

### **The Gram Positive Cell Wall**

The Gram positive cell wall is characterized by the presence of a very thick peptidoglycan layer, which is responsible for the retention of the crystal violet dyes during the Gram staining procedure. Imbedded in the Gram positive cell wall are polyalcohols called teichoic acids which are lipid-linked to form lipoteichoic acids. Because lipoteichoic acids are covalently linked to lipids within the cytoplasmic membrane they are responsible for linking the peptidoglycan to the cytoplasmic membrane. Teichoic acids give the Gram positive cell wall an overall negative charge due to the presence of phosphodiester bonds between teichoic acids monomers.

### **The Gram Negative Cell Wall**

Unlike the Gram positive cell wall, the Gram negative cell wall contains a thin peptidoglycan layer adjacent to the cytoplasmic membrane, which is responsible for the cell wall's inability to retain the crystal violet stain upon decolorization with ethanol during Gram staining. In addition to the peptidoglycan layer, the Gram negative cell wall also contains an additional outer membrane composed by phospholipids and lipopolysaccharides.