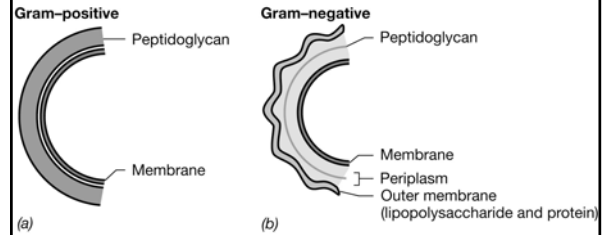


Comparing Prokaryotic and Eukaryotic Cells

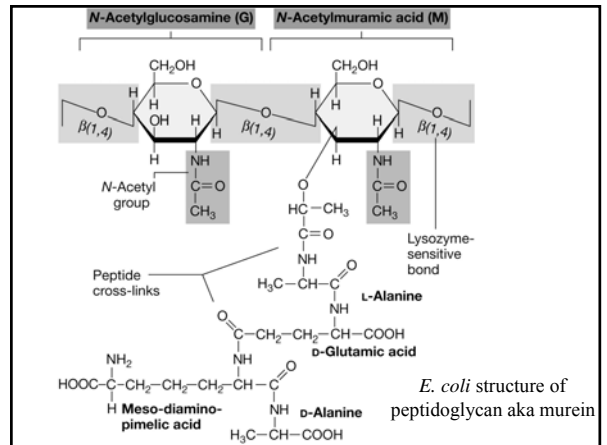
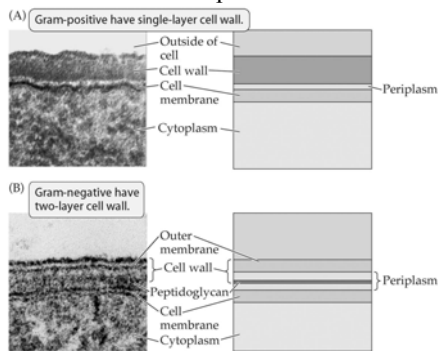
Classification of prokaryotic cellular features: Variant (or NOT common to all)

- 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)

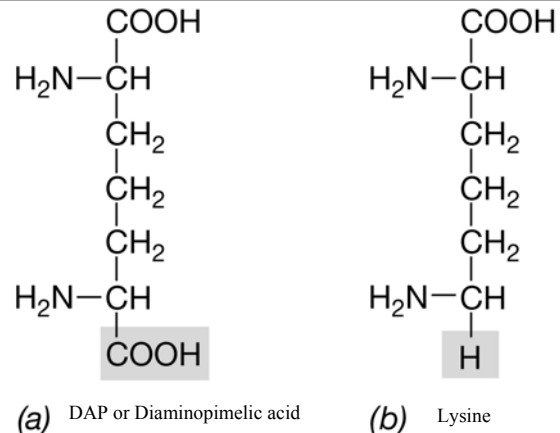
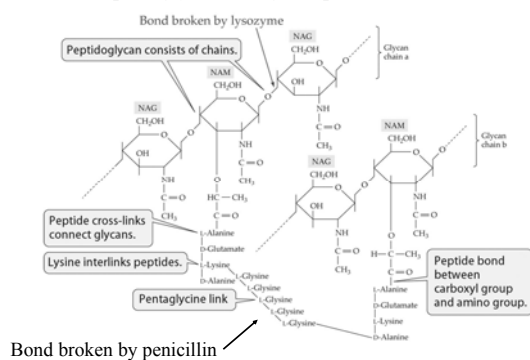
Cell walls of *Bacteria*

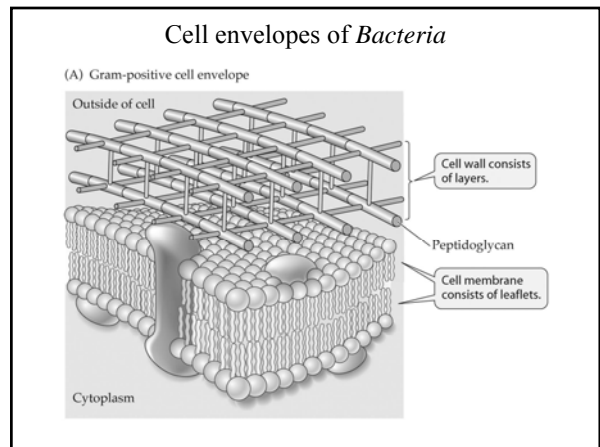
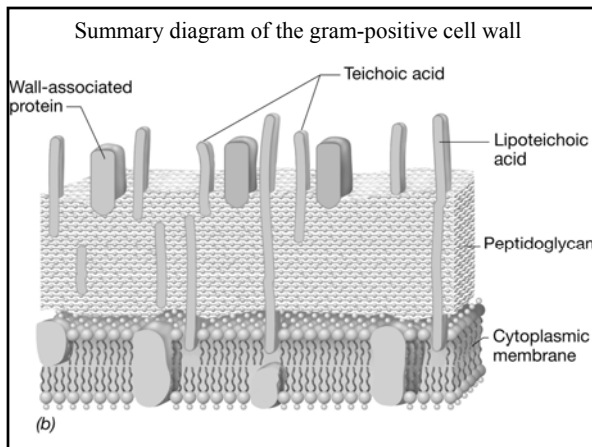
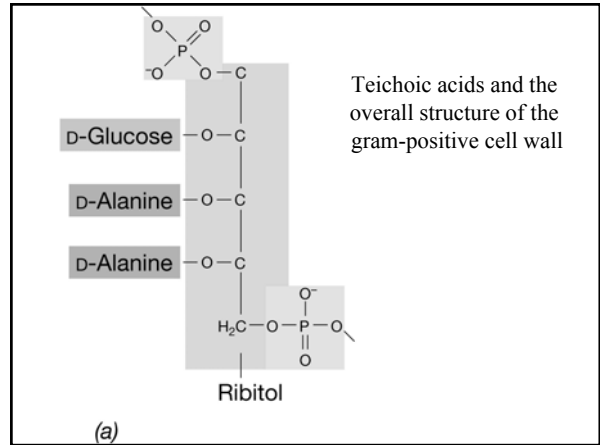
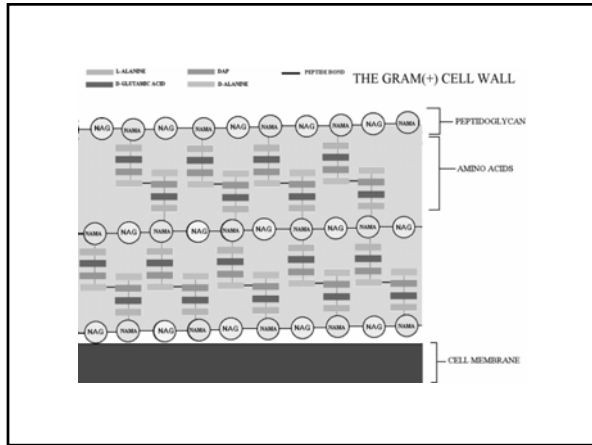
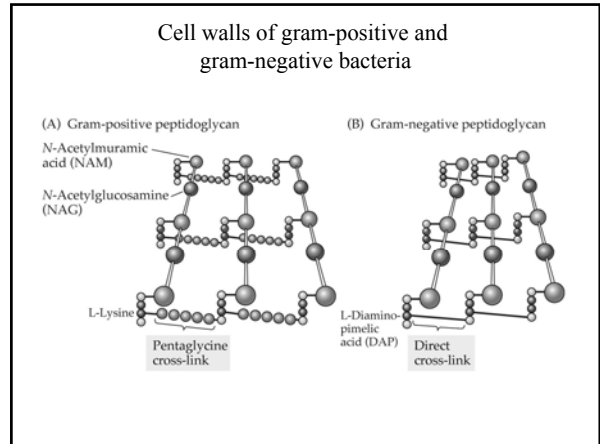
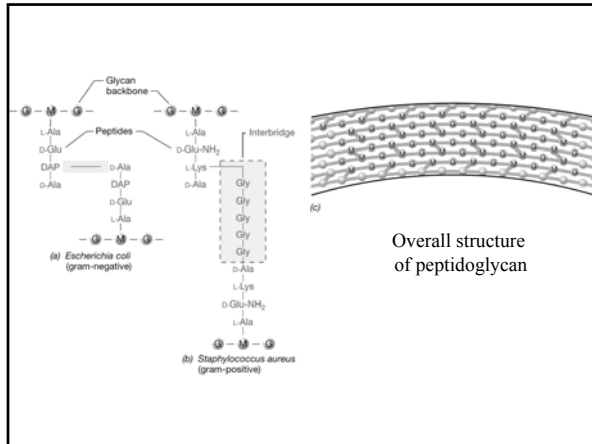


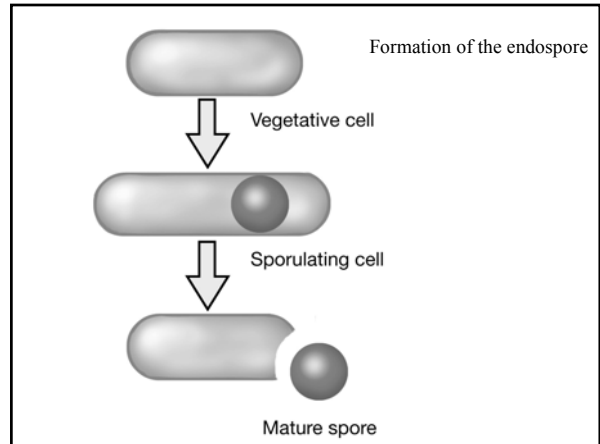
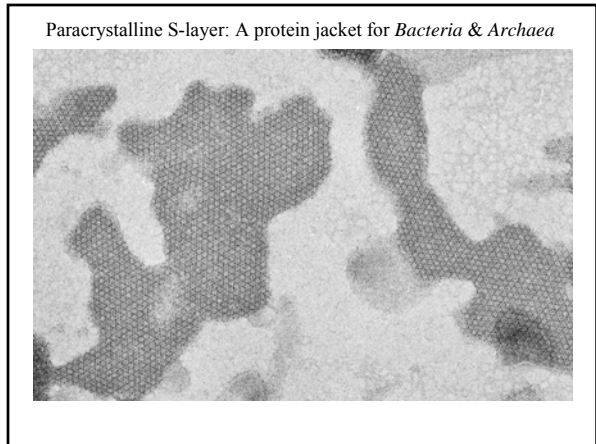
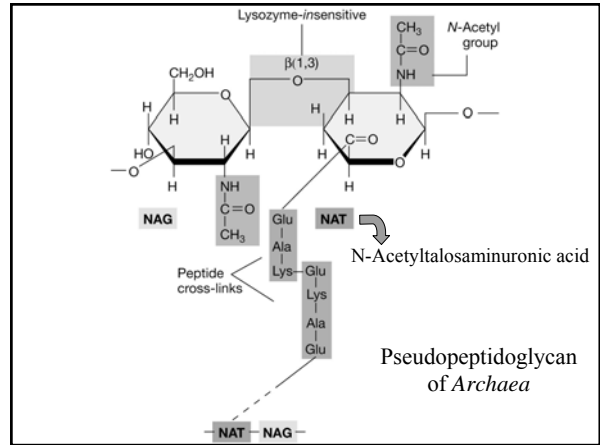
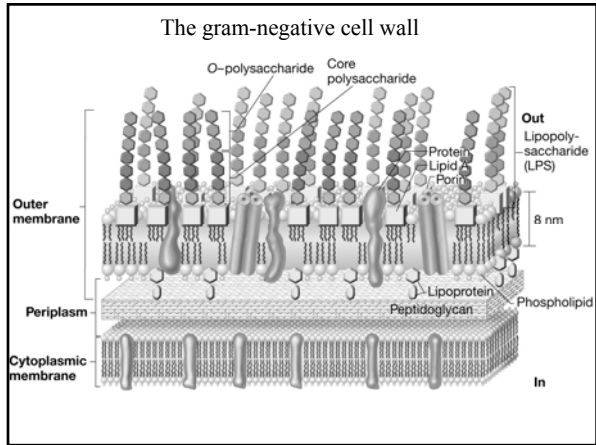
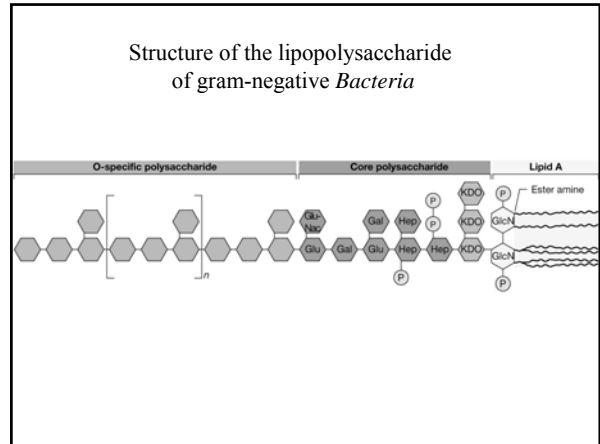
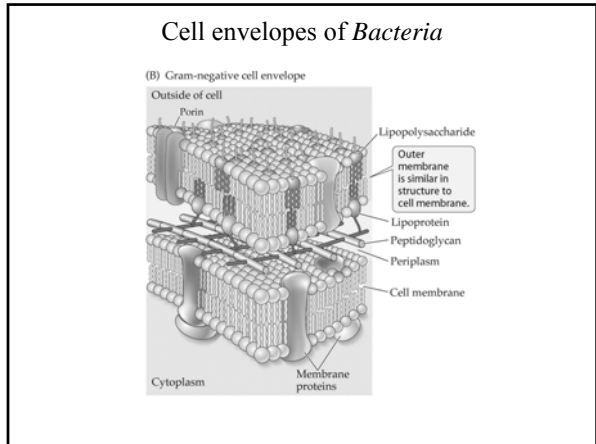
Cell envelope structure



Peptidoglycan of a gram-positive bacterium







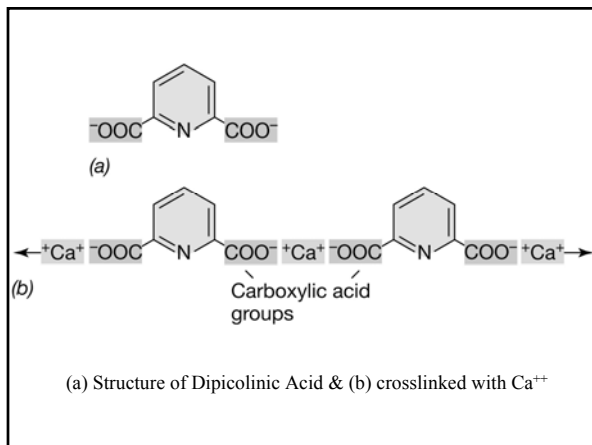
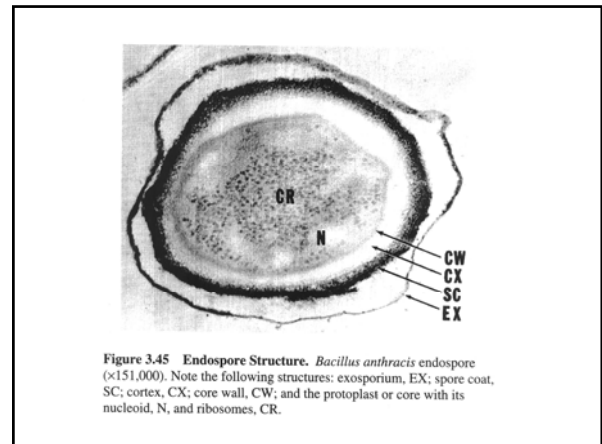
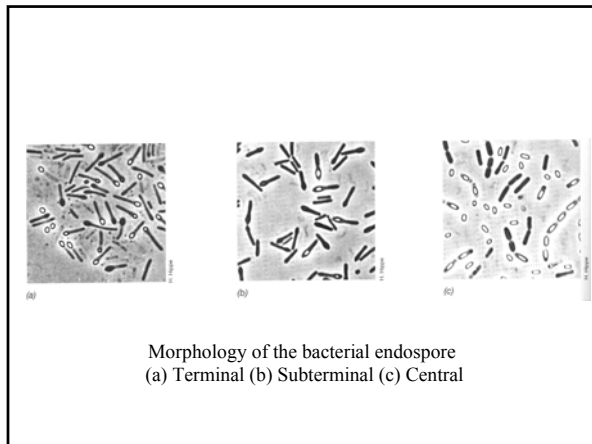
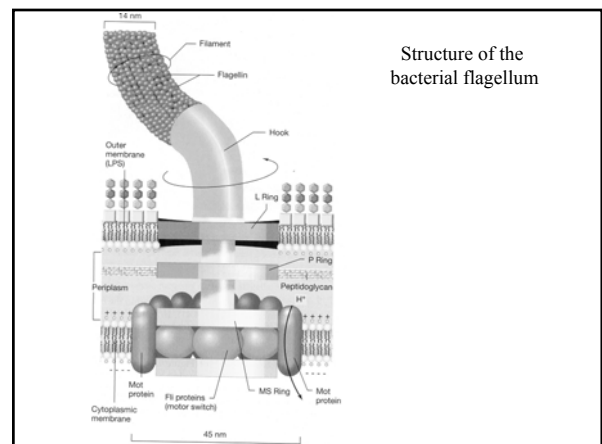
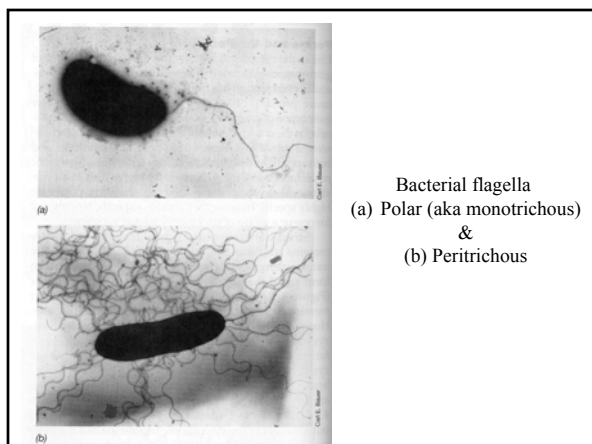
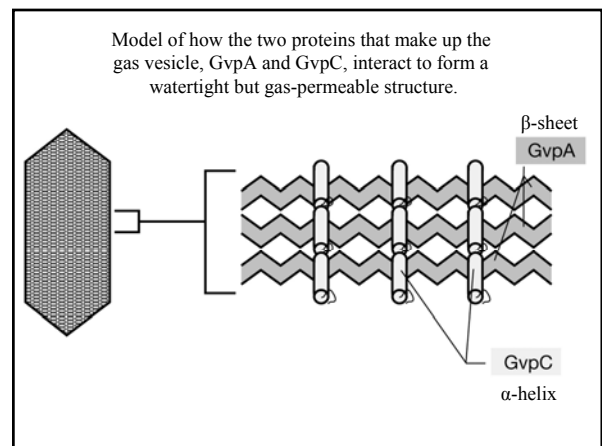
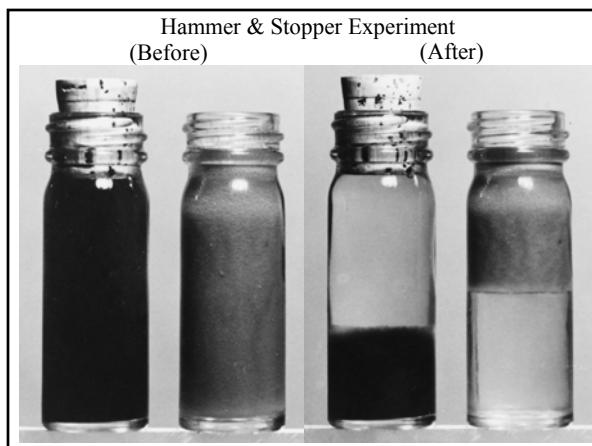
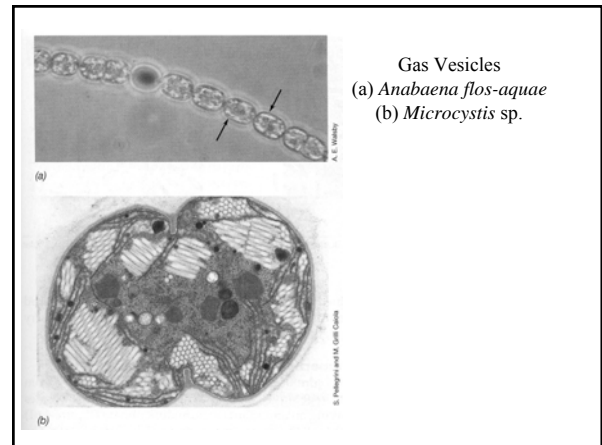
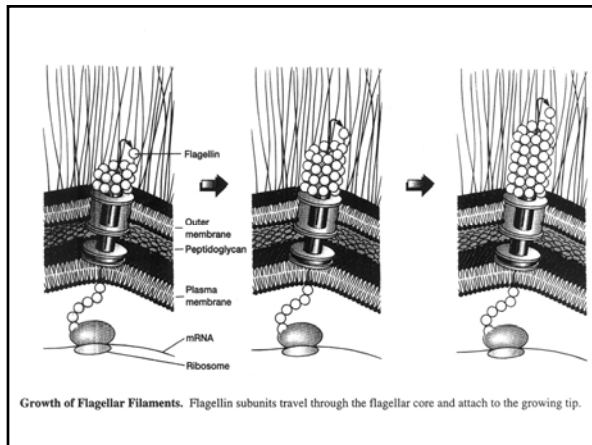
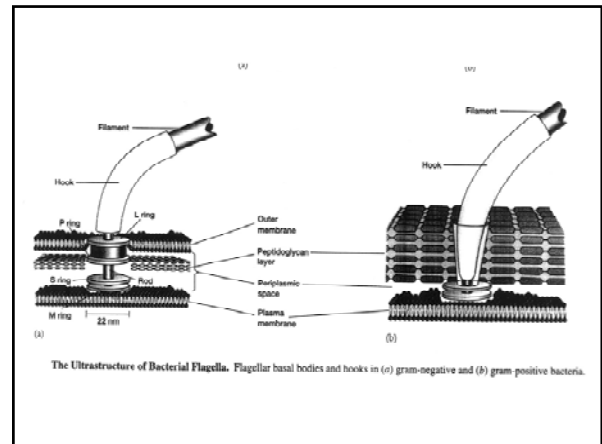
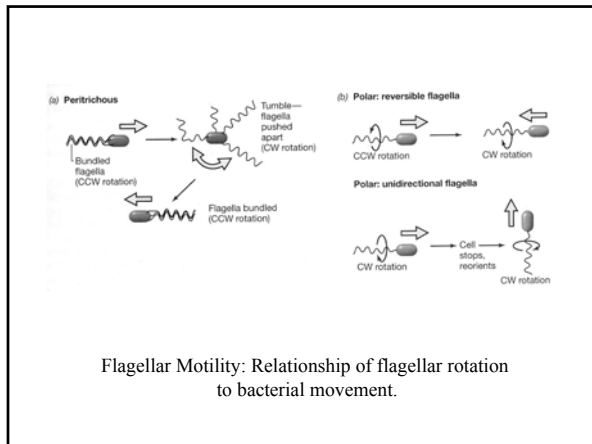


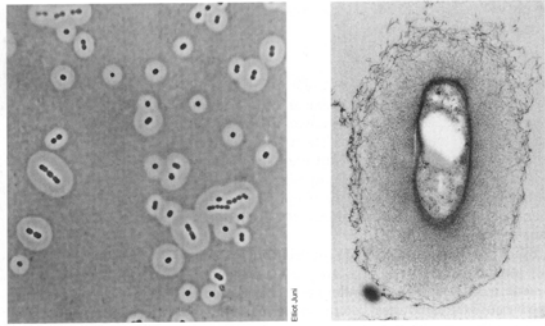
Table 4.2 Differences between endospores and vegetative cells

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>sfp</i> genes)	Absent	Present
Cytoplasmic pH	About pH 7	About pH 5.5-6.0 (in core)



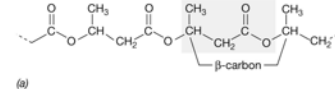


Bacterial Capsules (a) *Acinetobacter* sp. (b) *Rhizobium trifolii*

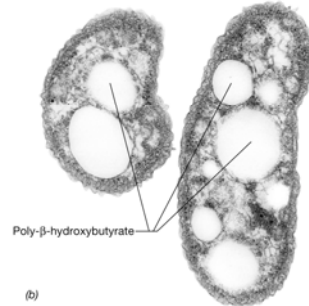


(a) negative stain

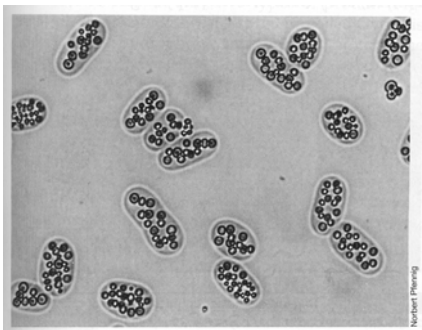
(b)



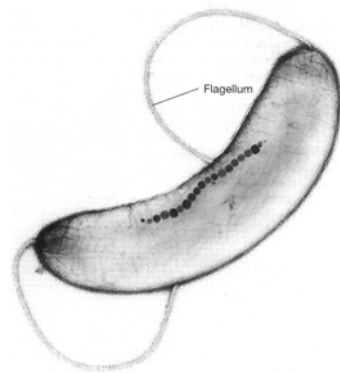
Storage of PHB



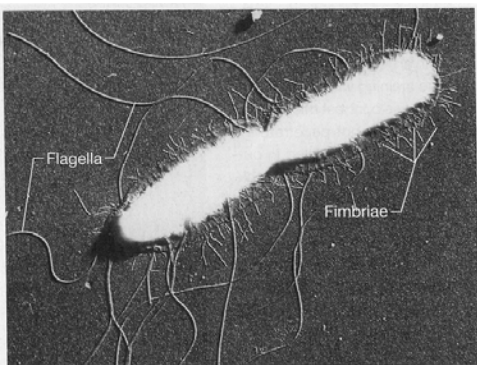
(b)



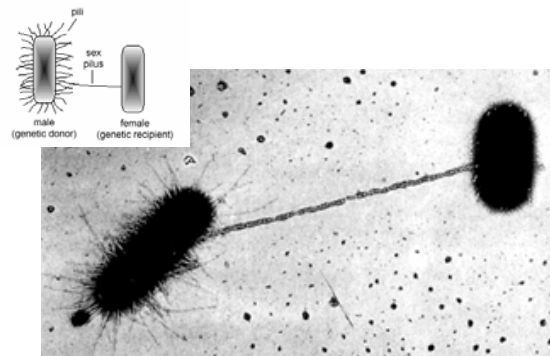
Sulfur globules inside the purple sulfur bacterium *Isochromatium buderi*



Magnetotactic bacteria with Fe_3O_4 (magnetite) particles called magnetosomes



EM of *Salmonella typhi*



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