

PROKARYOTIC CELLS (Chapter 4):

- **DNA not enclosed by membrane**
- **DNA not associated with histones**
- **No membrane enclosed organelles**
- **Cell walls usually contain peptidoglycan**
- **Divide by binary fission**

Bacteria: .2-2.0um diameter/2-8um long

Capsule or Glycocalyx (sugar coat)

- ** outermost layer of cell**
- **made inside cell and secreted outside **polysaccharide and/or polypeptide **allows cell to adhere to surfaces**
- **contributes to virulence**
- avoid phagocytosis**

Capsule if firmly attached

Slime Coat if loosely attached

Flagella

- **monotrichous**
- **amphitrichous**
- **lophotrichous**
- **peritrichous**

3 parts:Filament

Hook

Basal body

Motile/H antigen

Axial Filament

Spirochetes: Treponema pallidum

Fimbriae

**Made of a protein- pilin
Used for attachment**

Pili

**Longer than fimbriae
Used in gene transfer**

Cell Wall Peptidoglycan

**NAG(nacetylglucosamine) NAM (n-acetylmuramic acid) with
peptide cross links to form lattice**

**Prevent lysis of cell when H₂O pressure is greater
inside than outside cell**

Protects plasma membrane

Anchors flagella

Gram Positive Cell Wall

Layers of peptidoglycan

Contains teichoic acids

Gram Negative Cell Wall

**One/few layers of peptidoglycan bonded with lipoproteins
in Outer**

Layer Lipopolysaccharide

O polysaccharide=O Ag

Lipid A- Endotoxin

Periplasm fluid filled space between layers Porins

Atypical

Acid-Fast Mycobacterium

Cell wall is 60% mycolic acid(waxy lipid)

peptidoglycan

Mycoplasma

Smallest known bacteria/no cell wall

Archaea May lack cell wall or have unusual composition

No Peptidoglycan

Plasma (Cytoplasmic) Membrane

Phospholipids bilayer and proteins
Fluid mosaic model
Selective Permeability (semi-permeable)
Photosynthetic pigments (chromatophores or thylakoids)
found in folds of membrane

Passive Transport

No ATP required
Movement along concentration gradient
simple diffusion
facilitated diffusion
osmosis
isotonic solutions
hypotonic solutions
hypertonic solutions

Active Transport

requires use of ATP for energy
movement against concentration gradient

Active Transport

Group Translocation
Proton motive force

**Cytoplasm 80% water with proteins, enzymes,
carbohydrates, lipids, ions**

**Bacterial Chromosome single, long, continuous, circular,
double-stranded DNA**

Plasmid

small circular DNA
Extrachromosomal
replicates independently
not crucial for survival

Ribosome

site of protein synthesis

2 subunits with ribosomal RNA (rRNA)

30S + 50S 70S (Eukaryotic cells have 80S ribosomes)

Endospores

Clostridia

Bacillus

Inclusions

Metachromatic inorganic phosphate reserve

Polysaccharide glycogen and starch

Lipid

Sulfur

Carboxysomes

Gas

Magnetosomes