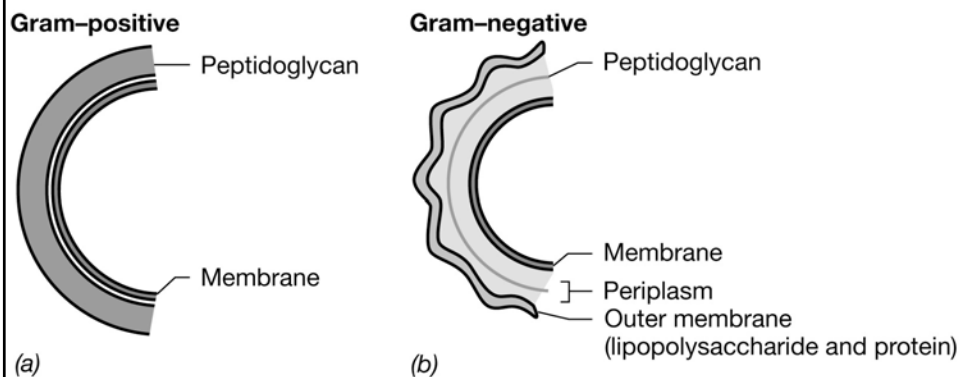


Comparing Prokaryotic and Eukaryotic Cells

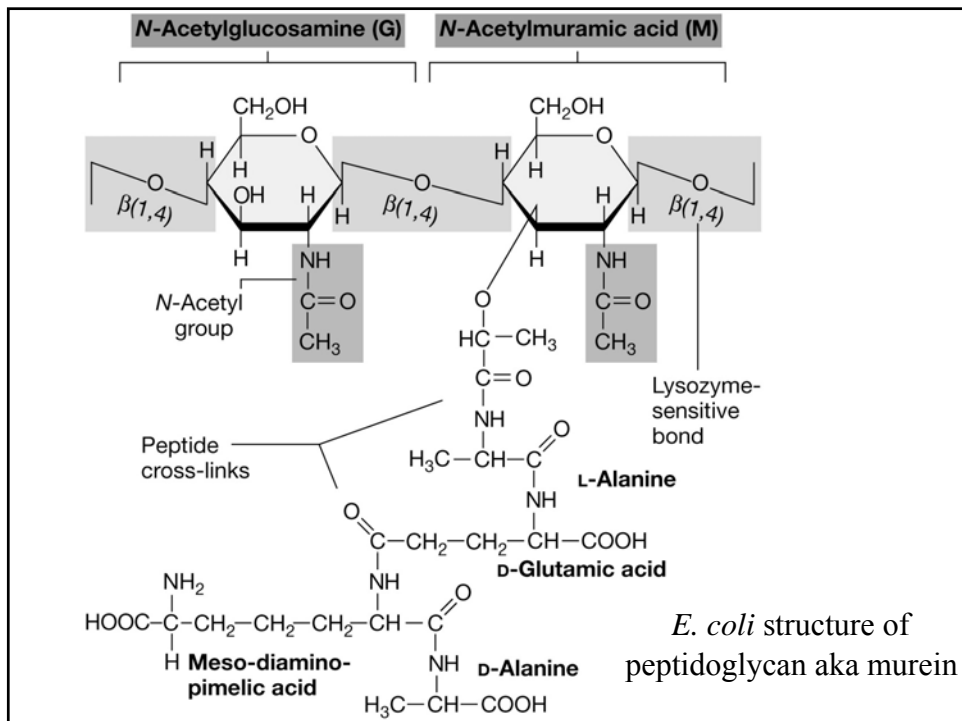
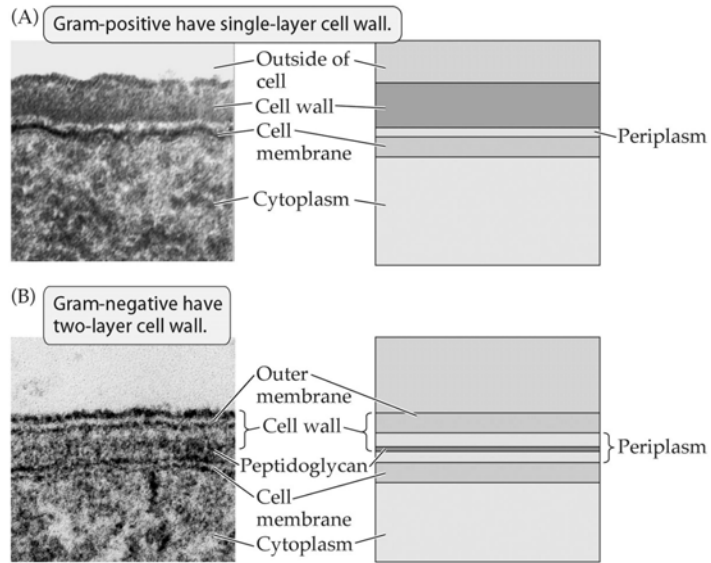
Classification of prokaryotic cellular features: Variant (or NOT common to all)

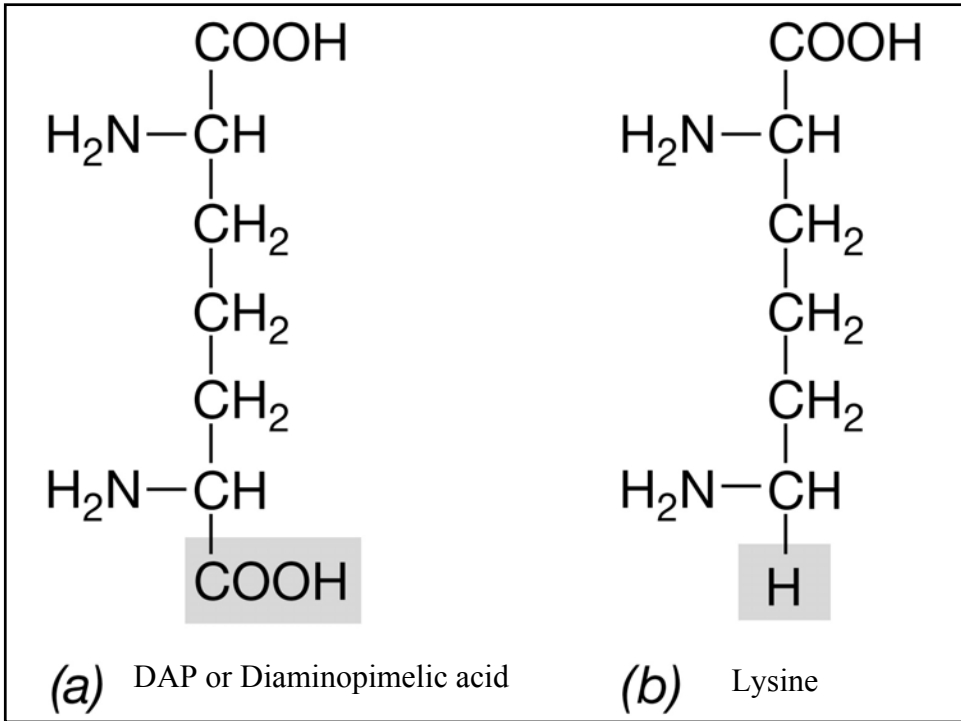
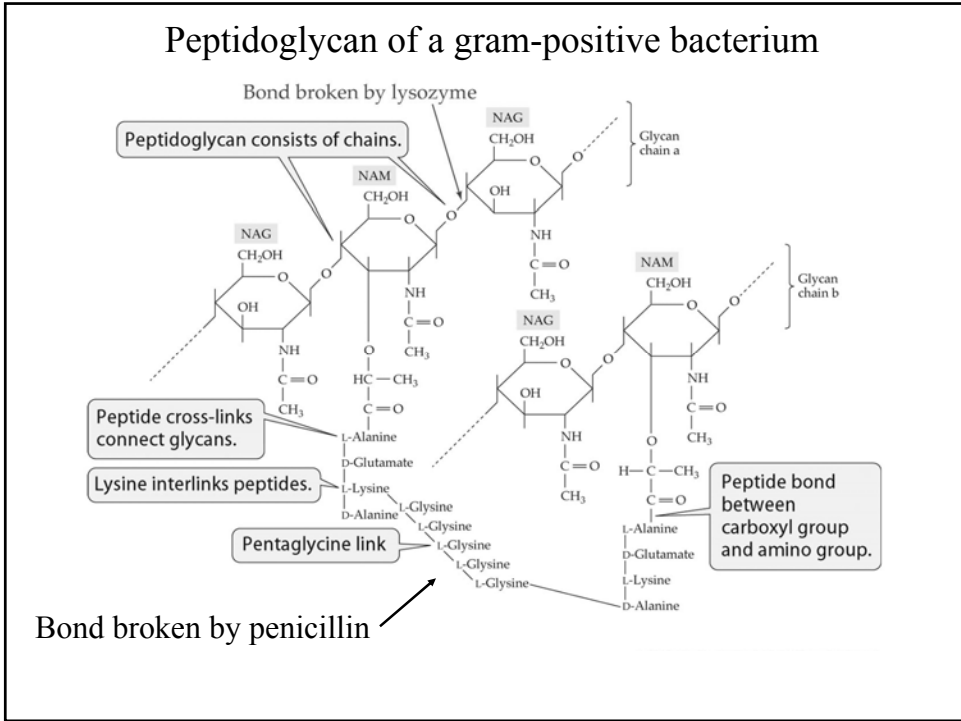
- Cell Wall (multiple barrier support themes)
- Endospores (heavy-duty life support strategy)
- Bacterial Flagella (appendages for movement)
- Gas Vesicles (buoyancy compensation devices)
- Capsules/Slime Layer (exterior to cell wall)
- Inclusion Bodies (granules for storage)
- Pili (conduit for genetic exchange)

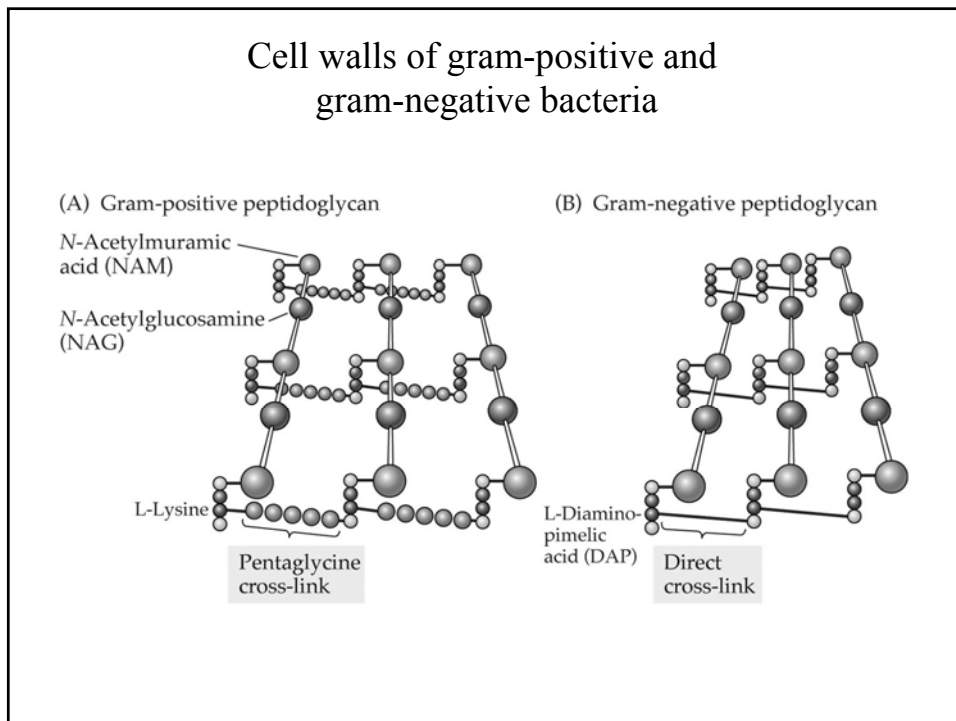
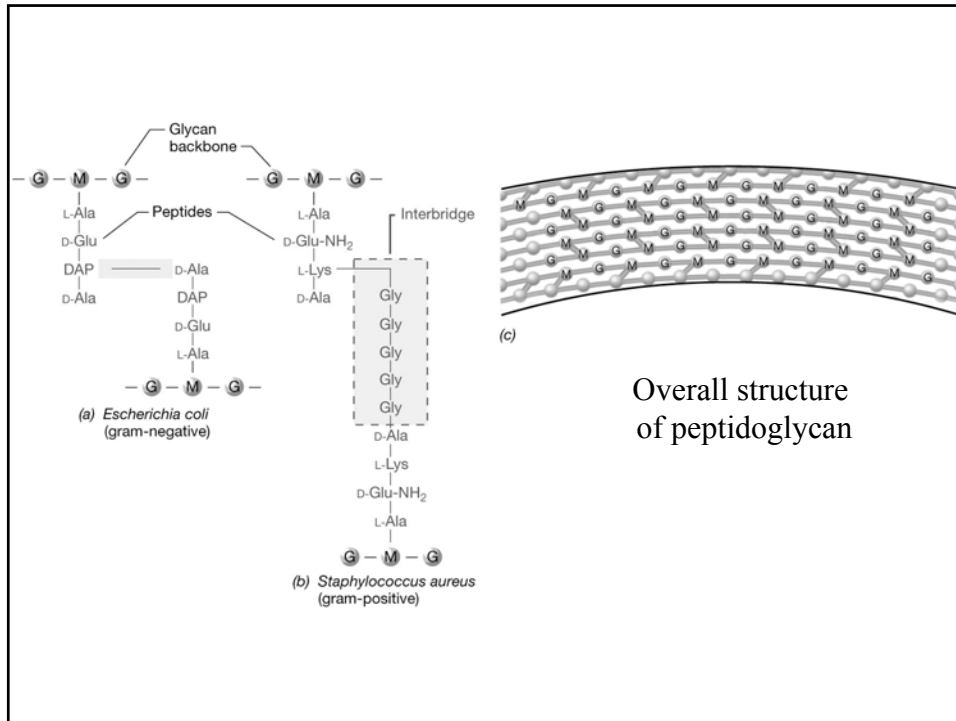
Cell walls of *Bacteria*

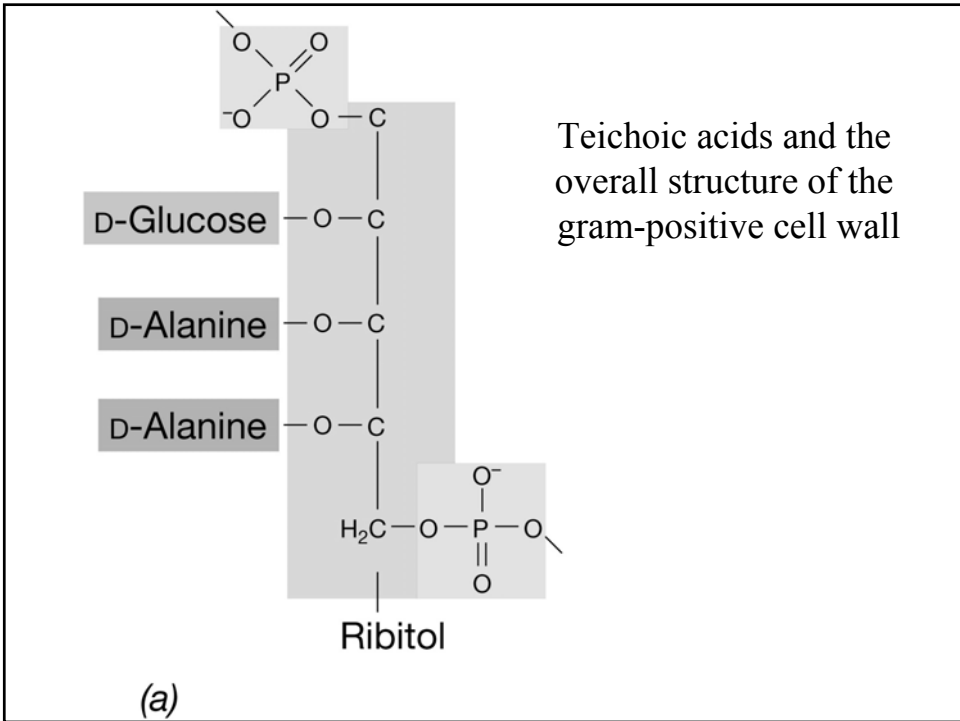
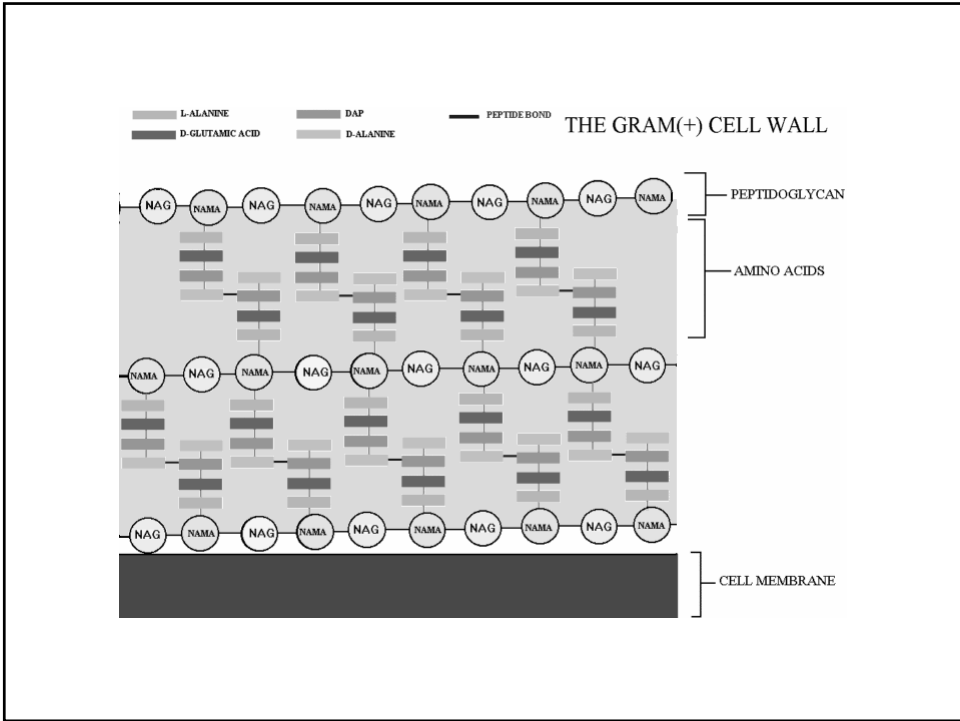


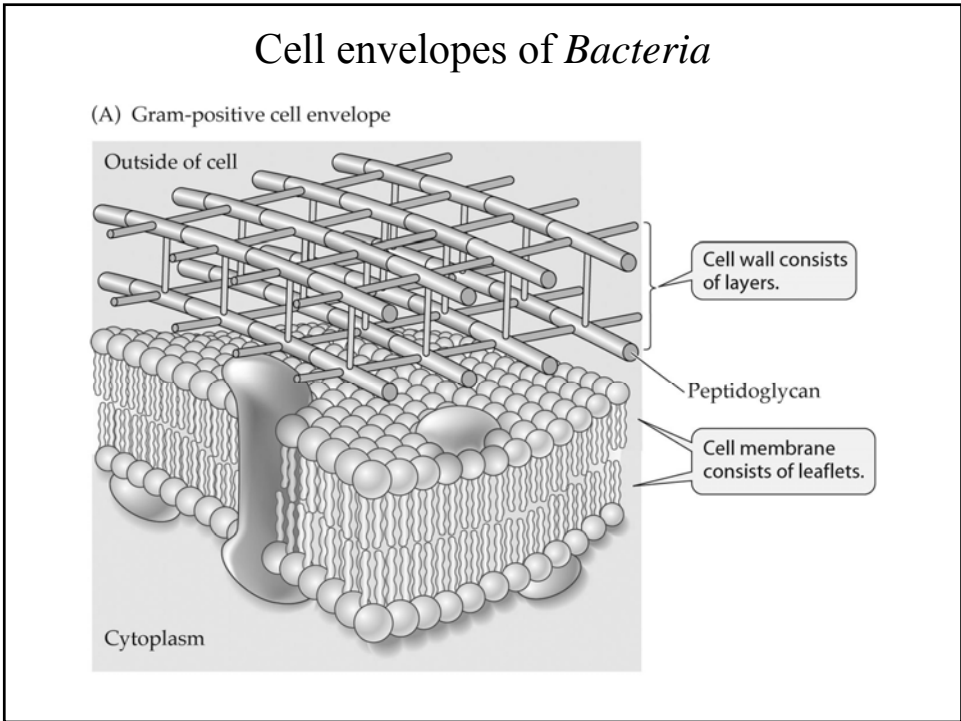
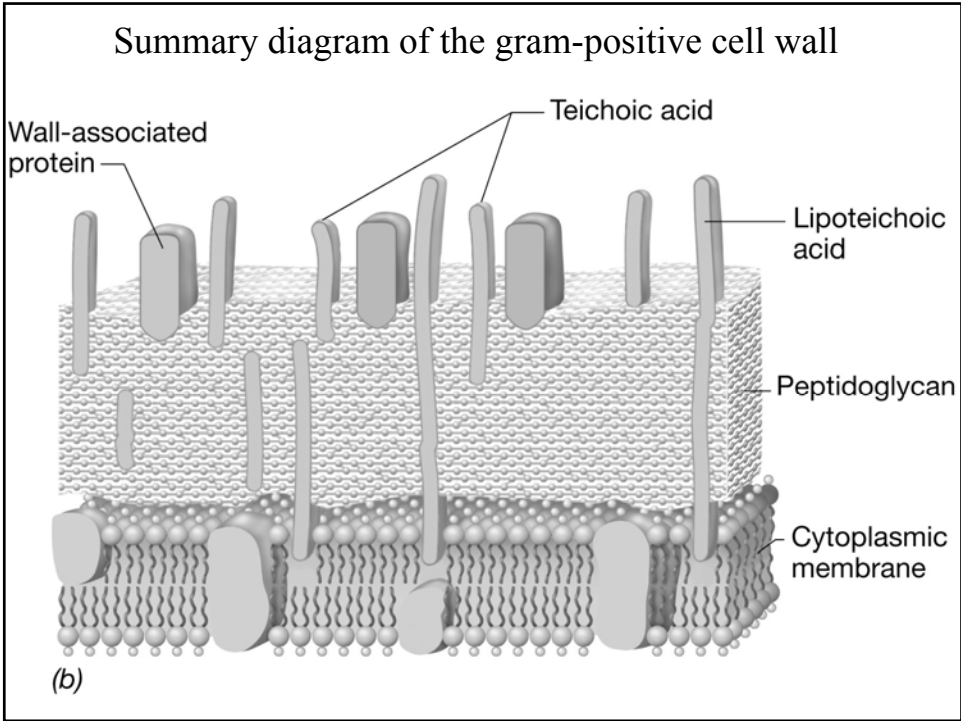
Cell envelope structure





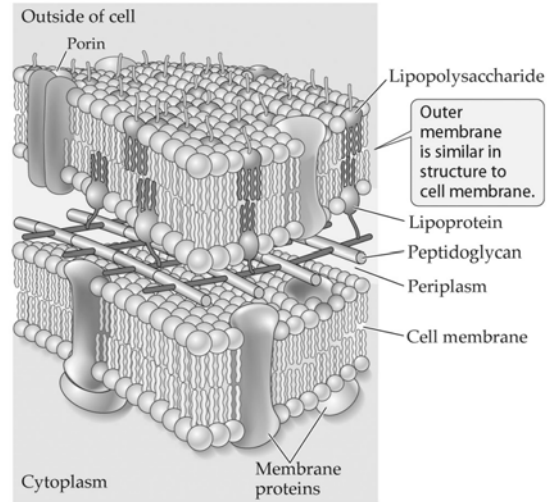




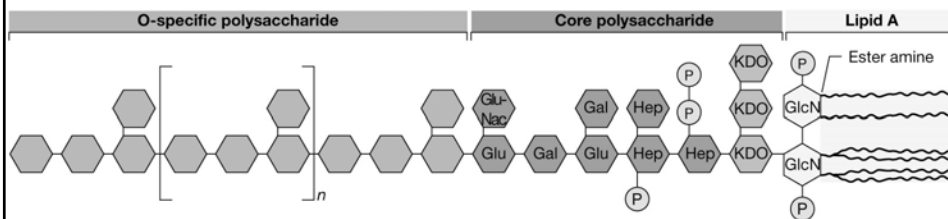


Cell envelopes of *Bacteria*

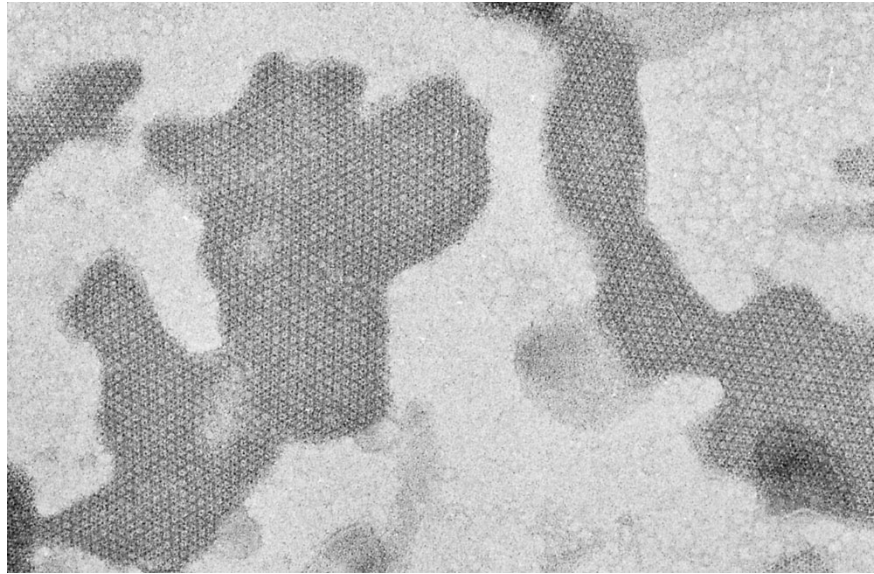
(B) Gram-negative cell envelope



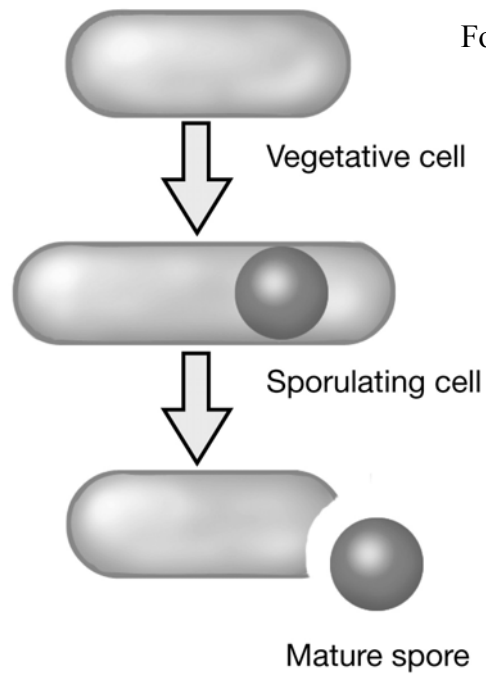
Structure of the lipopolysaccharide of gram-negative *Bacteria*

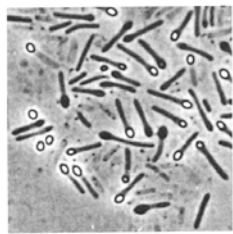


Paracrystalline S-layer: A protein jacket for *Bacteria & Archaea*

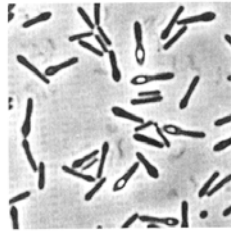


Formation of the endospore

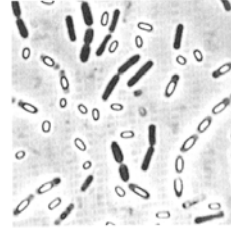




(a)



(b)



(c)

Morphology of the bacterial endospore
(a) Terminal (b) Subterminal (c) Central

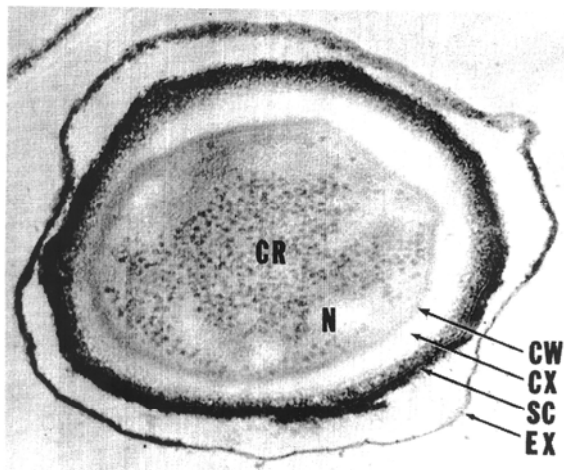


Figure 3.45 Endospore Structure. *Bacillus anthracis* endospore ($\times 151,000$). Note the following structures: exosporium, EX; spore coat, SC; cortex, CX; core wall, CW; and the protoplast or core with its nucleoid, N, and ribosomes, CR.

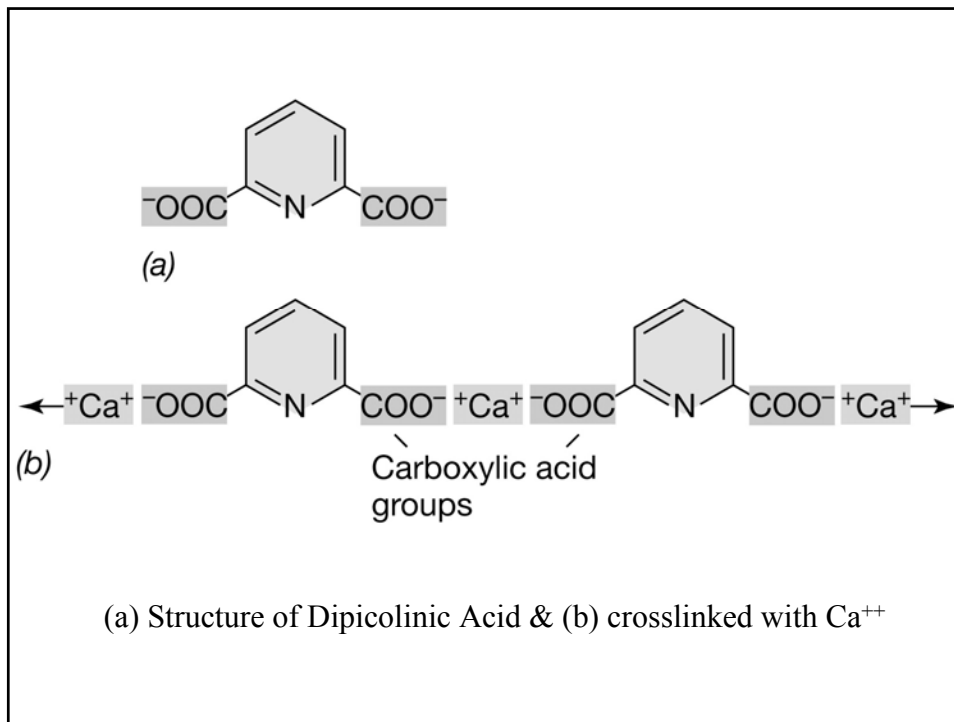
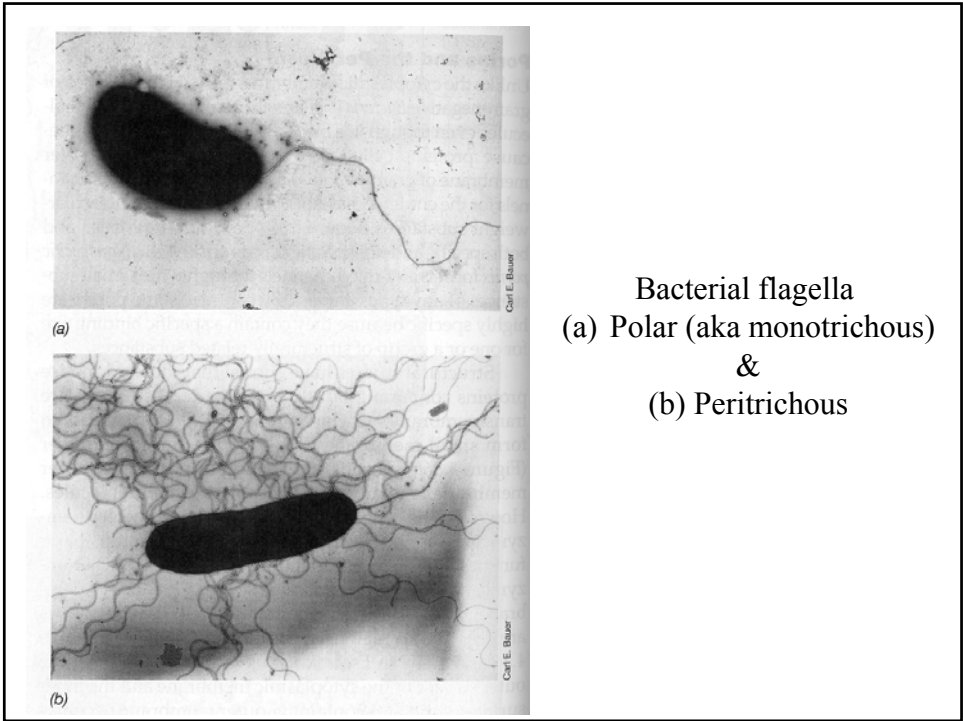
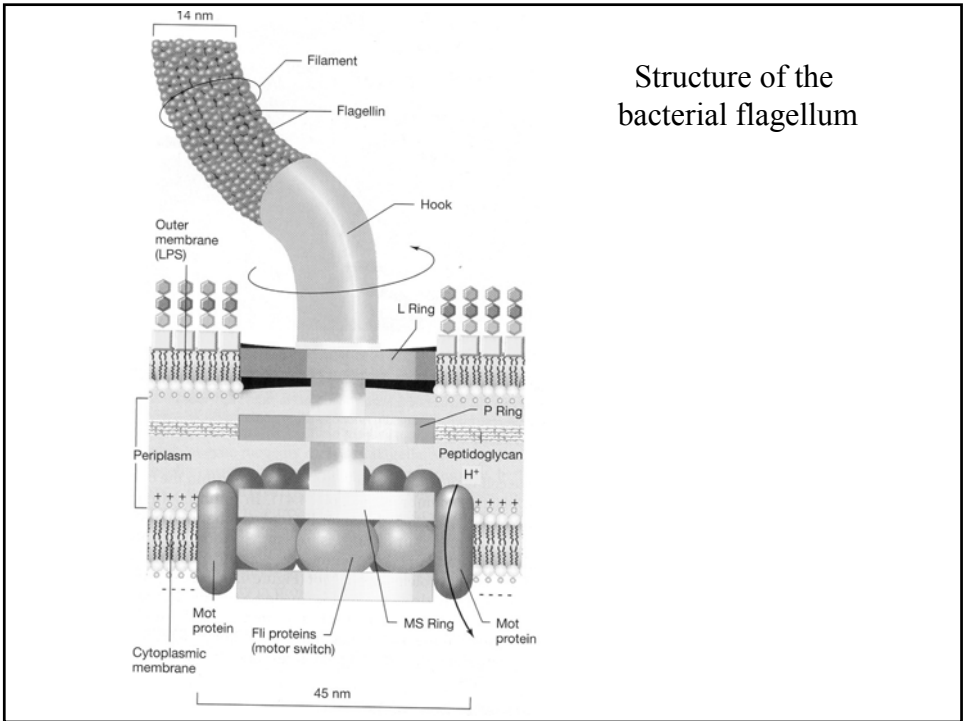


Table 4.2 Differences between endospores and vegetative cells

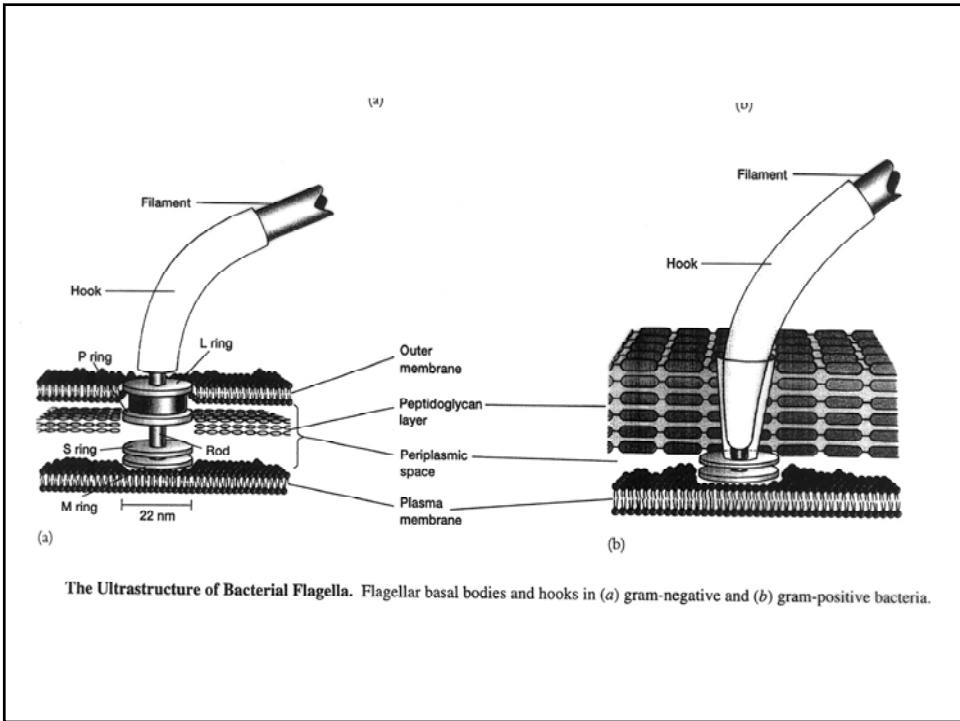
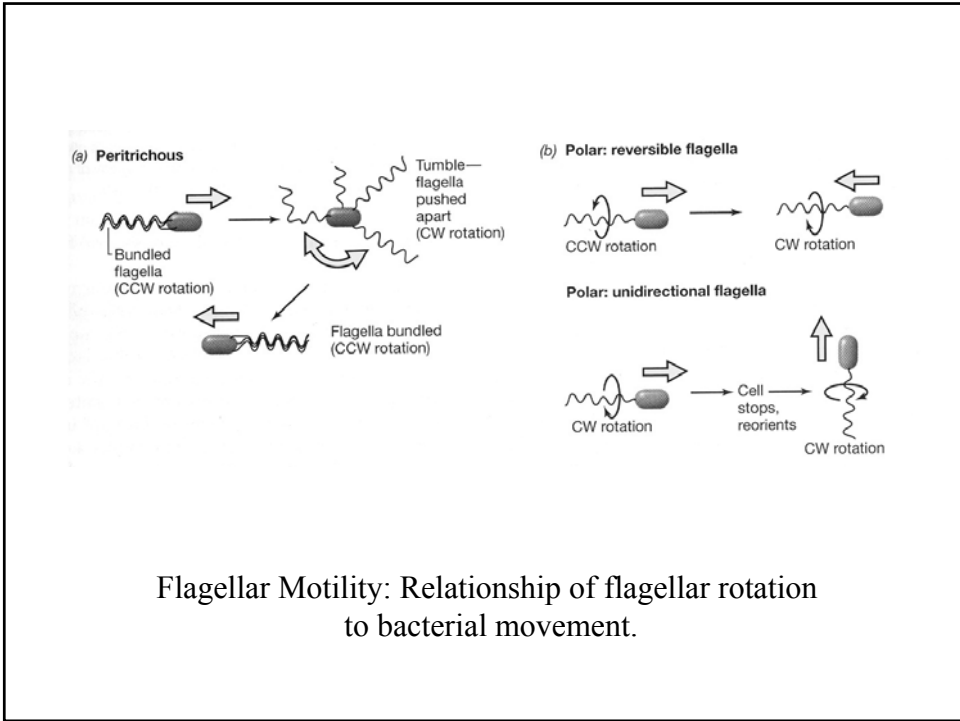
Characteristic	Vegetative cell	Endospore
Structure	Typical gram-positive cell; a few gram-negative cells	Thick spore cortex Spore coat Exosporium
Microscopic appearance	Nonrefractile	Refractile
Calcium content	Low	High
Dipicolinic acid	Absent	Present
Enzymatic activity	High	Low
Metabolism (O_2 uptake)	High	Low or absent
Macromolecular synthesis	Present	Absent
mRNA	Present	Low or absent
Heat resistance	Low	High
Radiation resistance	Low	High
Resistance to chemicals (for example, H_2O_2) and acids	Low	High
Stainability by dyes	Stainable	Stainable only with special methods
Action of lysozyme	Sensitive	Resistant
Water content	High, 80-90%	Low, 10-25% in core
Small acid-soluble proteins (product of <i>ssp</i> genes)	Absent	Present
Cytoplasmic pH	About pH 7	About pH 5.5-6.0 (in core)

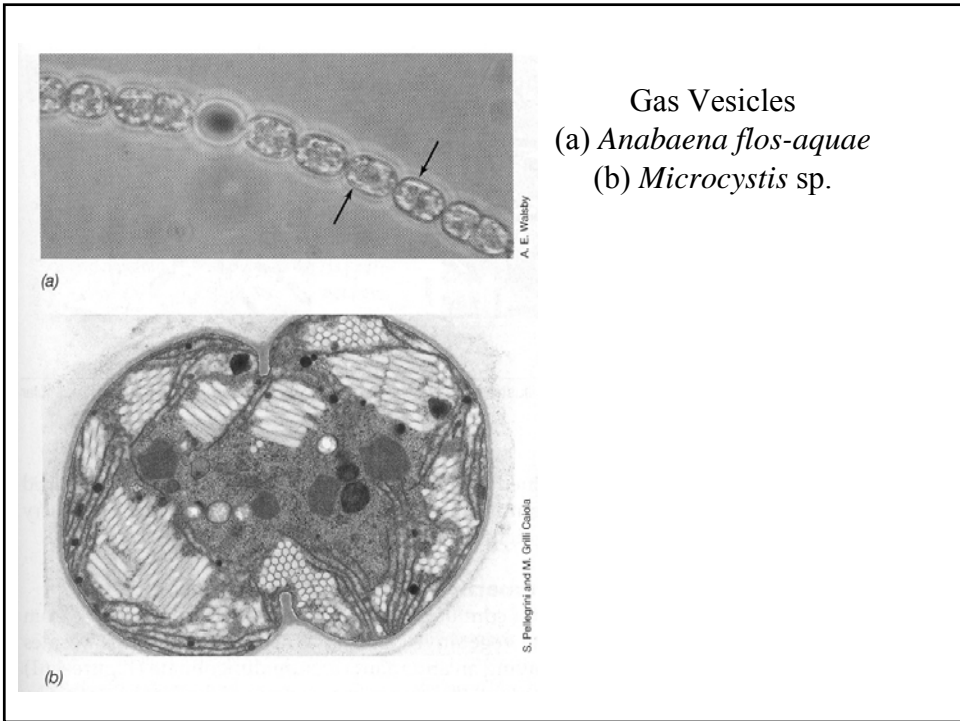
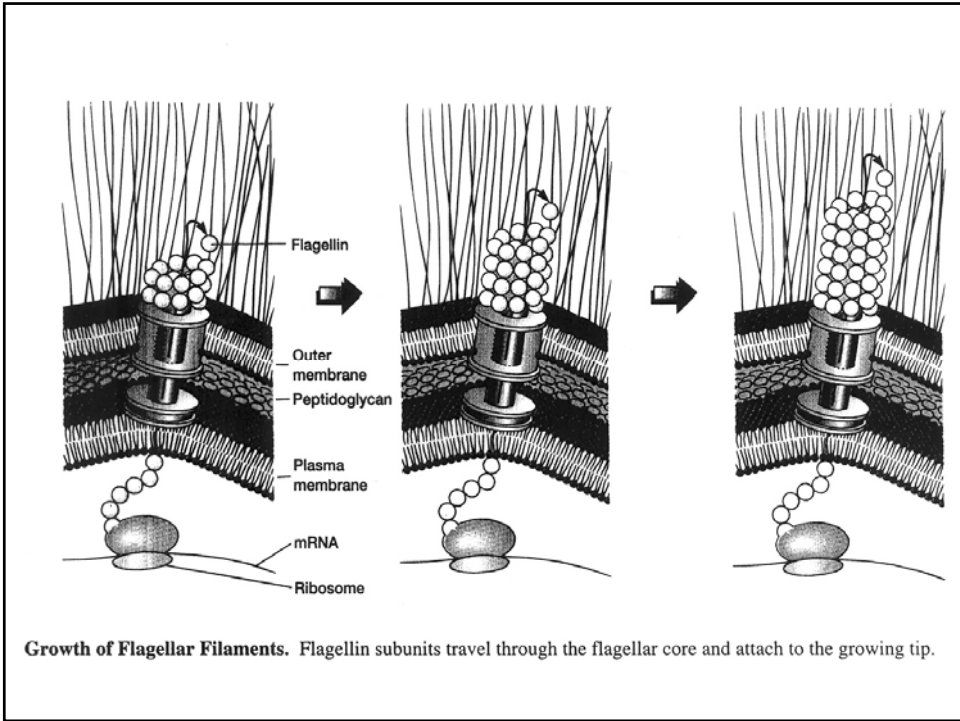


Bacterial flagella
 (a) Polar (aka monotrichous)
 &
 (b) Peritrichous



Structure of the
 bacterial flagellum

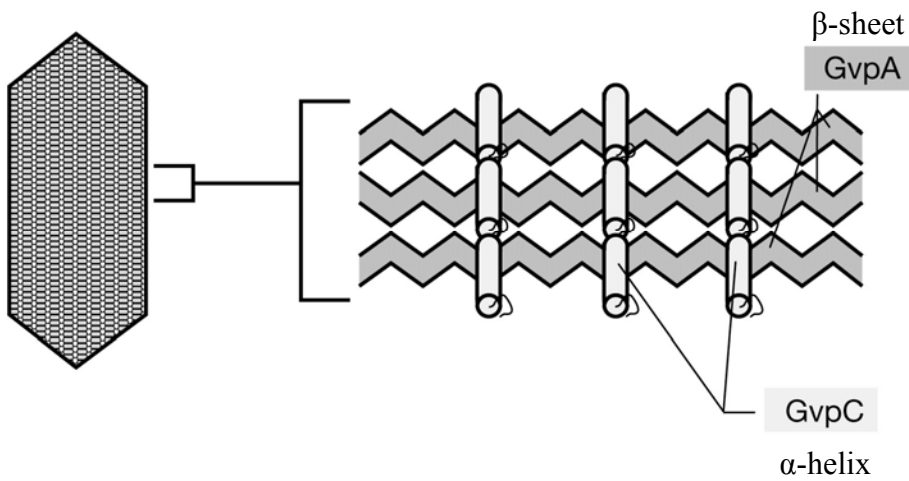




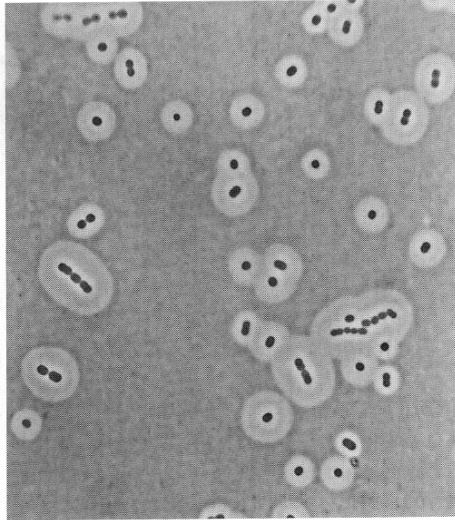
Hammer & Stopper Experiment
(Before) (After)



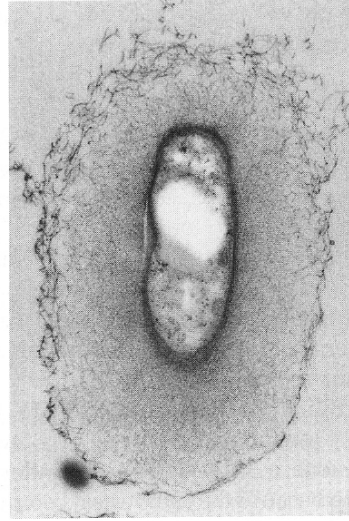
Model of how the two proteins that make up the gas vesicle, GvpA and GvpC, interact to form a watertight but gas-permeable structure.



Bacterial Capsules (a) *Acinetobacter* sp. (b) *Rhizobium trifolii*



Elliott, Juni

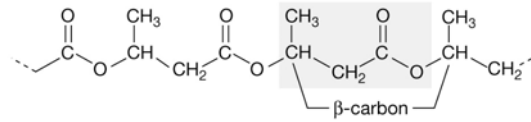


Frank Dazzo and Richard Heinzen

(a)

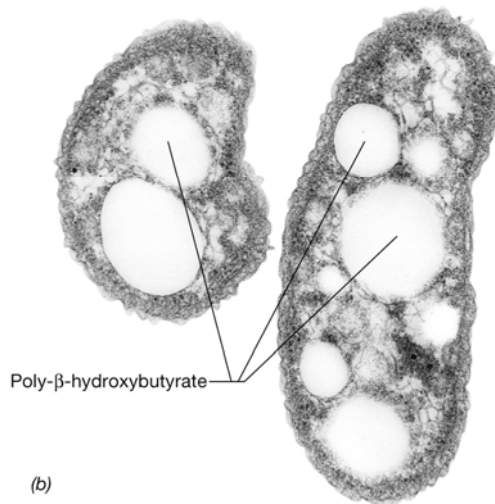
negative stain

(b)



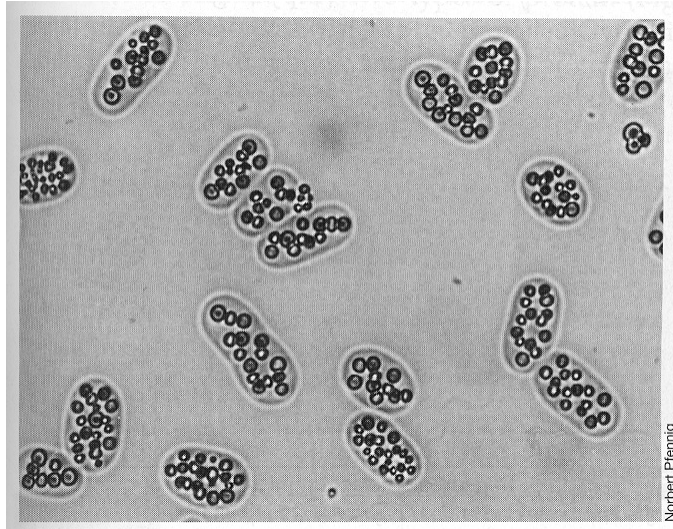
(a)

Storage of PHB

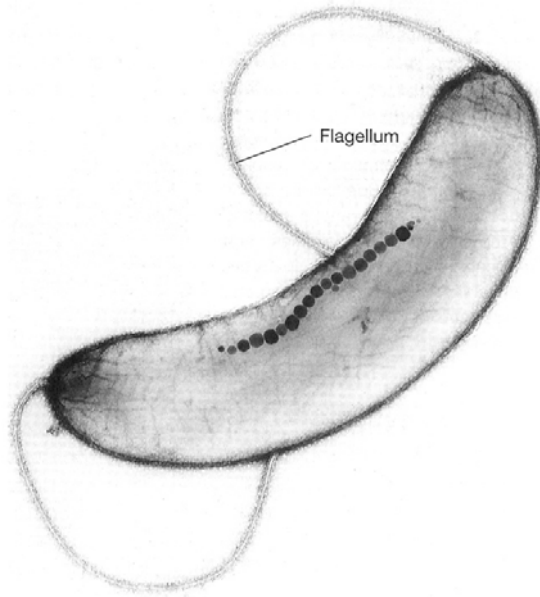


(b)

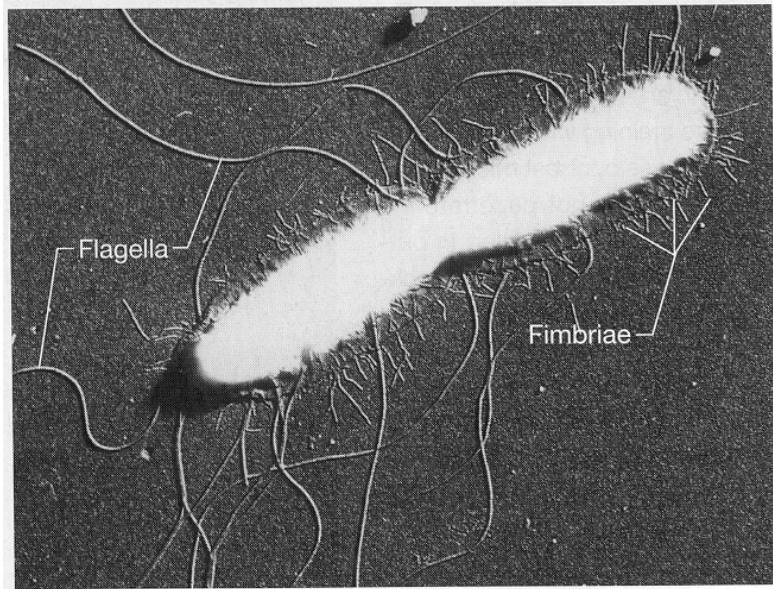
F. R. Turner and M. T. Madigan



Sulfur globules inside the purple sulfur bacterium *Isochromatium buderi*

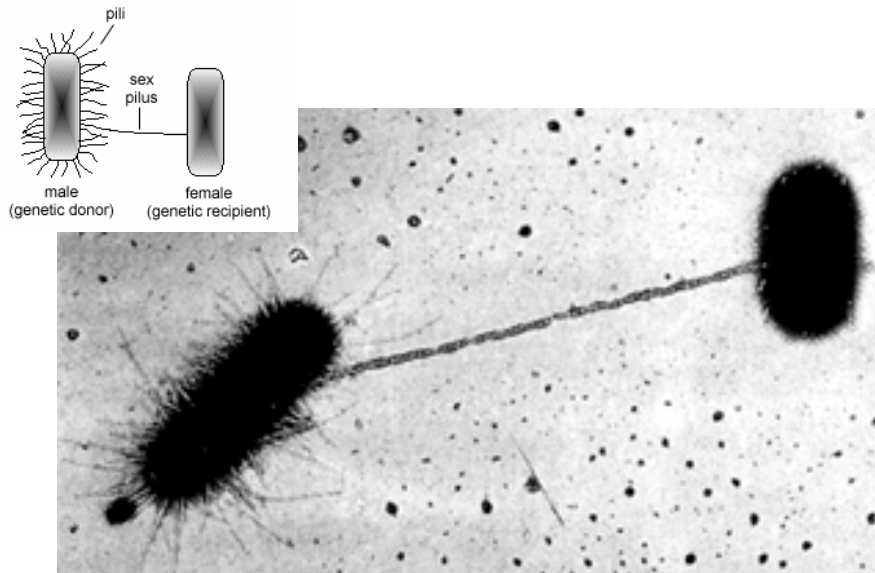


Magnetotactic bacteria with Fe_3O_4 (magnetite) particles called magnetosomes



J. P. Duguid and J. F. Wilkinson

EM of *Salmonella typhi*



“Sex” Pili used in bacterial conjugation of *E. coli* cells