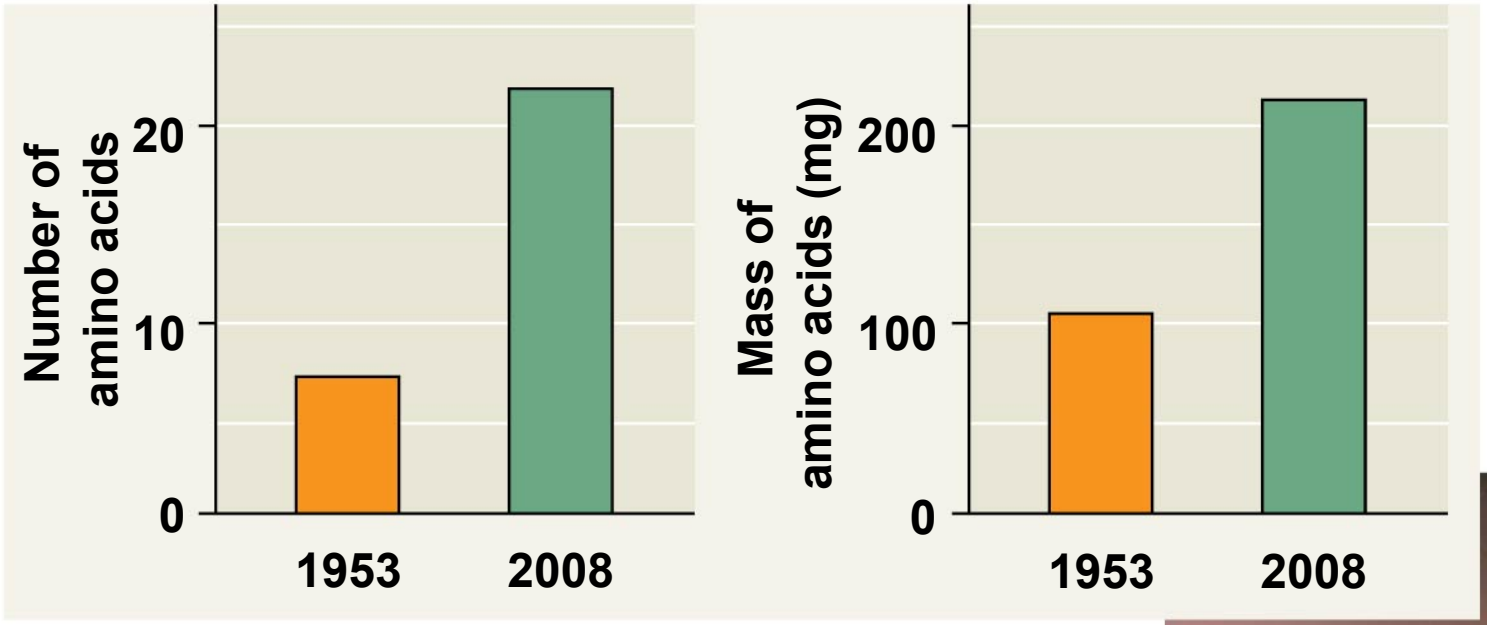
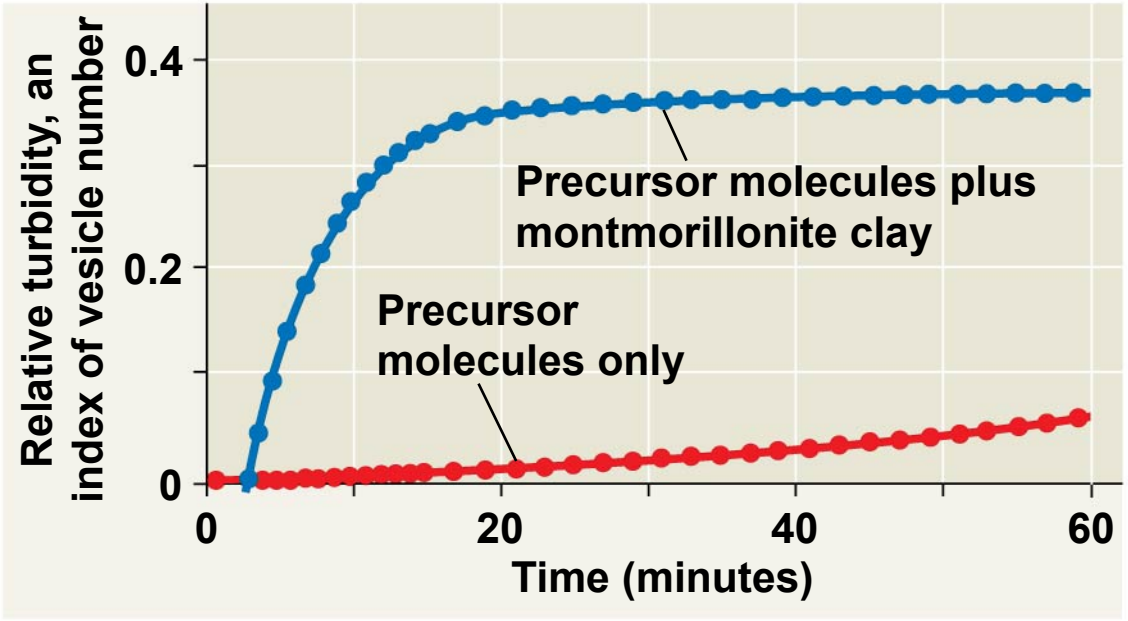
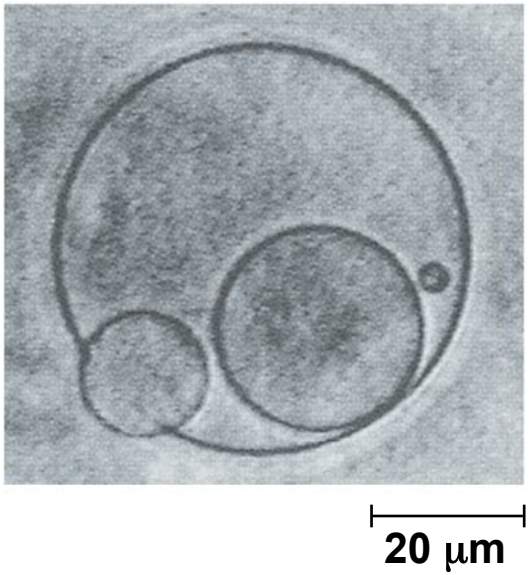
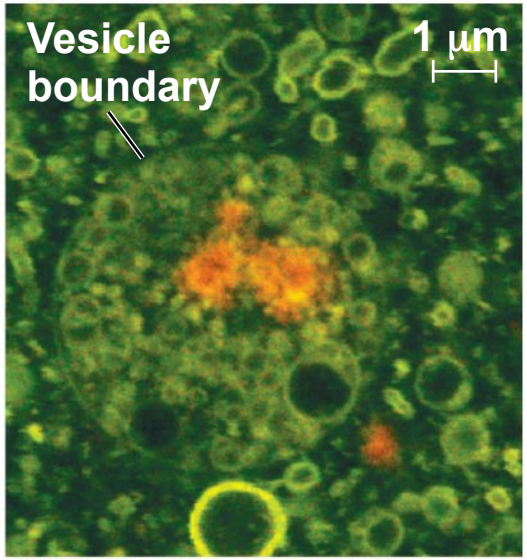




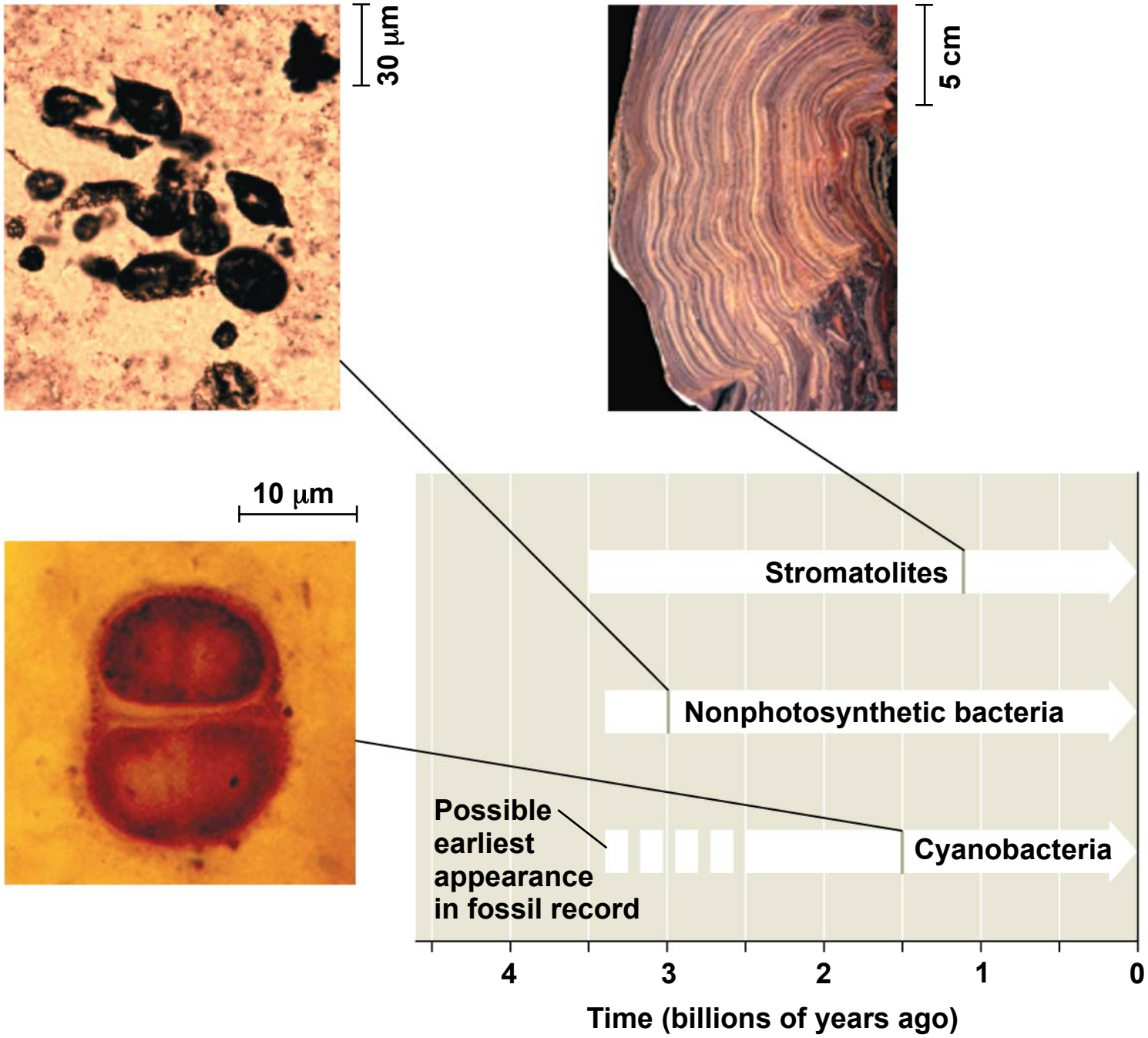
(a) Self-assembly

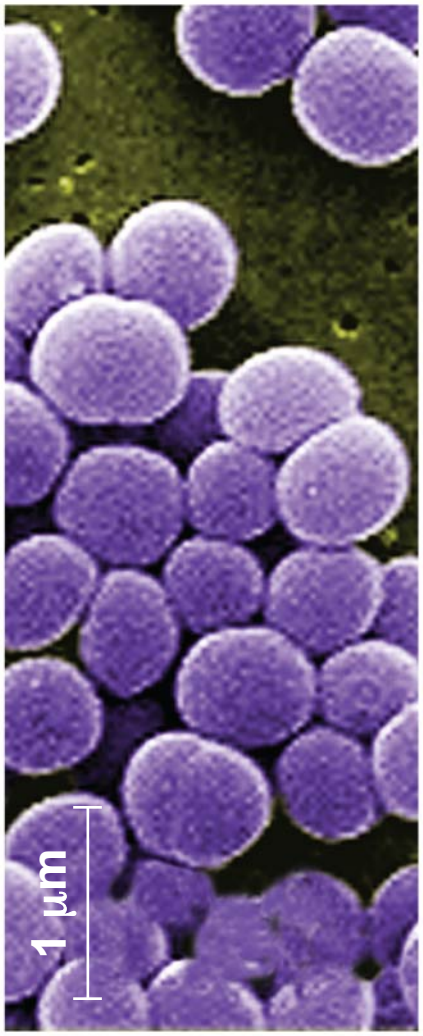


(b) Reproduction



(c) Absorption of RNA

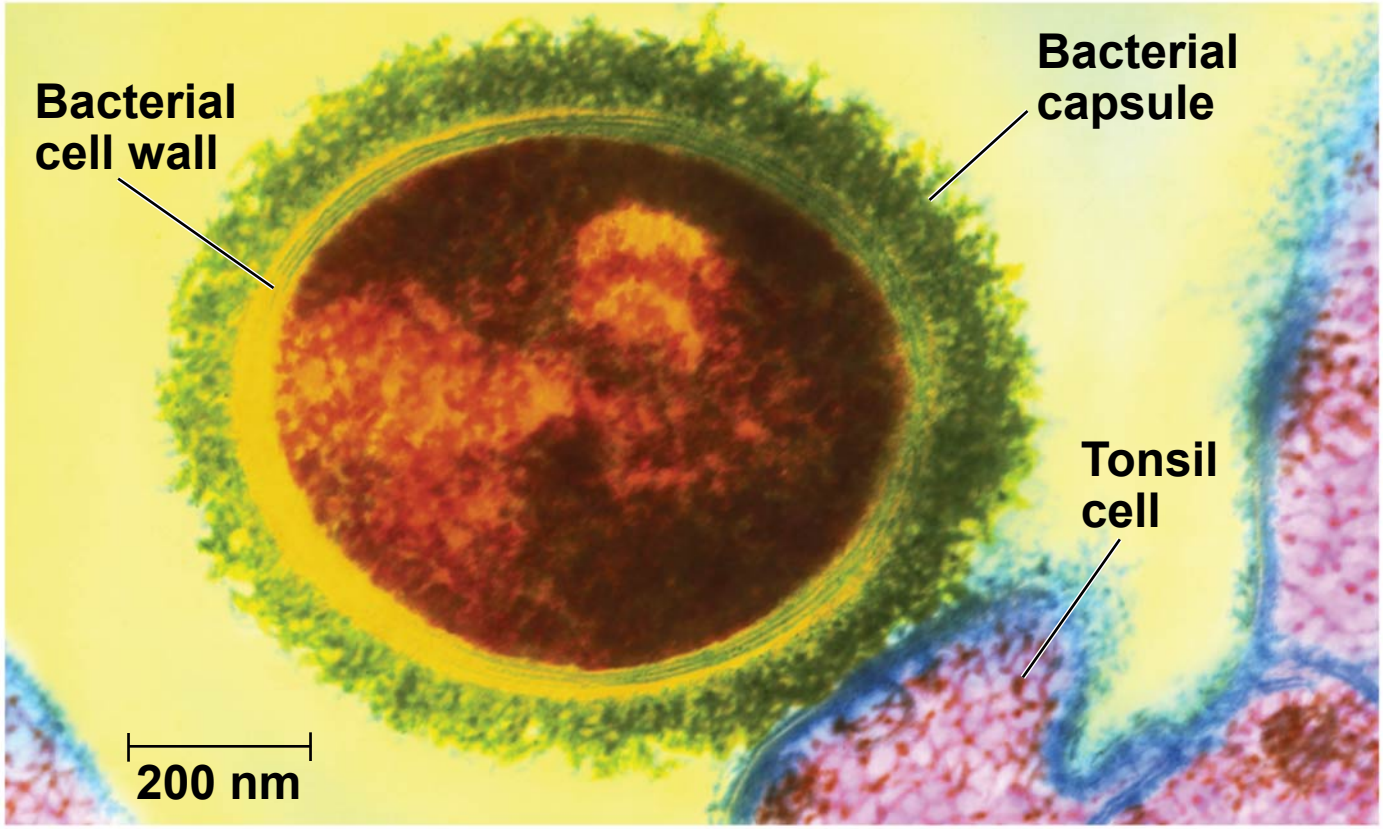


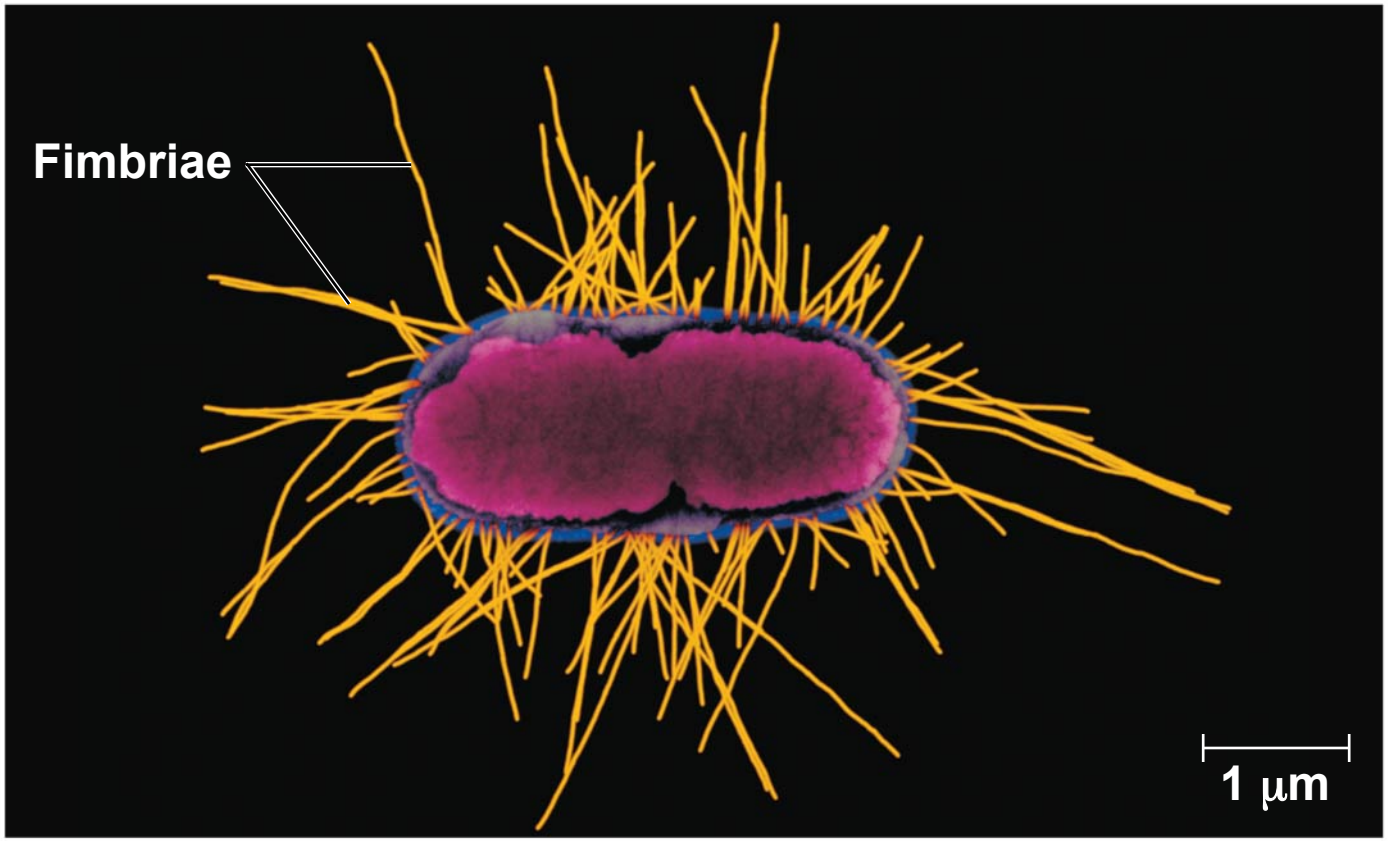


(a) Spherical

(b) Rod-shaped

(c) Spiral





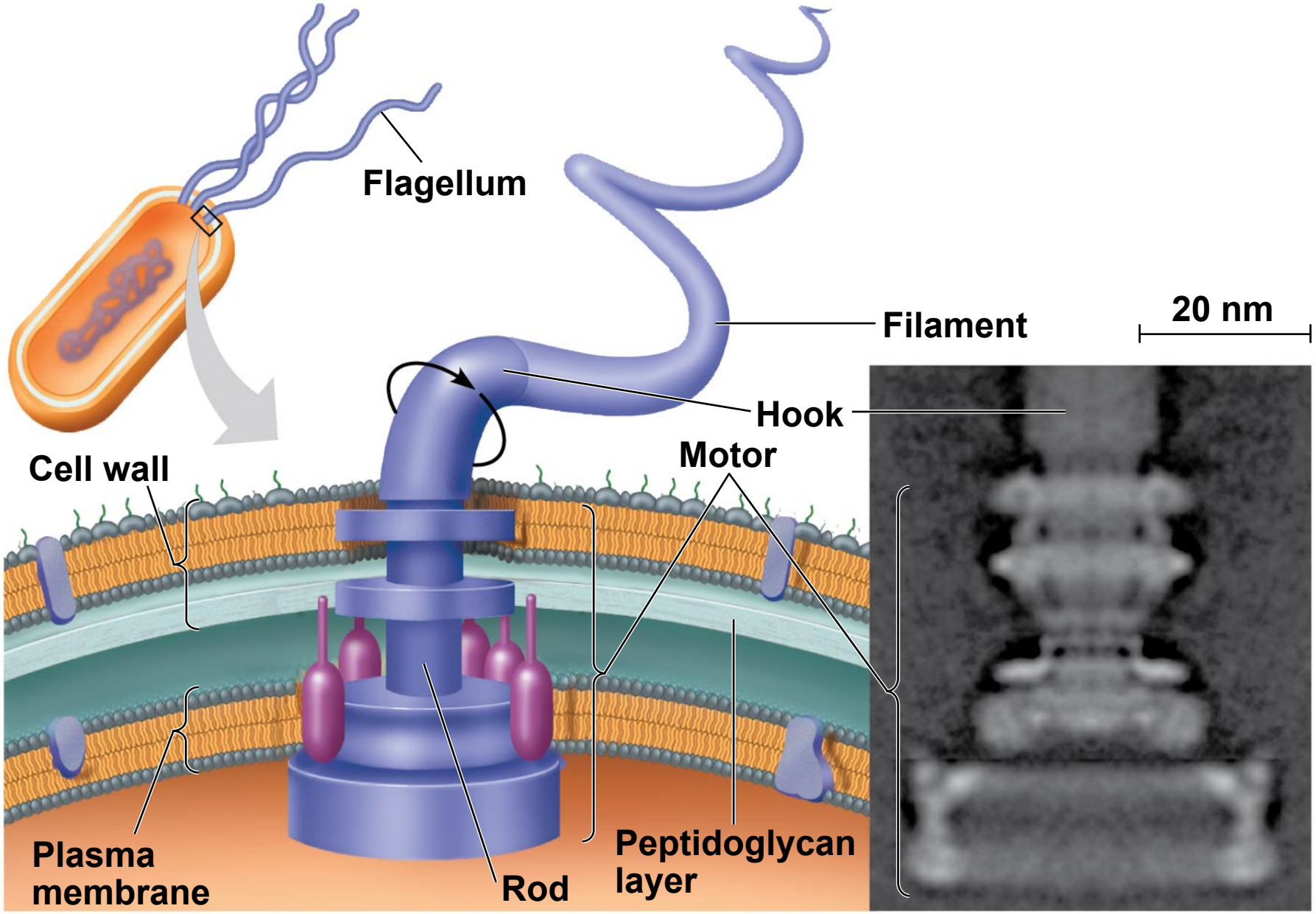
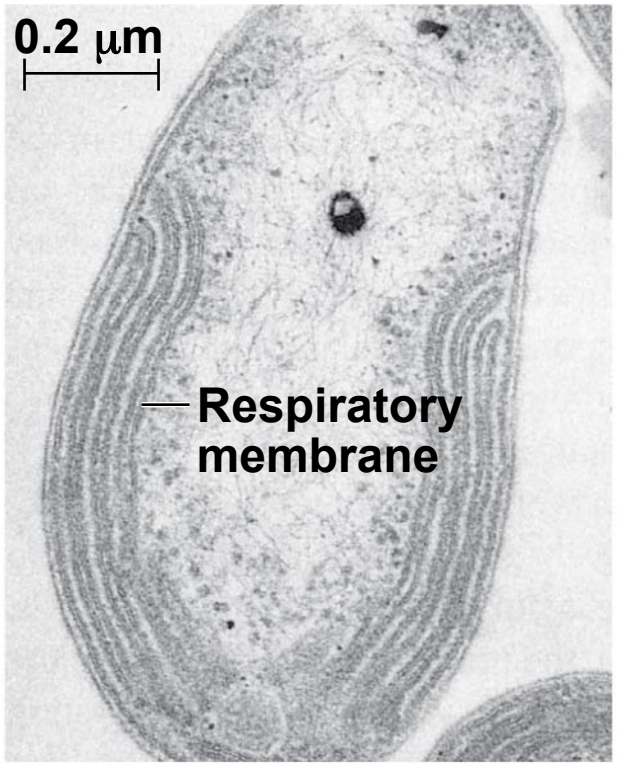
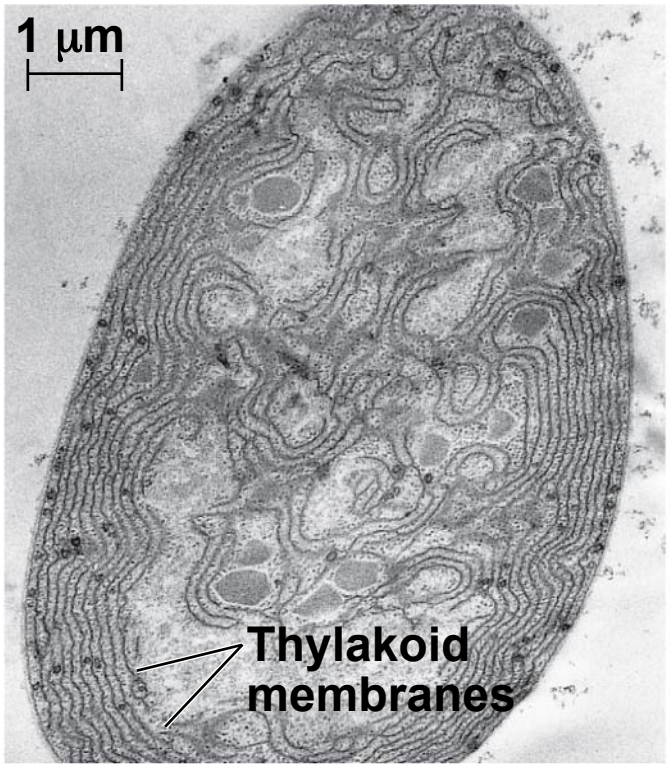


Table 24.1 Major Nutritional Modes

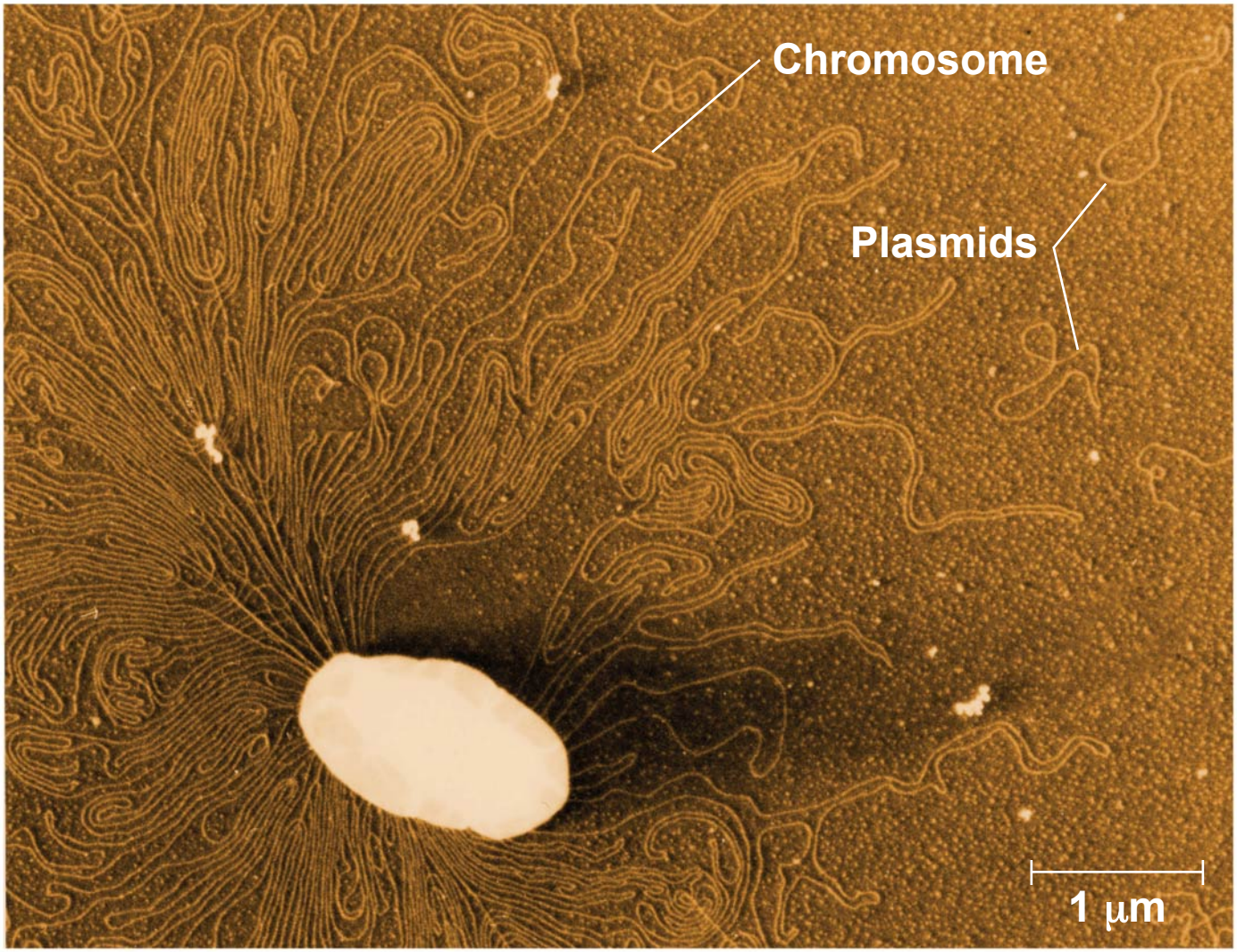
Mode	Energy Source	Carbon Source	Types of Organisms
AUTOTROPH			
Photoautotroph	Light	CO_2, HCO_3^-, or related compound	Photosynthetic prokaryotes (for example, cyanobacteria); plants; certain protists (for example, algae)
Chemoautotroph	Inorganic chemicals (such as H_2S, NH_3, or Fe^{2+})	CO_2, HCO_3^-, or related compound	Unique to certain prokaryotes (for example, *Sulfolobus*)
HETEROTROPH			
Photoheterotroph	Light	Organic compounds	Unique to certain aquatic and salt-loving prokaryotes (for example, *Rhodobacter*, *Chloroflexus*)
Chemoheterotroph	Organic compounds	Organic compounds	Many prokaryotes (for example, *Clostridium*) and protists; fungi; animals; some plants

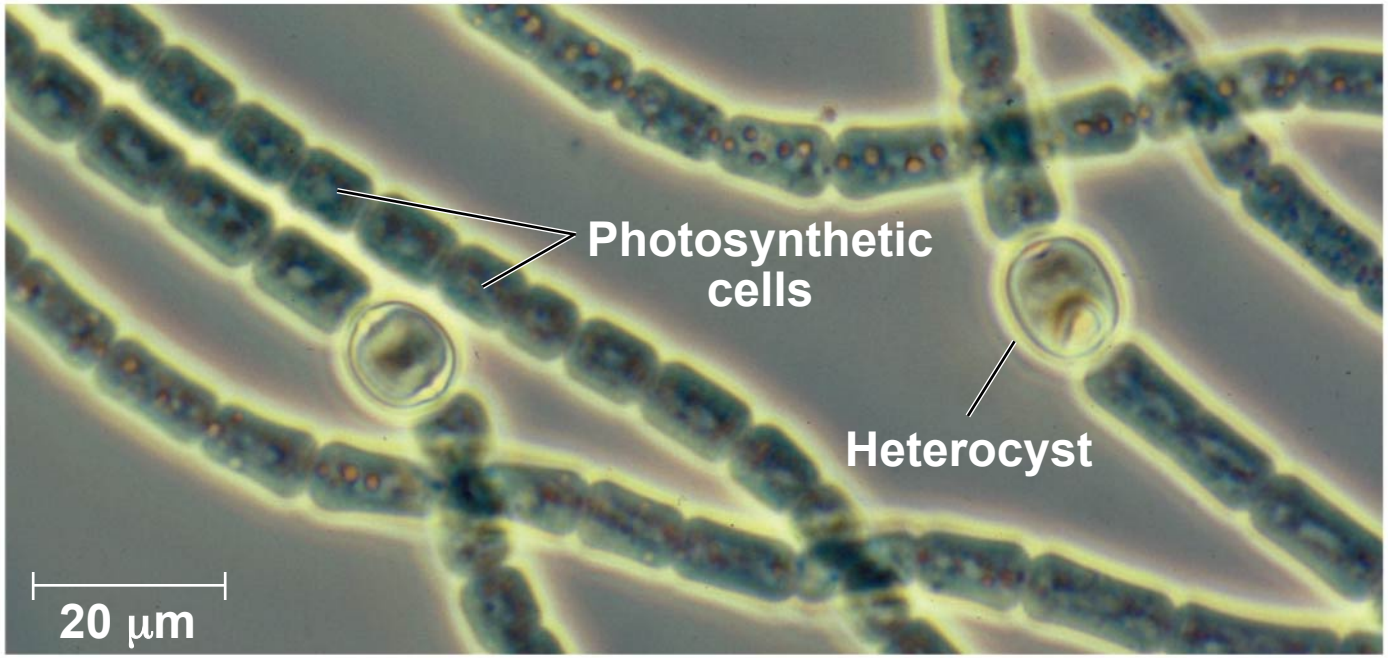


(a) Aerobic prokaryote



(b) Photosynthetic prokaryote





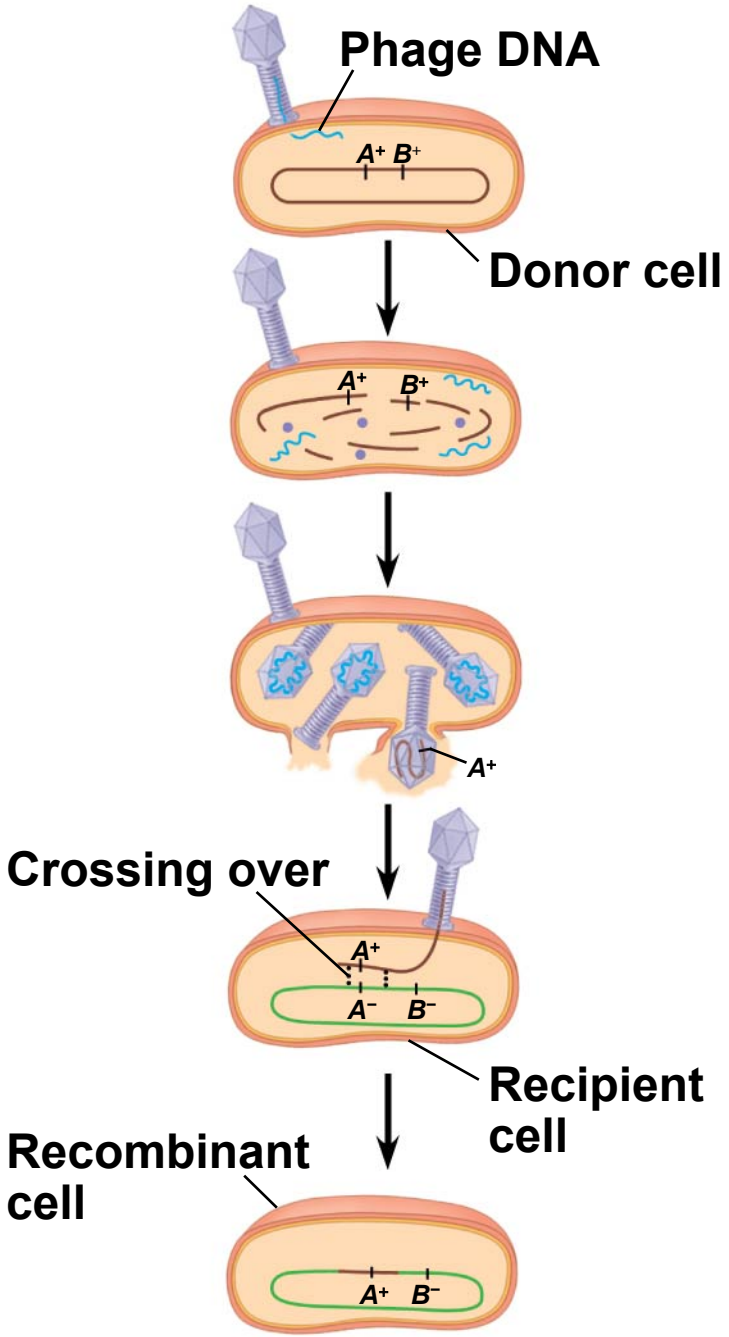
1. Phage infects bacterial donor cell with A^+ and B^+ alleles.

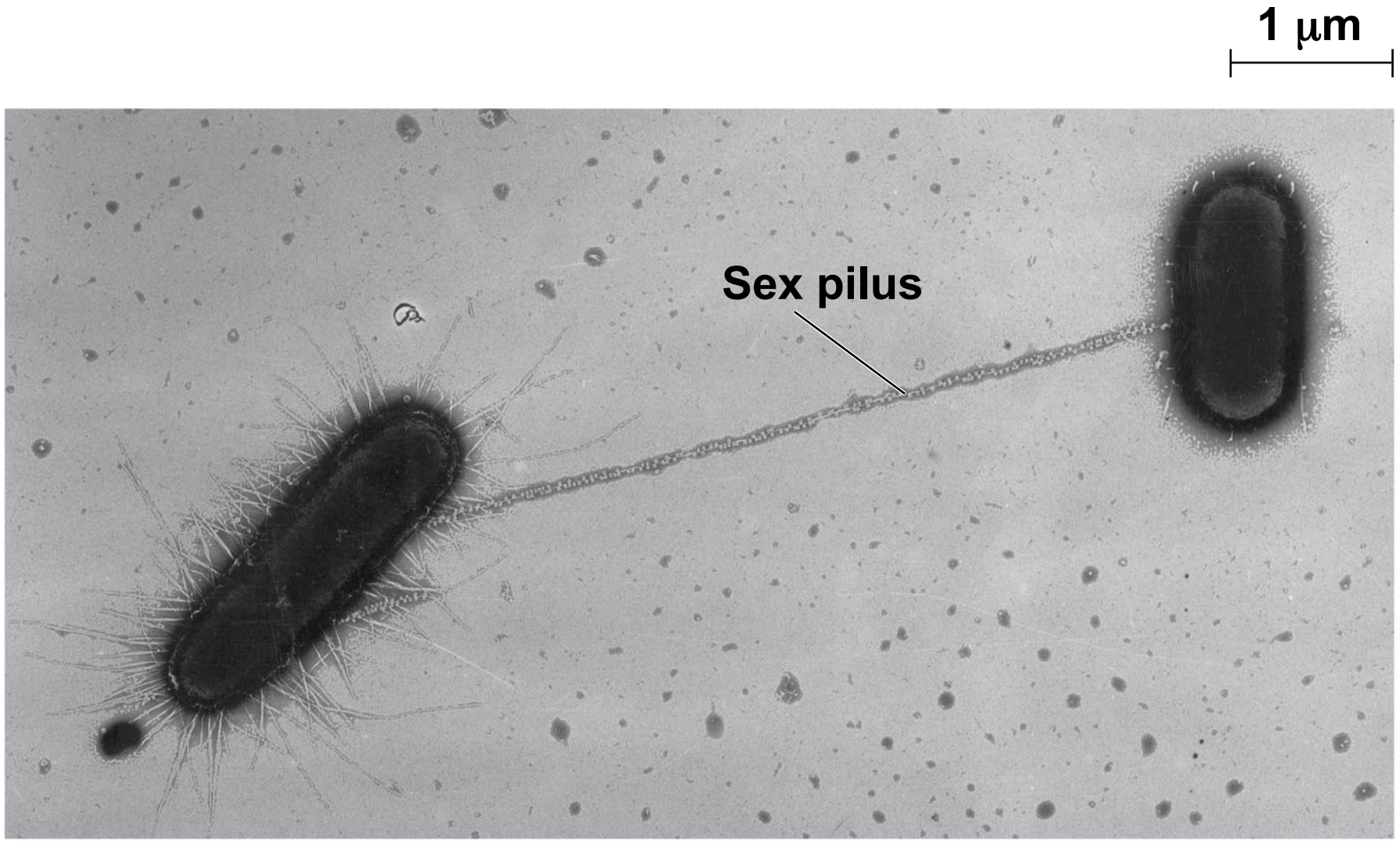
2. Phage DNA is replicated and proteins synthesized.

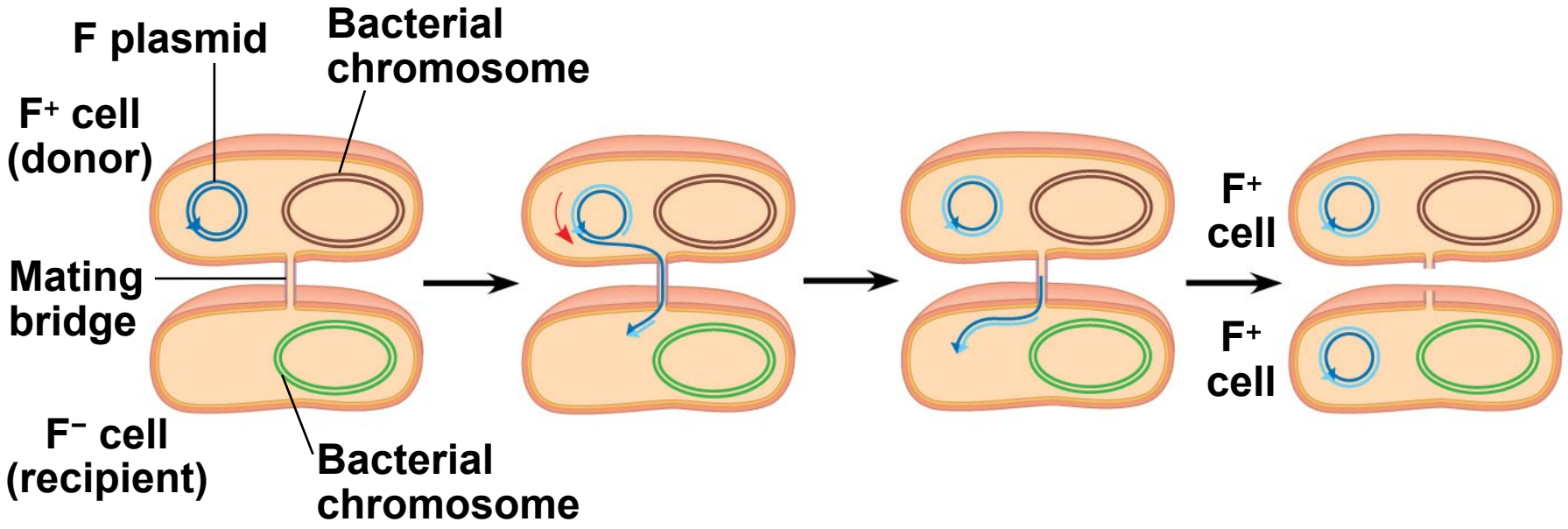
3. Fragment of DNA with A^+ allele is packaged within a phage capsid.

4. Phage with A^+ allele infects bacterial recipient cell.

5. Incorporation of phage DNA creates recombinant cell with genotype A^+B^+.







1. One strand of F+ cell plasmid DNA breaks at arrowhead.
2. Broken strand peels off and enters F− cell.
3. Donor and recipient cells synthesize complementary DNA strands.
4. Recipient cell is now a recombinant F+ cell.

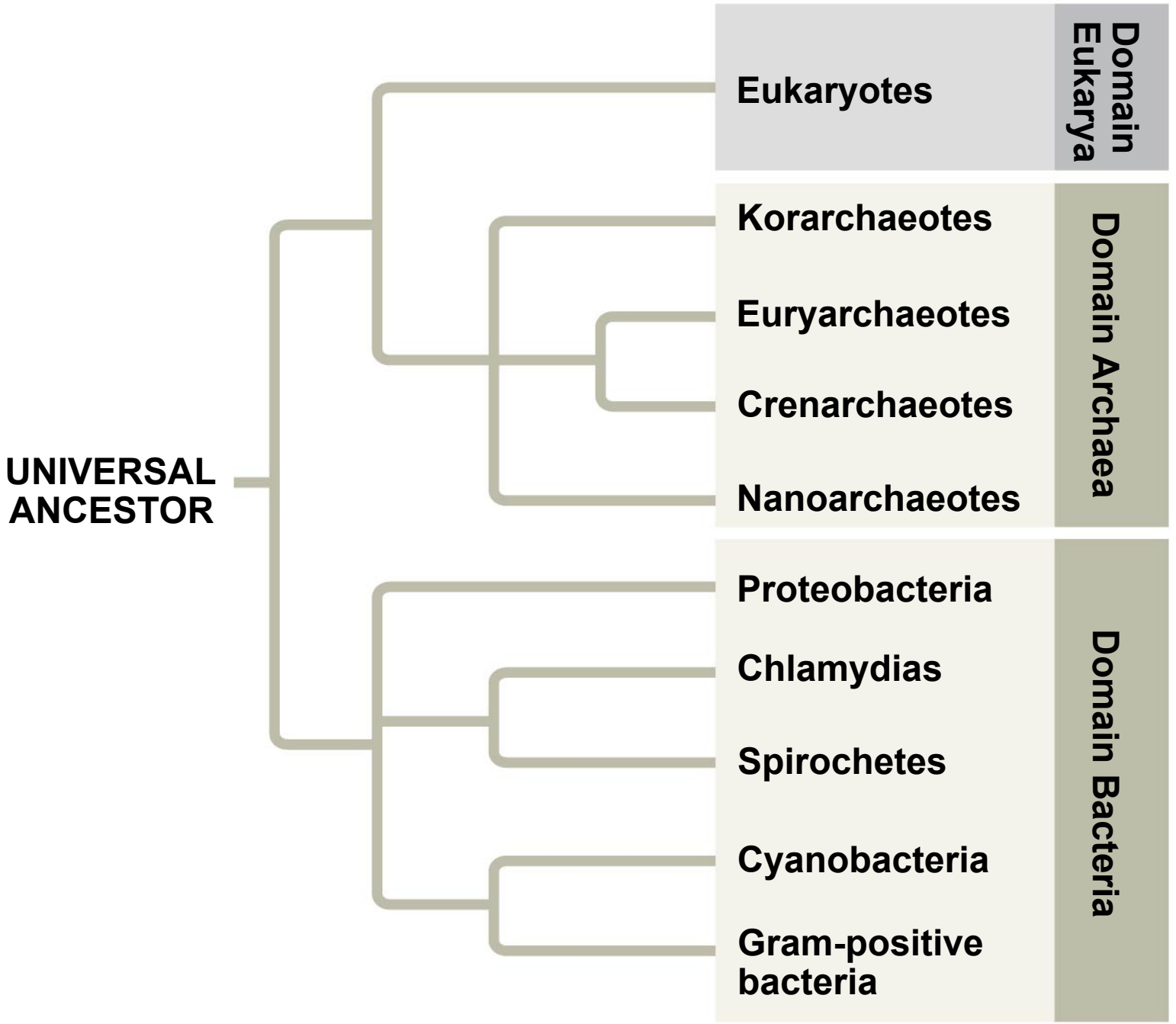
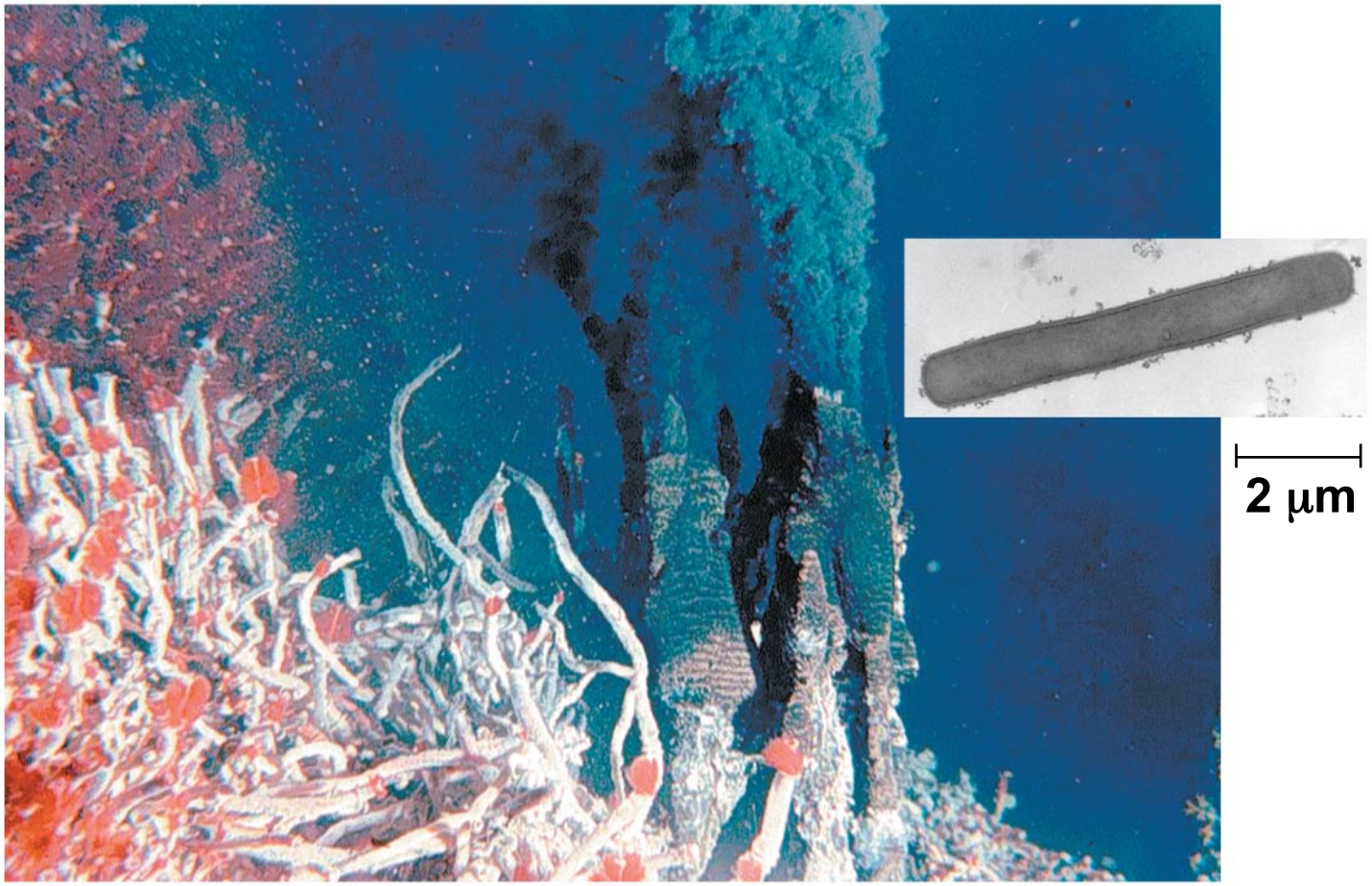
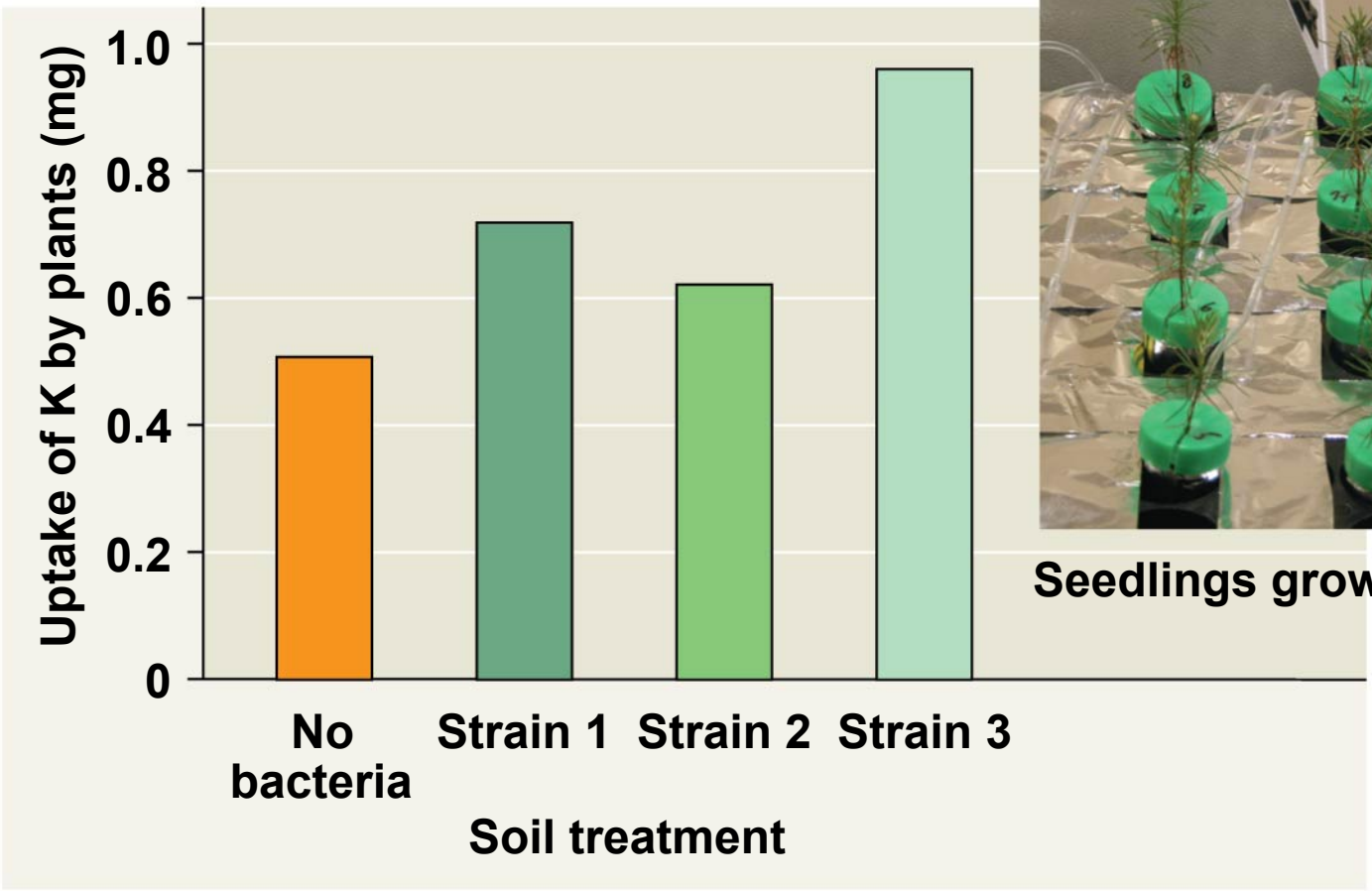


Table 24.2 A Comparison of the Three Domains of Life

CHARACTERISTIC	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 in many genes
Response to the antibiotics streptomycin and chloramphenicol	Growth usually 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





Seedlings growing in the lab