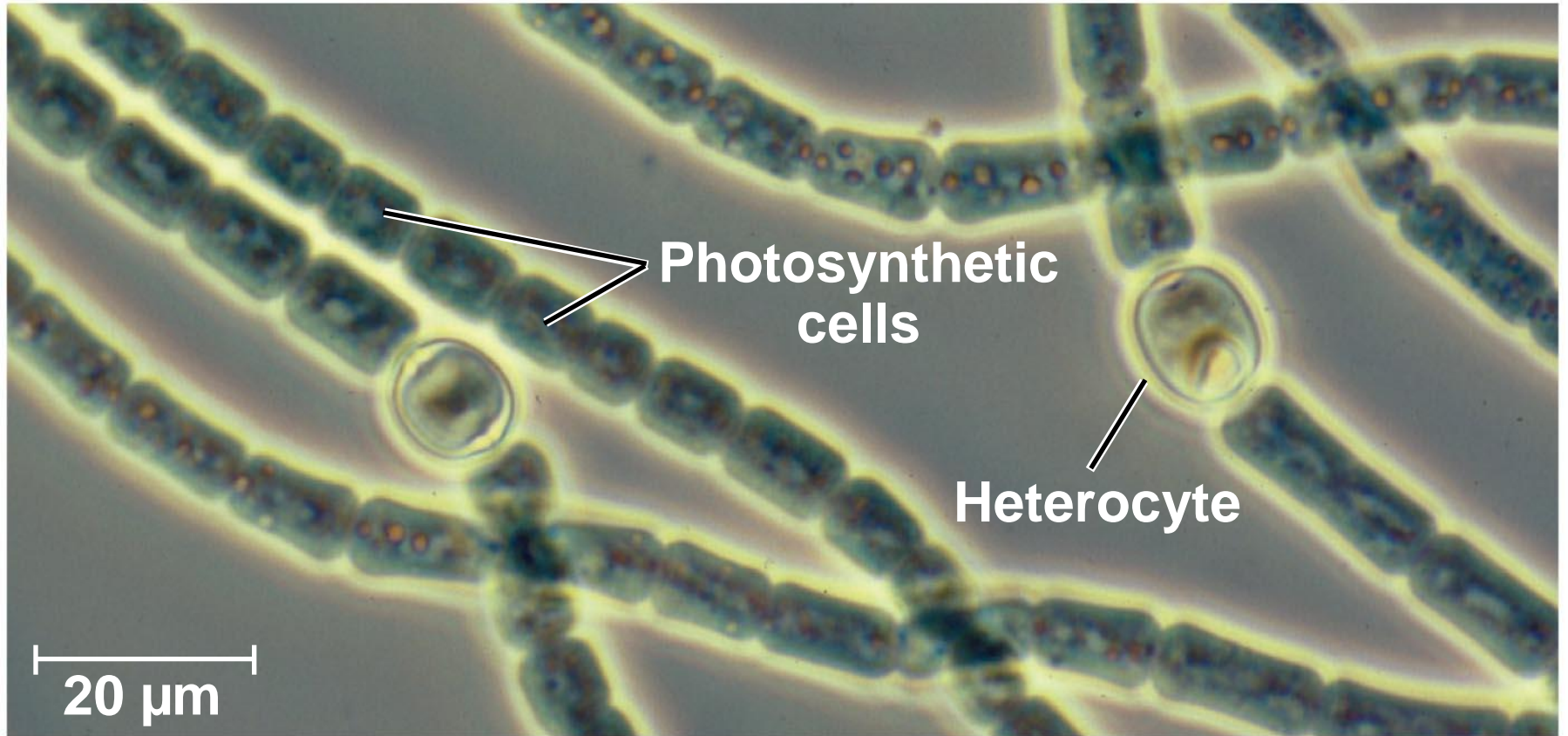
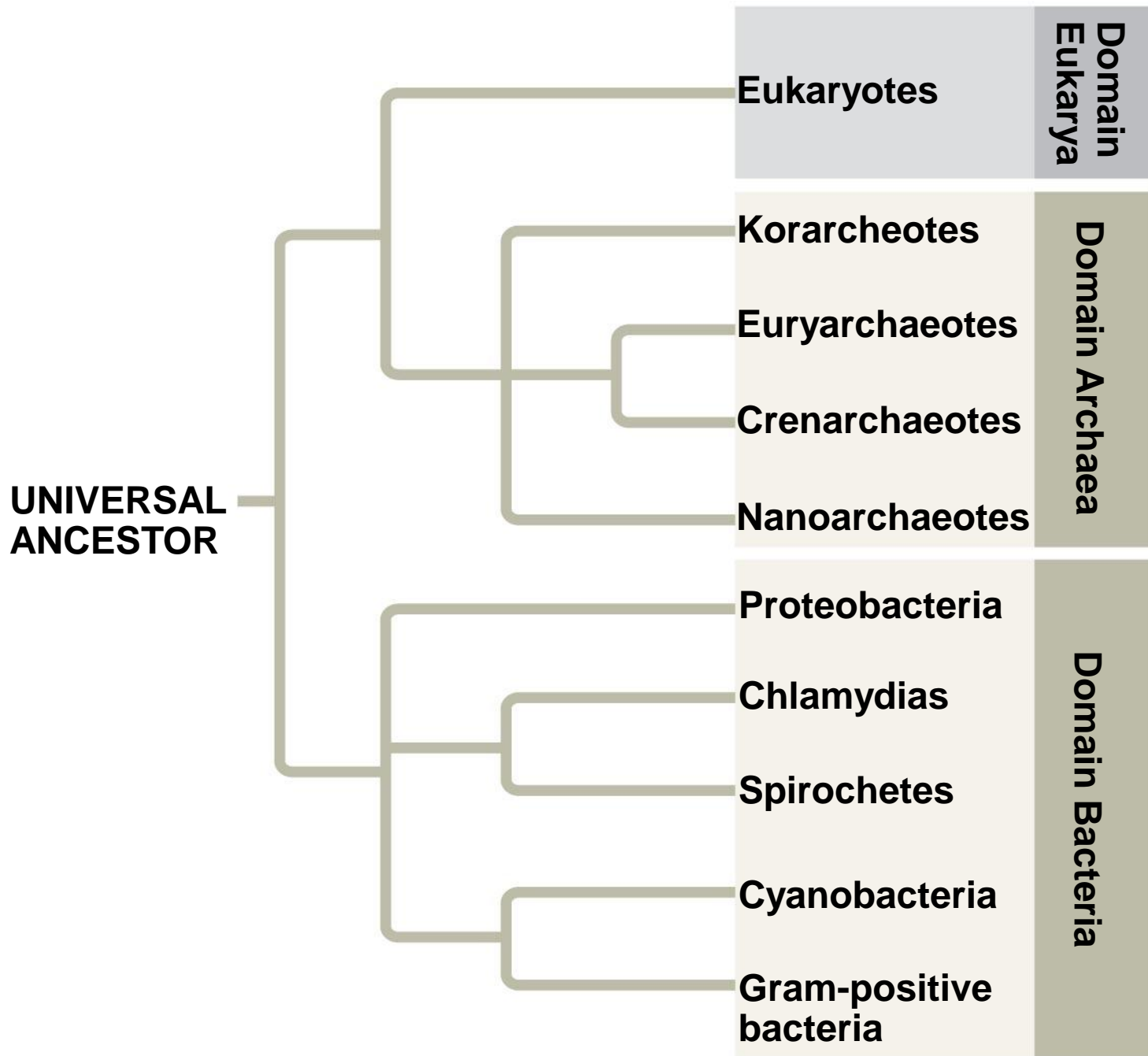
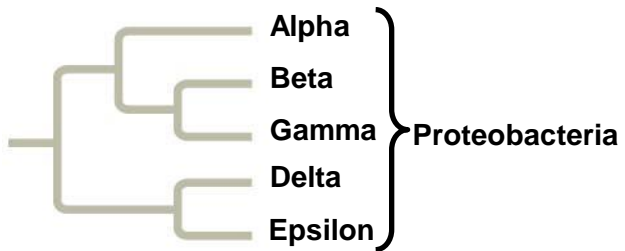


Fig. 27-16



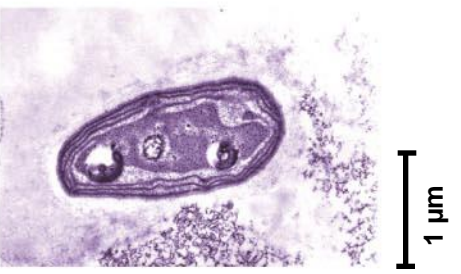


Subgroup: Alpha Proteobacteria



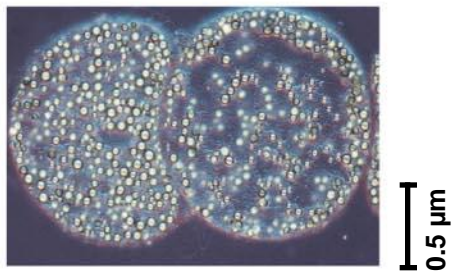
Rhizobium (arrows) inside a root cell of a legume (TEM)

Subgroup: Beta Proteobacteria



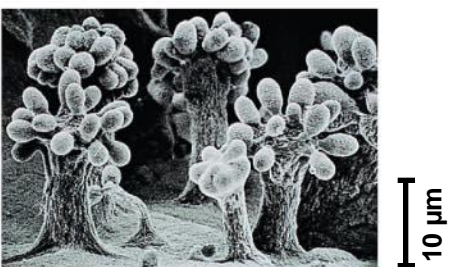
Nitrosomonas (colorized TEM)

Subgroup: Gamma Proteobacteria

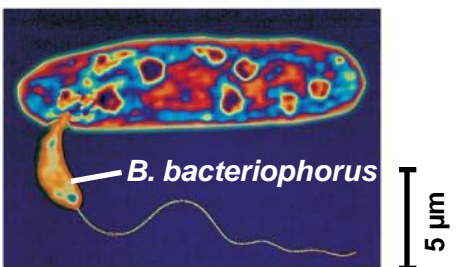


Thiomargarita namibiensis containing sulfur wastes (LM)

Subgroup: Delta Proteobacteria



Fruiting bodies of *Chondromyces crocatus*, a myxobacterium (SEM)



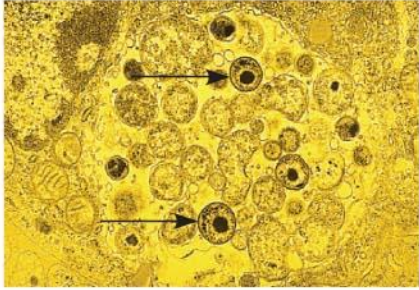
Bdellovibrio bacteriophorus attacking a larger bacterium (colorized TEM)

Subgroup: Epsilon Proteobacteria



Helicobacter pylori (colorized TEM)

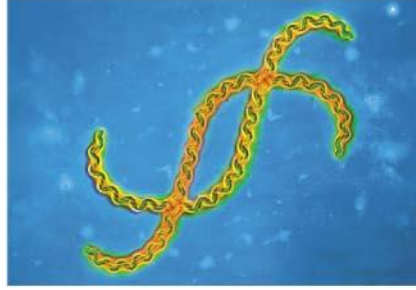
CHLAMYDIAS



2.5 μm

Chlamydia (arrows) inside an animal cell (colorized TEM)

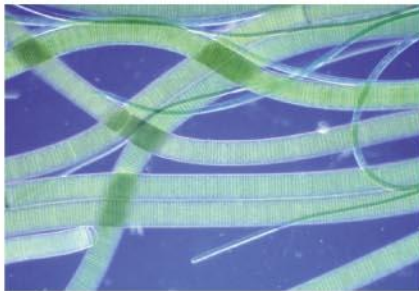
SPIROCHETES



5 μm

Leptospira, a spirochete (colorized TEM)

CYANOBACTERIA



50 μm

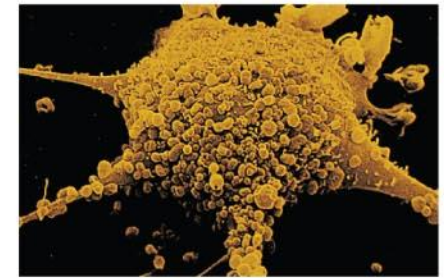
Two species of *Oscillatoria*, filamentous cyanobacteria (LM)

GRAM-POSITIVE BACTERIA



5 μm

Streptomyces, the source of many antibiotics (colorized SEM)



1 μm

Hundreds of mycoplasmas covering a human fibroblast cell (colorized SEM)

Fig. 27-6

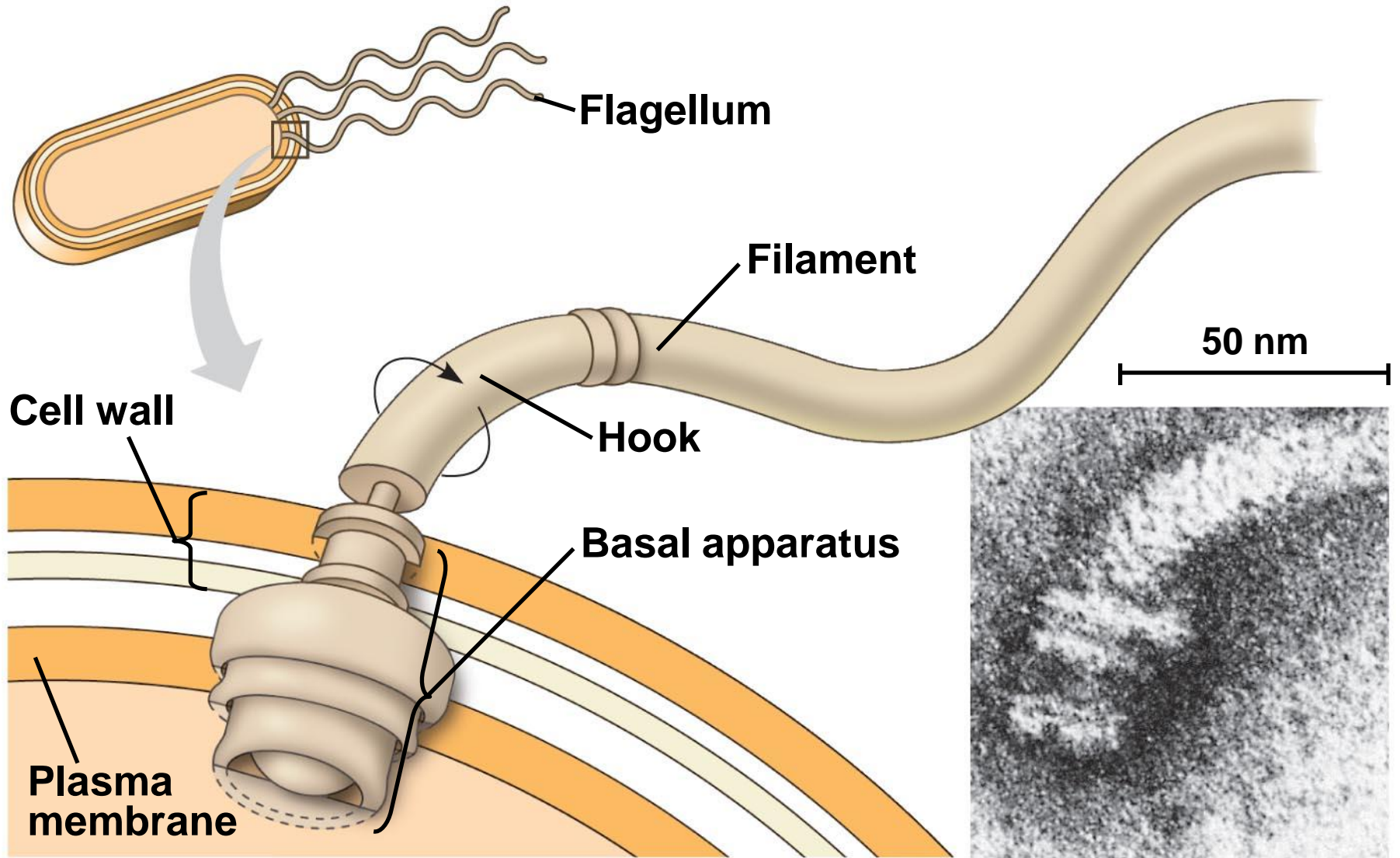


Fig. 27-8

Chromosome

Plasmids

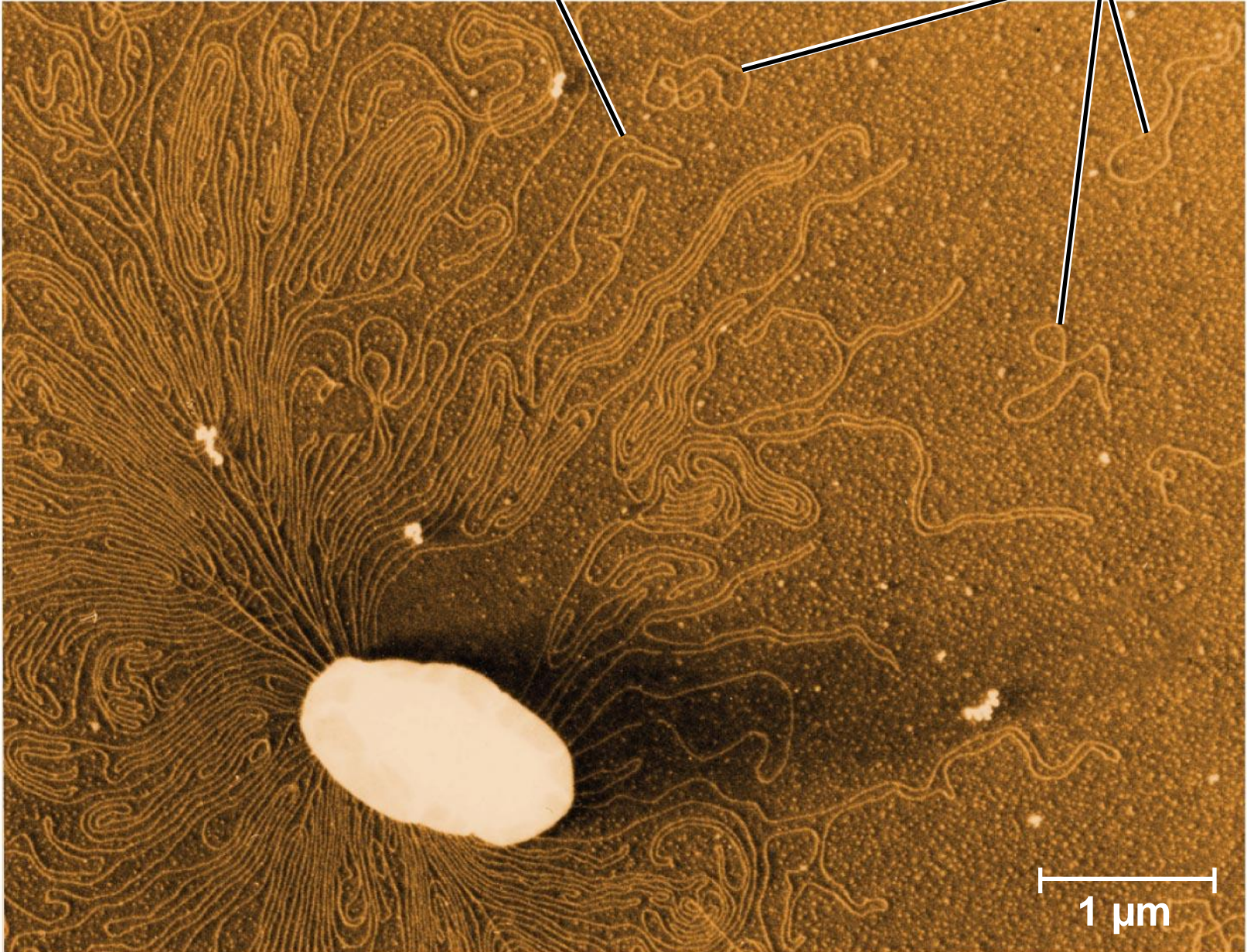
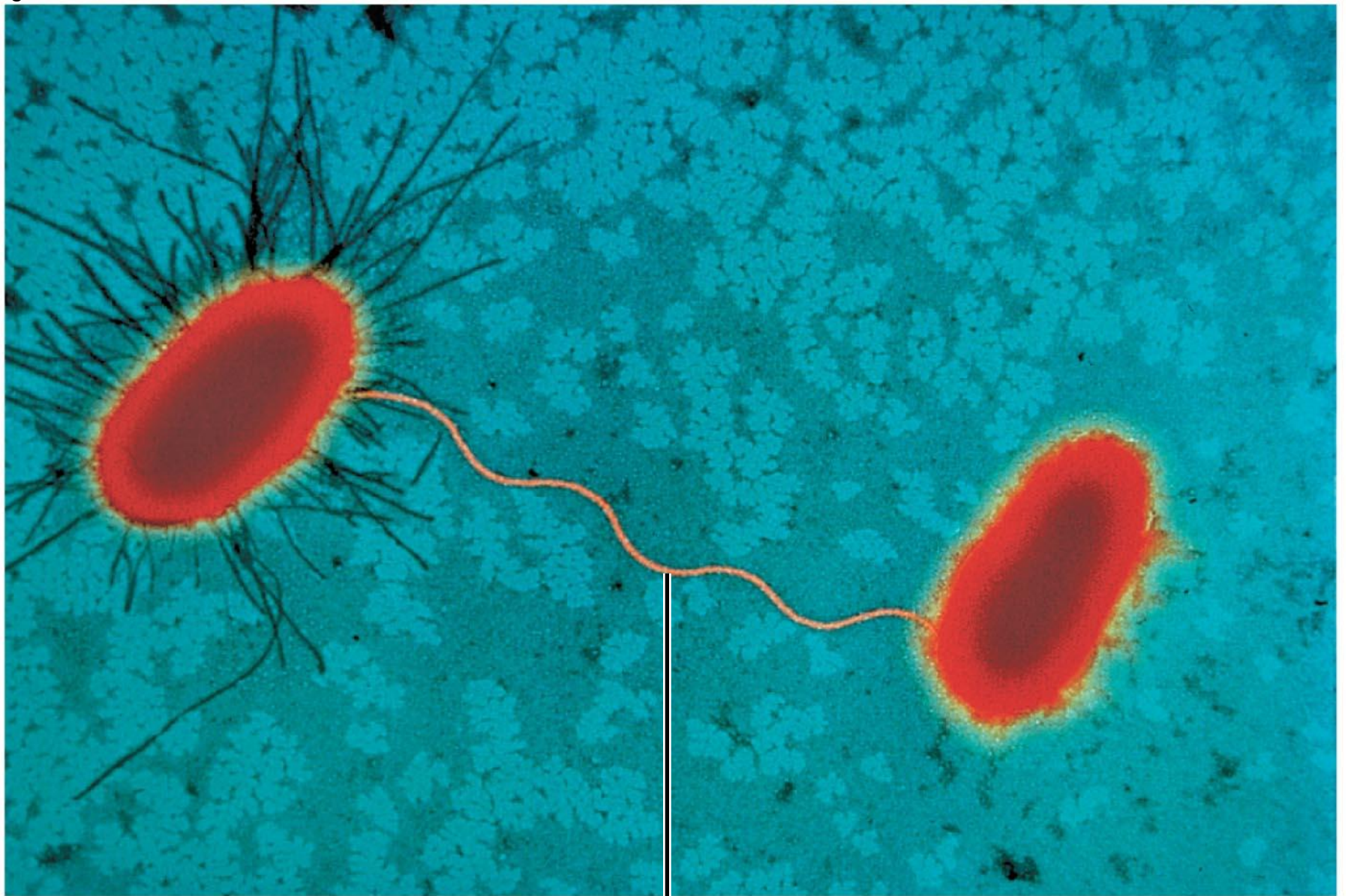
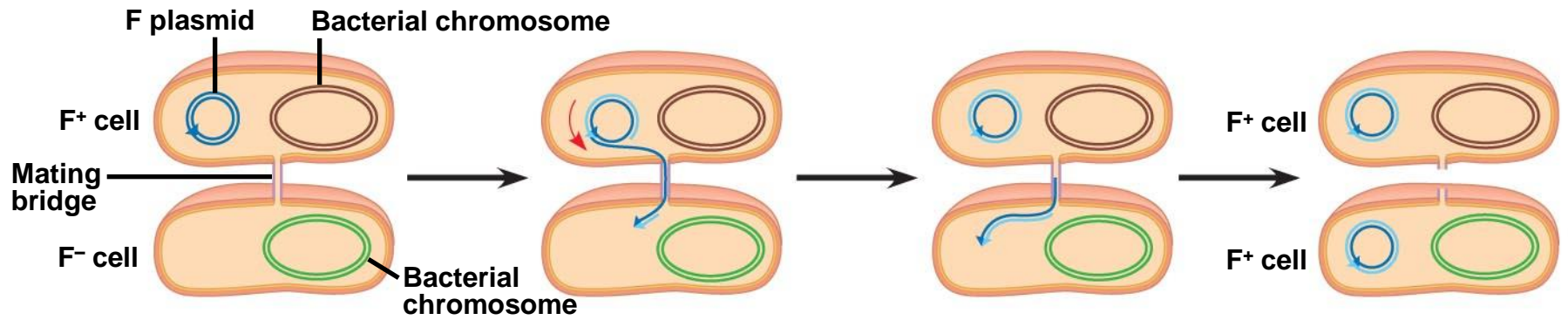


Fig. 27-12

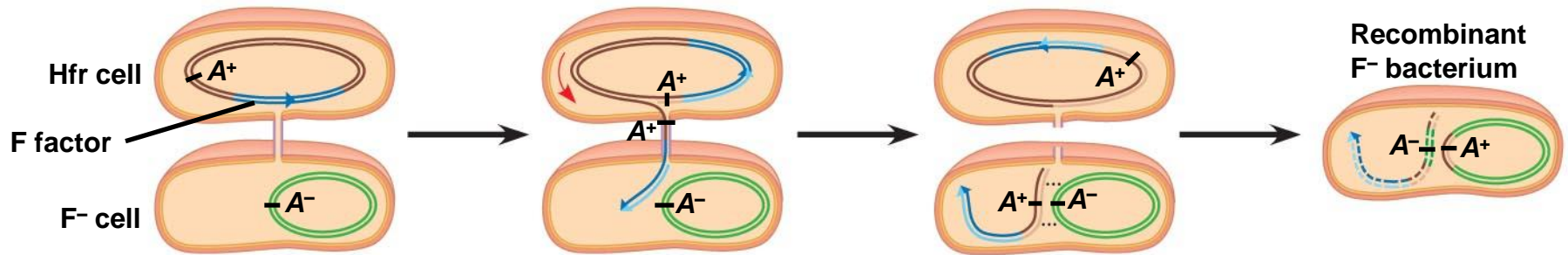


Sex pilus

1 μm



(a) Conjugation and transfer of an F plasmid



(b) Conjugation and transfer of part of an Hfr bacterial chromosome

Fig. 27-11-4

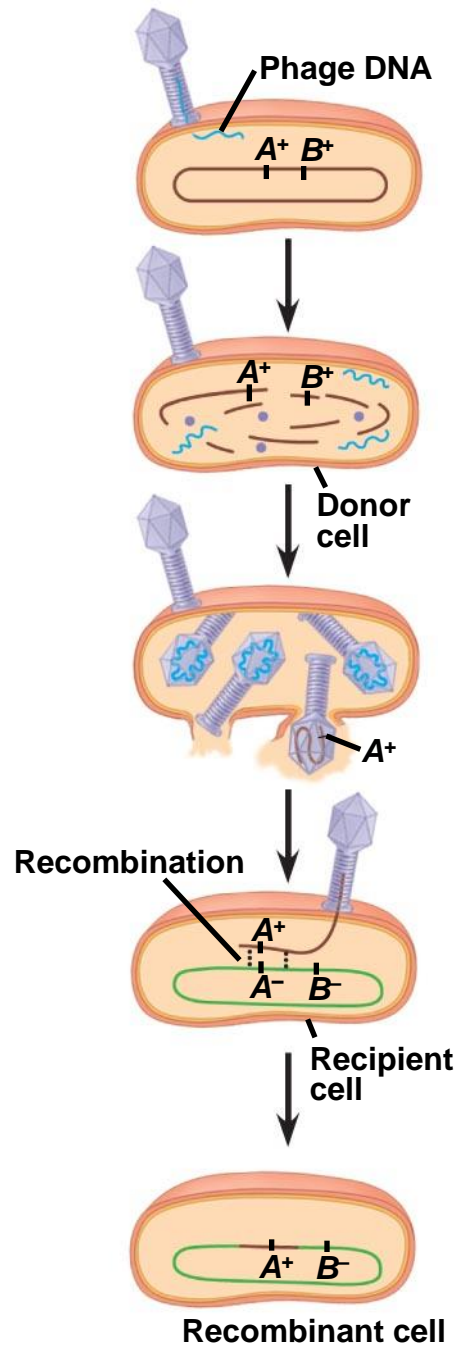


Fig. 27-9

