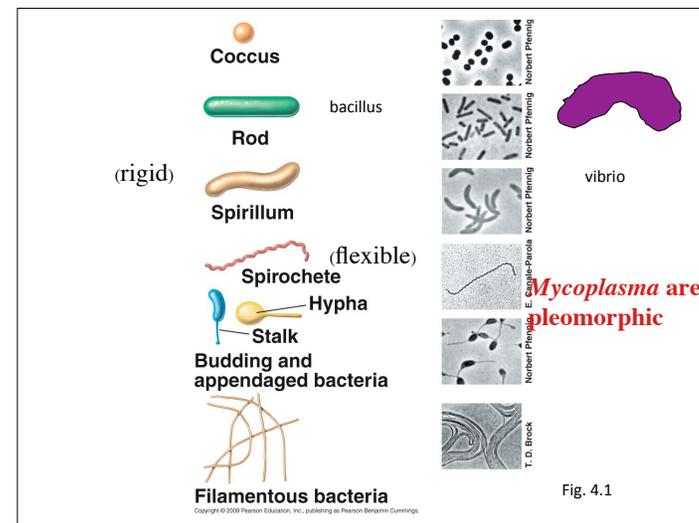
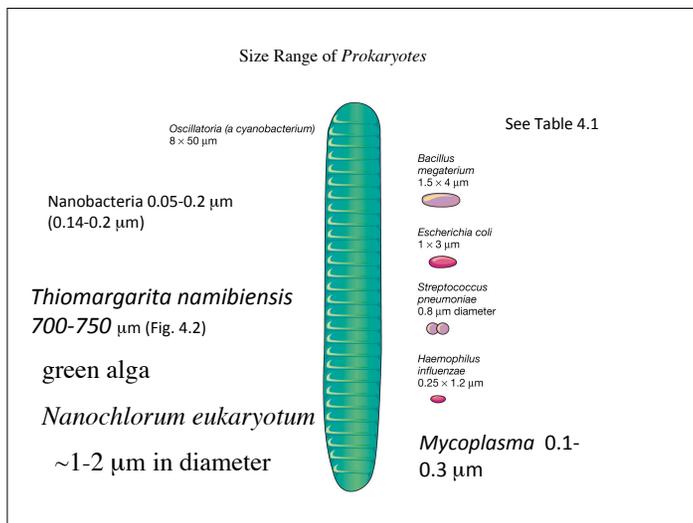
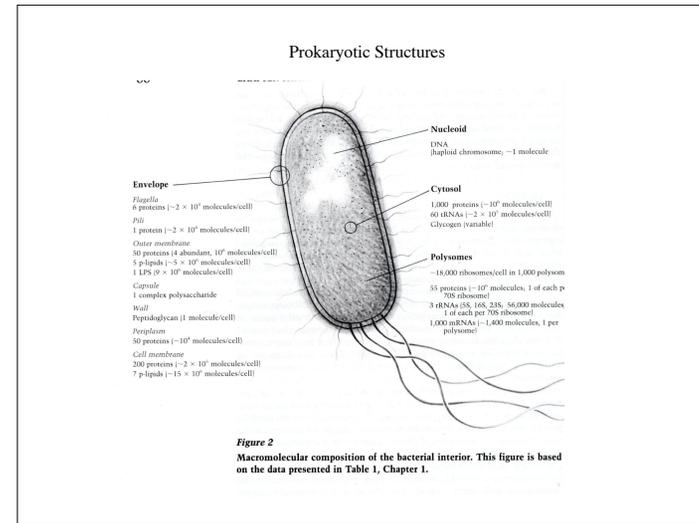
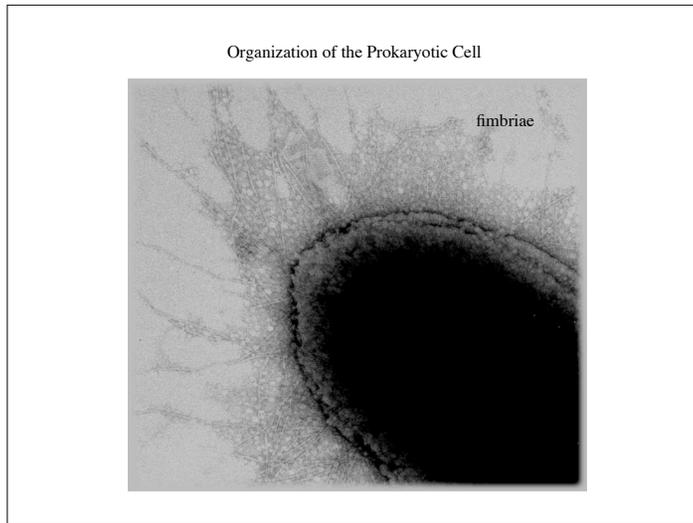
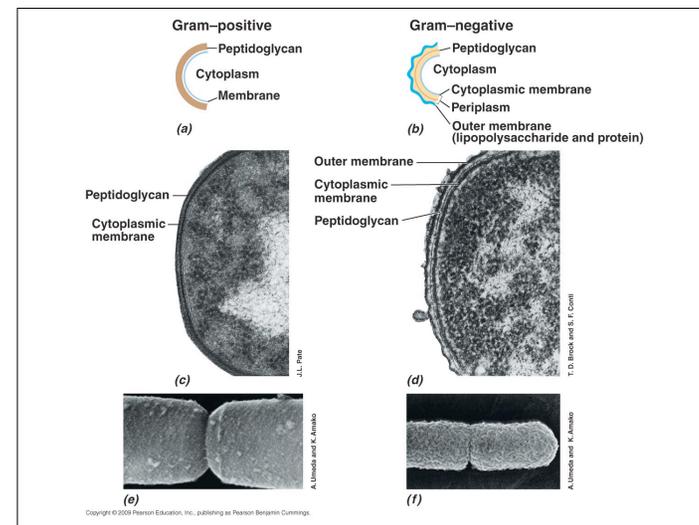
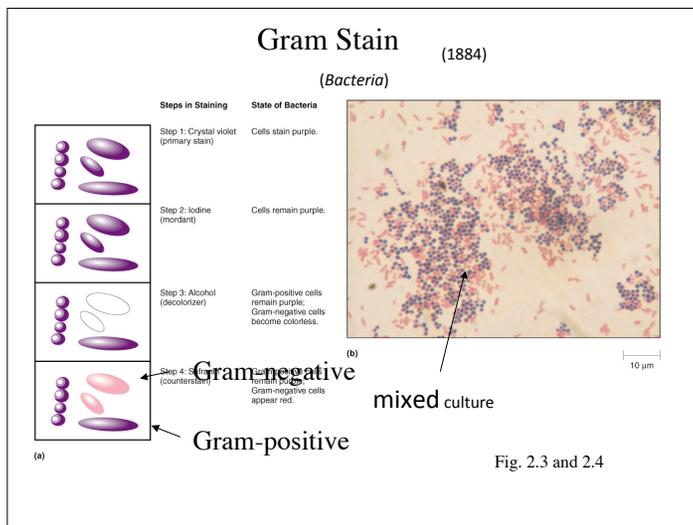
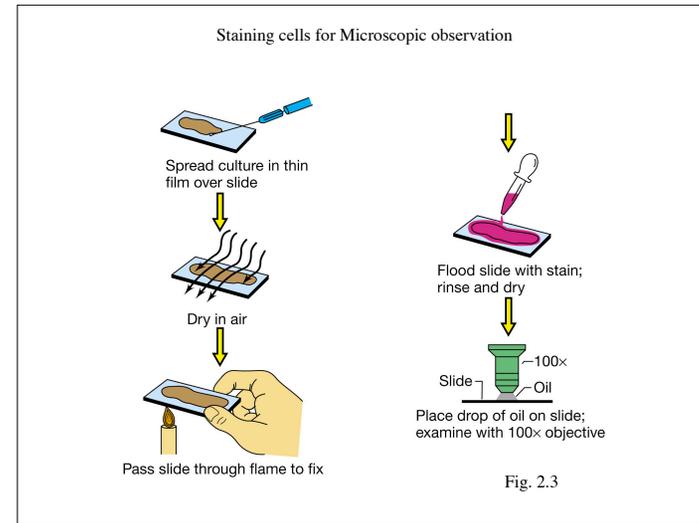
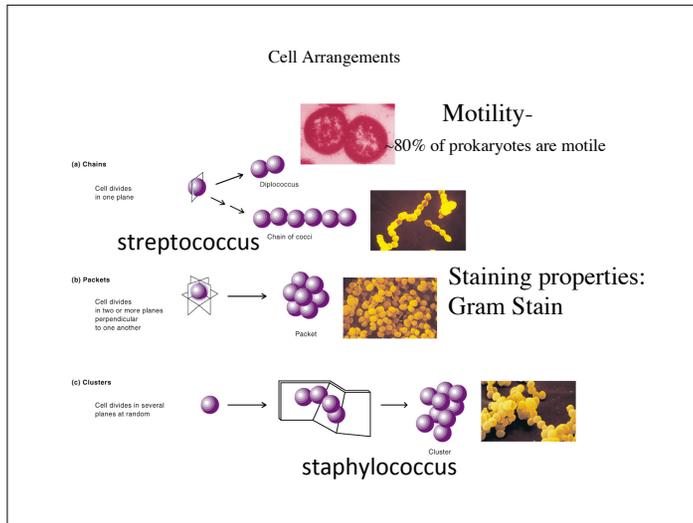


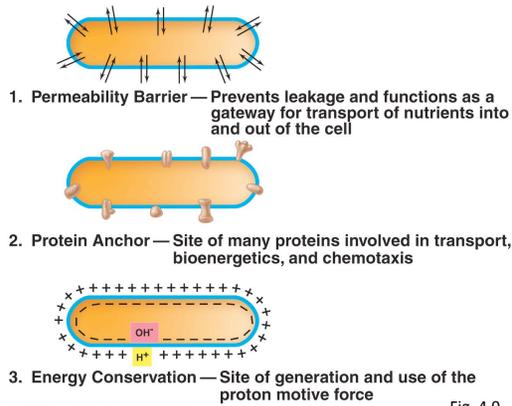
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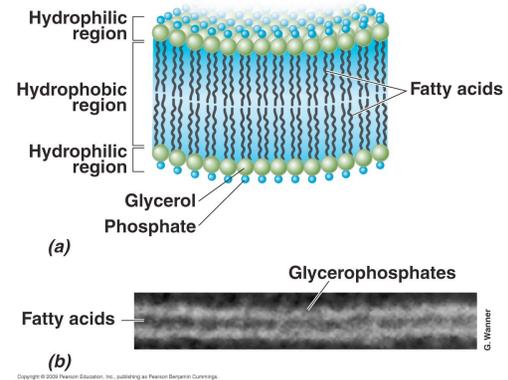
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Functions of the cytoplasmic membrane



The phospholipid bi-layer



What is the structure of bacterial phospholipids?

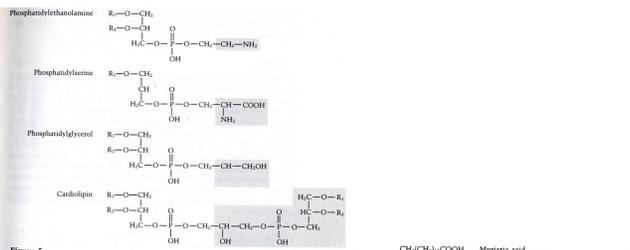


Figure 5
 Structures of common bacterial phospholipids. The four types shown are all found in *E. coli*. R_1 and R_2 fatty acyl residues.

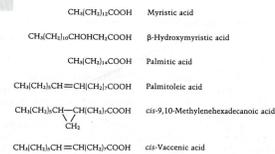
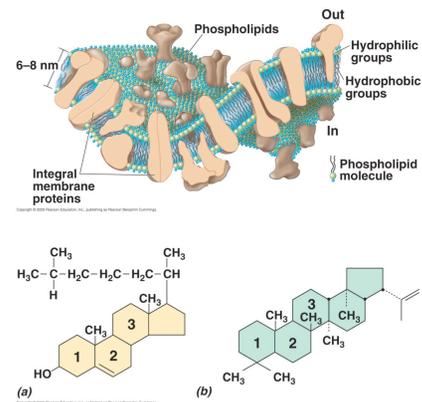


Figure 6
 Structures of common fatty acids in bacteria. The six molecules shown are found in *E. coli*.

Other components of the cytoplasmic membrane



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Archaeal phospholipids have an ether linkage

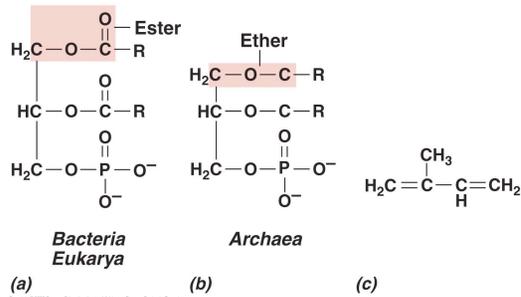


Fig. 4.7

Archaeal membranes can be a lipid monolayer

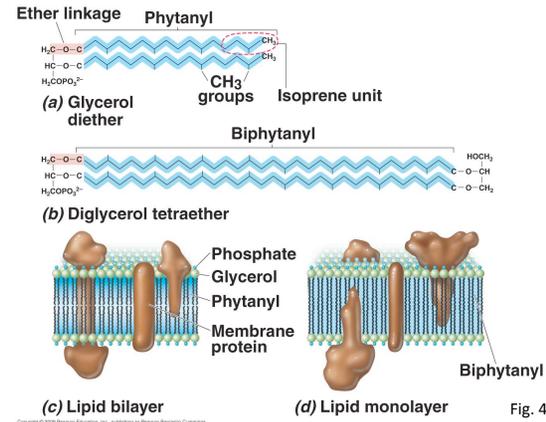


Fig. 4.8

Importance of Cell Wall

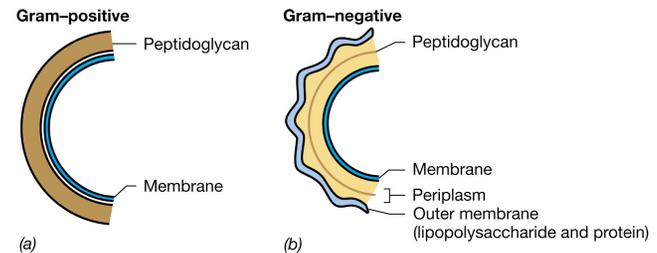
- Provides rigidity to cell allowing cell to withstand the large osmotic/ionic changes a bacterium may experience in its environment, and turgor pressure of cytoplasm (conc. of solutes in cytoplasm).

Cell lysis

- May have a role in shape determination.
- Provides a barrier against certain toxic chemical and biological agents.
- Site of action of some of the most commonly used antibiotics used to treat bacterial infections (penicillin family).
- A component of cell wall of *Bacteria* is responsible for some of symptoms associated with an infection, e.g. fever response (lipopolysaccharide and lipoteichoic acid).

Schematic diagram cell wall

Fig. 4.16



Functions of Cell Wall

- Provides shape (?) and rigidity
- Involved in cell wall biosynthesis
- Involved in cell division (protoplast/sphereoplast)
- Involved in motility
- Influences permeability (teichoic acid, LPS, OCWM)
- LPS may inhibit phagocytosis
- LPS and lipoteichoic acid elicit symptoms of Gram-negative and positive bacteria infection, respectively.

Prokaryotes Lacking a Cell Wall Structure

- The mollicutes group of *Bacteria* (5 genera, *Mycoplasma*)
 - Properties of group:
 - Sensitive to osmotic lysis
 - Resistant to antibiotics directed at cell wall biosynthesis (penicillins)
 - pleomorphic
 - contain sterols in membrane similar to those found in membranes of animal cells.
 - some are parasites of plants and animals.
- L-forms of *Bacteria* *M. pneumoniae*
- Certain *Archaea* (*Thermoplasma*)

Cell-walled Prokaryotes

• Contain peptidoglycan

All cells in the domain *Bacteria* contain peptidoglycan with exception of *Planctomyces* and *Chlamydia*

• Lack peptidoglycan

All cell-walled *Archaea*

C. trachomatis- intracellular parasite; leading cause of blindness in world.

Energy parasite

Has genes for peptidoglycan synthesis and ATP synthase but does not express genes!

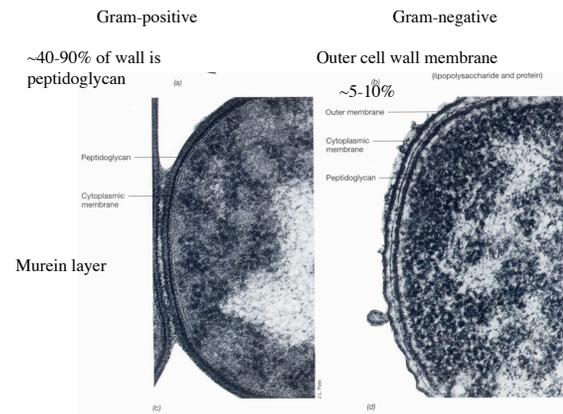
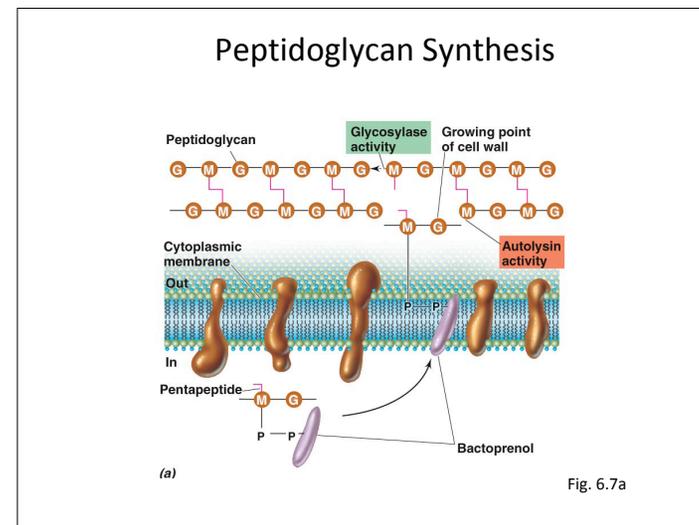
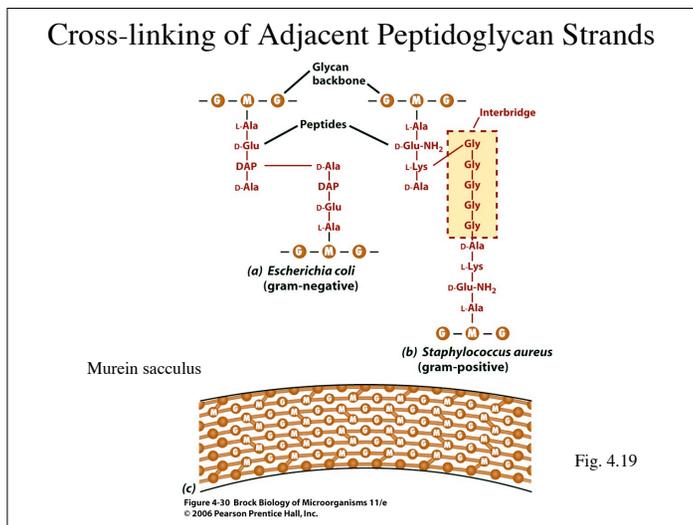
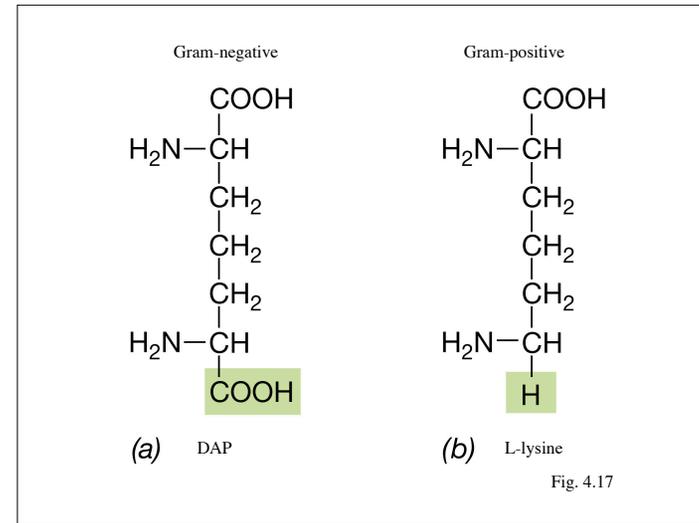
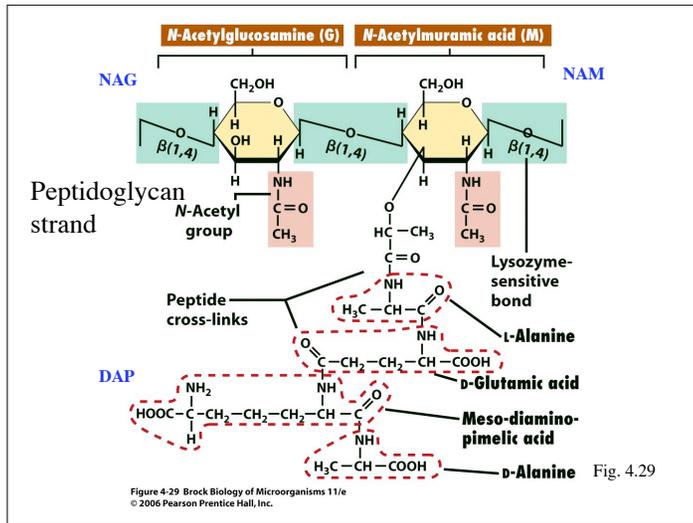
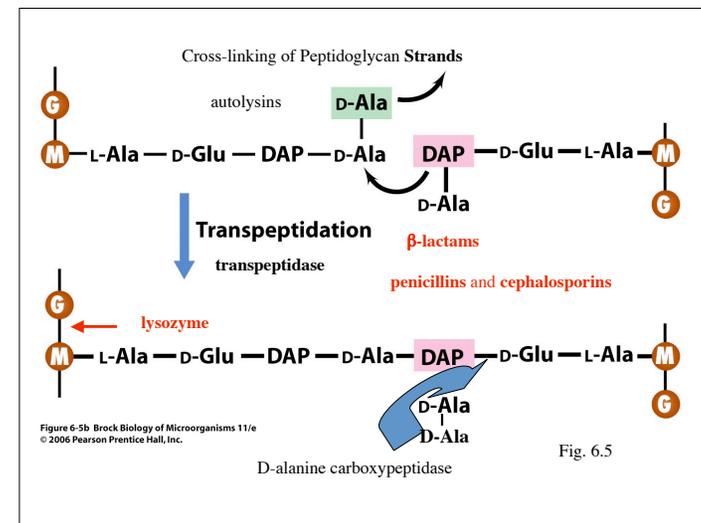
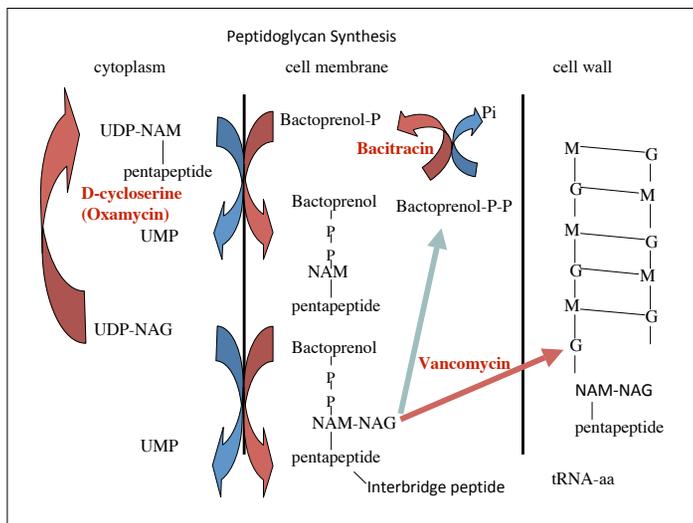
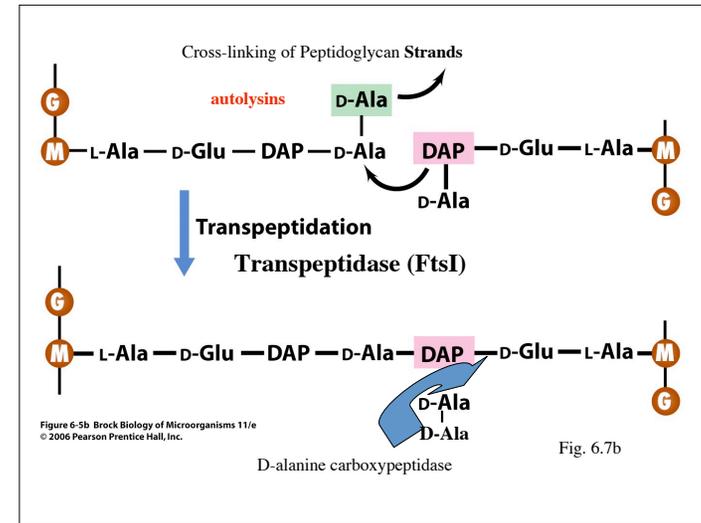
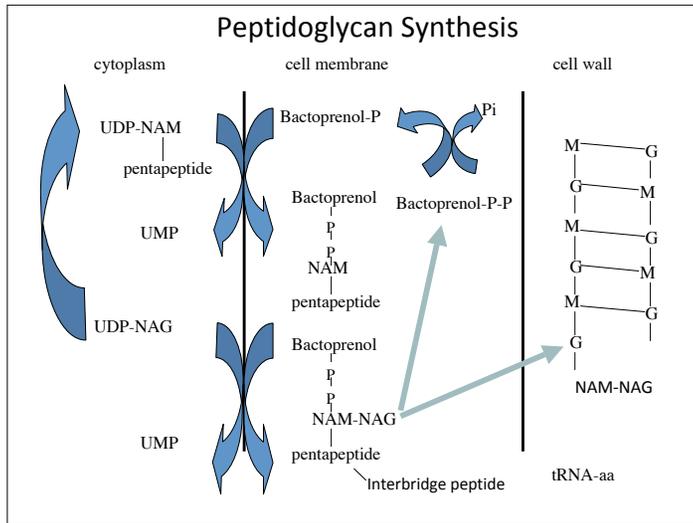


Fig. 4.16

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Antibiotic Resistance

- Inactivate antibiotic β -lactamase (penicillinase)

Clavulanic acid

Augmentin and Trimentin (combination of clavulanic acid and amoxicillin or ampicillin respectively)

- Change chemistry of target site
- Limit access of the antibiotic to target site