

PEPTIDOGLYCAN:

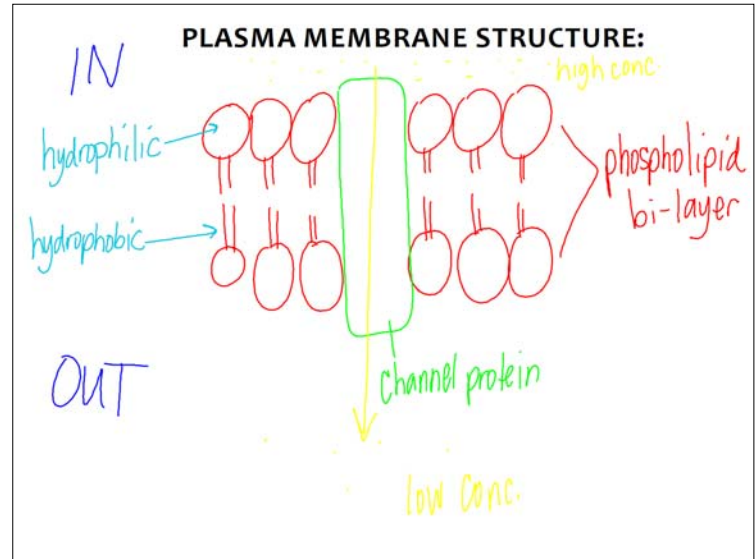
- Polymer of Sugars & Amino Acids
- Form mesh-like layer outside plasma membrane; forming cell wall
- Thicker in Gram +

PORINS:

- Protein that crosses cell membrane (β -pleated sheet)
- Acts as a pore; allows for passive diffusion
- Present in Gram -

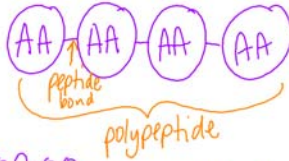
LIPOPOLYSACCHARIDES: (LPS)

- Large molecules of lipids & polysaccharides
- Found in outer membrane of Gram -
- Elicit strong immune response, endotoxins



PROTEIN STRUCTURE: FOLDING

1) primary

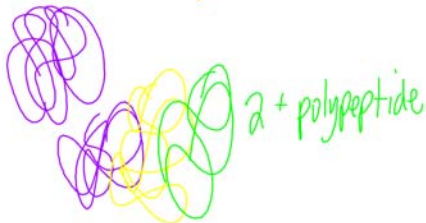


2) Secondary

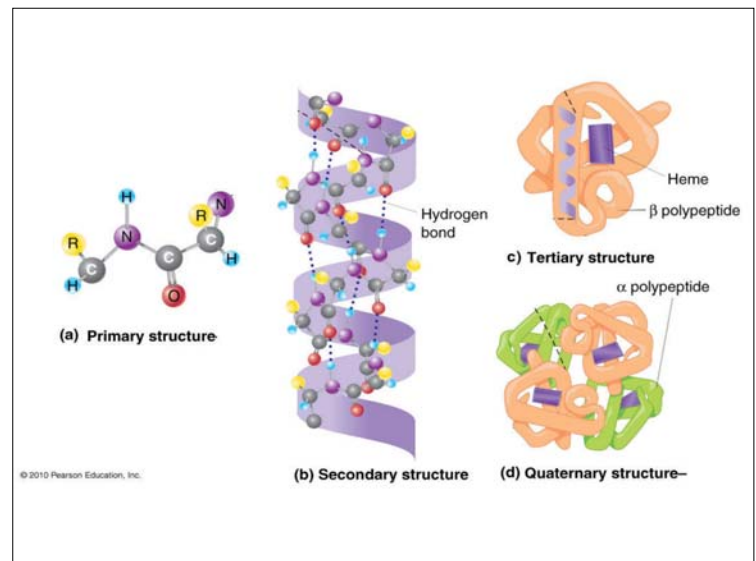
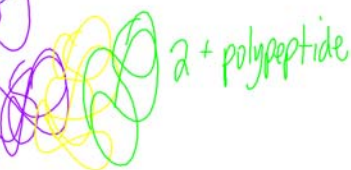


3) tertiary

3-D



4) quaternary



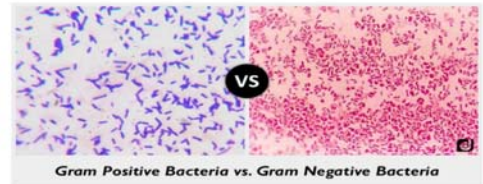
Gram Negative Bacteria

- The cell wall contains multiple layers, including a **thin layer of peptidoglycan**.
- The outside layer is called the outer membrane, which is made of a lipid bilayer whose outside is composed of **lipopolysaccharides composed of endotoxins**.
- The outer membrane serves as a barrier to the passage of most molecules and contains **specialized proteins, called porins**, which allow certain molecules to pass through the membrane.
- The region between the plasma membrane and the outer membrane is called the **periplasm** and is filled with a gel-like fluid and proteins involved in a variety of cellular activities.
- The **Gram-stained cell is reddish-pink**.



Gram Positive Bacteria

- The cell wall contains a **thick layer of peptidoglycan** and teichoic acids. There is approximately twenty times more peptidoglycan than the Gram negative bacteria.
- There is **no outer membrane present**.
- There are **no porins present**.
- The **Gram-stained cell is purple**.



Antibiotics:

- 1st used in 1940
- Common bacterial infections caused death
- Surgery: 50% chance of survival
- Over last decade, bacteria have become stronger & less responsive to antibiotic treatments
- **Antibiotic Resistant bacteria:**
Tb, gonorrhea, malaria, skin infections, pneumonia, ear infections

(a) Exotoxins are proteins produced inside pathogenic bacteria, most commonly gram-positive bacteria, as part of their growth and metabolism. The exotoxins are then secreted or released into the surrounding medium following lysis.

(b) Endotoxins are the lipid portions of lipopolysaccharides (LPSs) that are part of the outer membrane of the cell wall of gram-negative bacteria (lipid A; see Figure 4.13c). The endotoxins are liberated when the bacteria die and the cell wall breaks apart.

Key Concept

Toxins are of two general types: exotoxins and endotoxins.

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