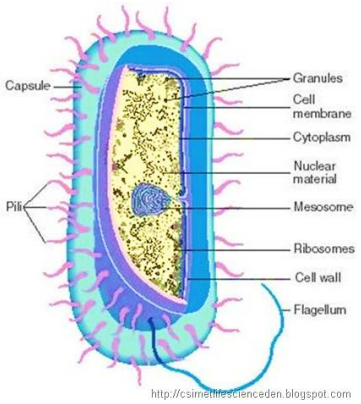
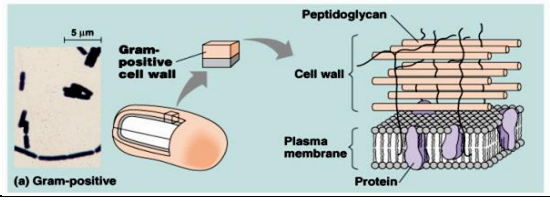
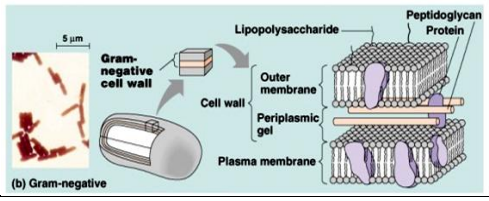
Bacterial structure and Genetics 1

Internal structure of bacteria	External structures of bacteria
Mesosomes	**Flagella**
Core	**capsule**
Nucleoid	**Pilli**
Ribosomes	



Prokaryotes	Eukaryotes
One chromosome	**Chromosome**
Does not have any Cell organelles except Ribosomes	**Cell organelles**
No nuclear membrane (nucleoid)	**nuclear membrane (nucleus)**
Cell wall	**No cell wall**
Plasmid	**No plasmid**

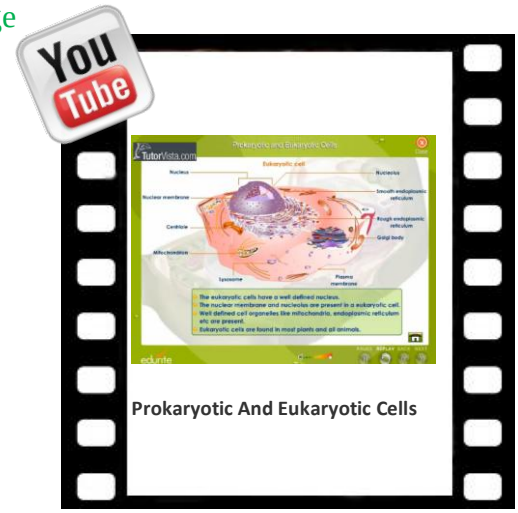
The Gram's stain

It is a tool for identifying specific bacteria, based on differences in their cell walls		
types	Gram-positive (Gram +ve) bacteria	Gram-negative (Gram -ve) bacteria
peptidoglycans	cell walls have large amount	cell walls have no or small amount
Stained (color)	violet	do not appear stained
Antigens	Polysaccharides (lancefield) + Protein (Griffith)	lipopolysaccharide & lipid **(ENDOTOXIN)**
shape		

External structures	Description	Composed of	found in	Function
Flagella	helical filaments	protein flagellin	gram(+) and gram(-)	1. Motility 2. chemotaxis
capsule	Amorphous material	usually polysaccharide, occasionally protein	Surrounds bacteria	1. Inhibits phagocytsis 2. Acts as virulence factor by assessing attachment to the surfaces
Pilli	Short filaments	protein pilin	The surface of gram(+) and gram(-)	1. Common pili : Responsible for adhesion and colonization 2. Sex pili: Responsible for conjugation
Cytoplasmic membrane	Double layered	phospholipid & protein	Surrounds bacteria	semi- permeable membrane (passive)

Gene exchange	The Mechanism	Examples
Transformation	Fragment of exogenous naked bacterial DNA are taken up and absorbed in to recipient cell	(Haemophilus influenza) and (streptococcus pneumonia)
Transduction	Phage mediated transfer of genetic information from donor to recipient cells.	- Beta-lactamase (production in staphylococcus aureus). - Toxin (production in corynebacterium diphtheria)
conjugation	Cell contact required and genes reside on plasmid resident within donor (male) cell transfer to recipient (female) cell (mating).	

a. Antigenic determinants: the body can identify bacteria by its antigens.
b. Mycoplasma (bacteria lacks cell well): naturally But L-form, spheroplasts and protoplasts lack it for abnormal reasons.
c. Genetic exchange one of the most important factors that gives bacteria resistant to antibiotic.
d. Mutation and gene transfer are the main two reasons that cause Genetic variation in bacteria.
e. Functions of the cell wall: Rigidity, Shapes bacteria, protection, (porous: permeable to LMW molecules), cell division, Antigenic determations.
f. Spores produced by bacillus and clostridium, Enables the bacteria to survive adverse environmental condition, contains Ca^{+}, remain associated with the cell wall, and it used for checking the efficacy of autocalves.
g. Plasmid is responsible for genetic exchange
h. (Genetic recombination), it is important.



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