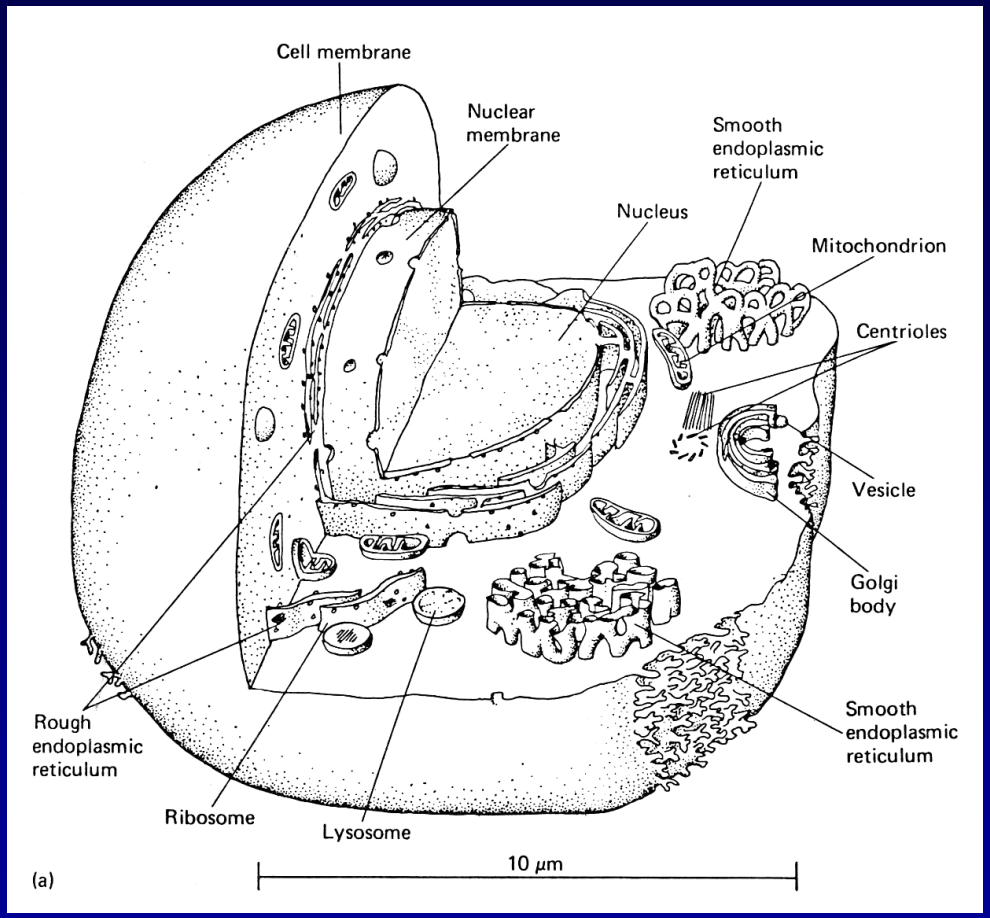
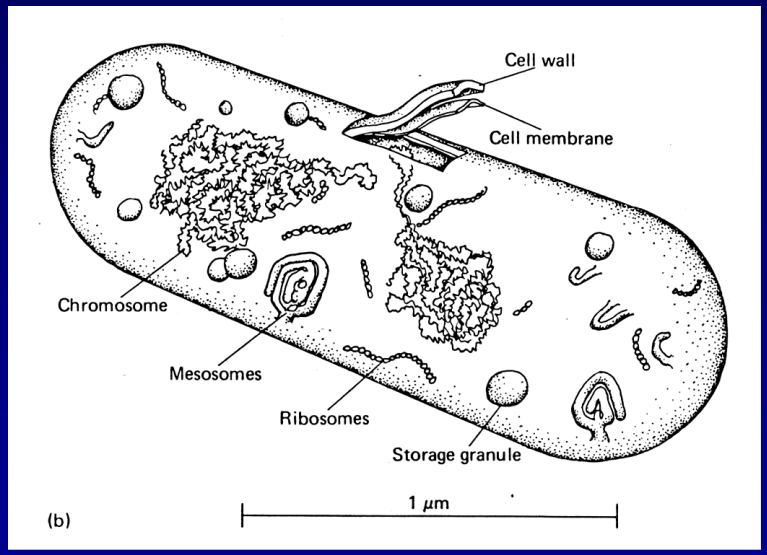
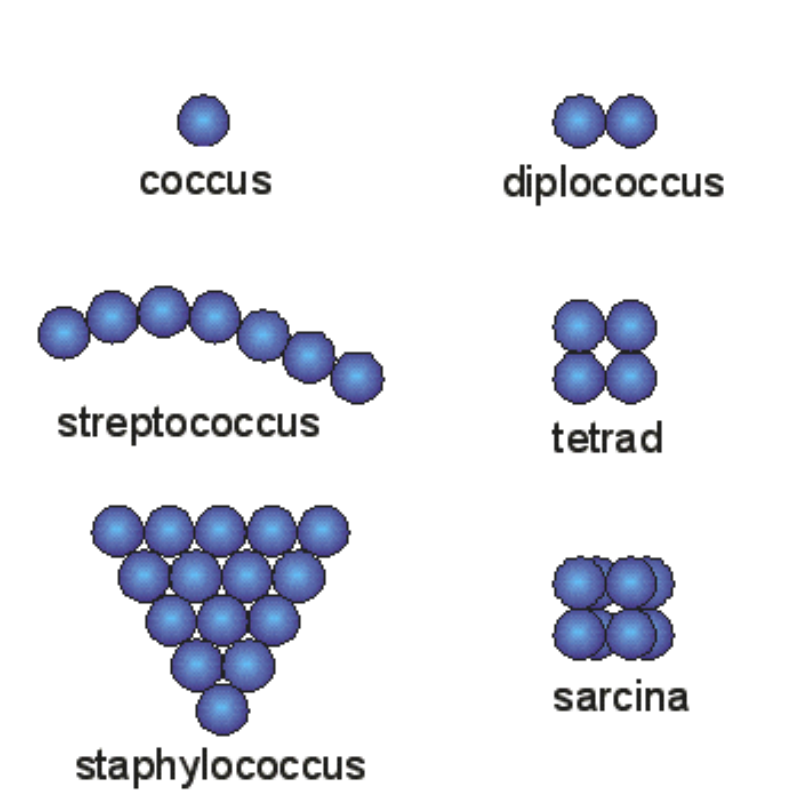
CONFRONTO FRA CELLULA PROCARIOTICA ED EUCARIOTICA

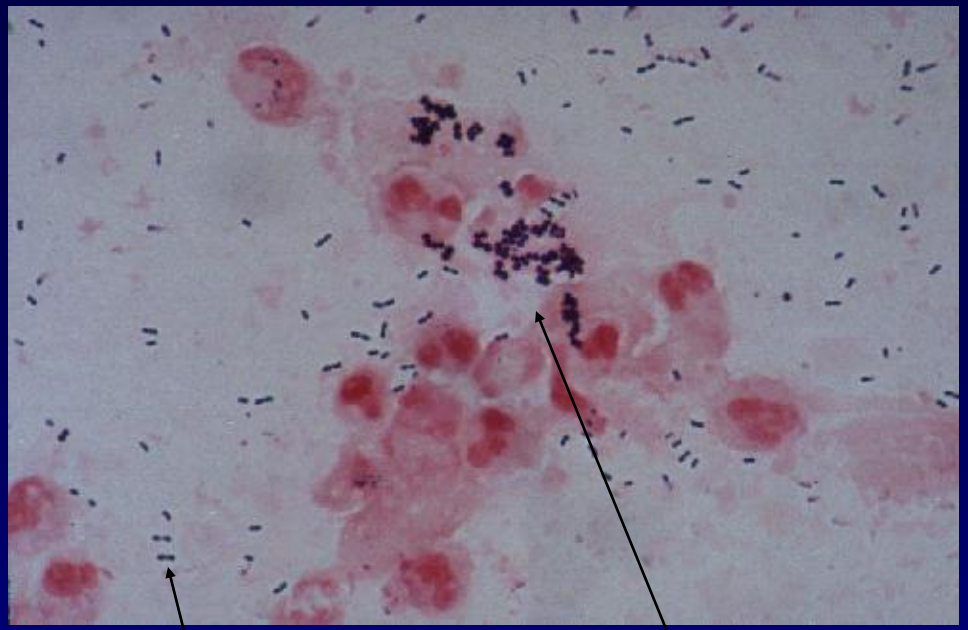




Sferici

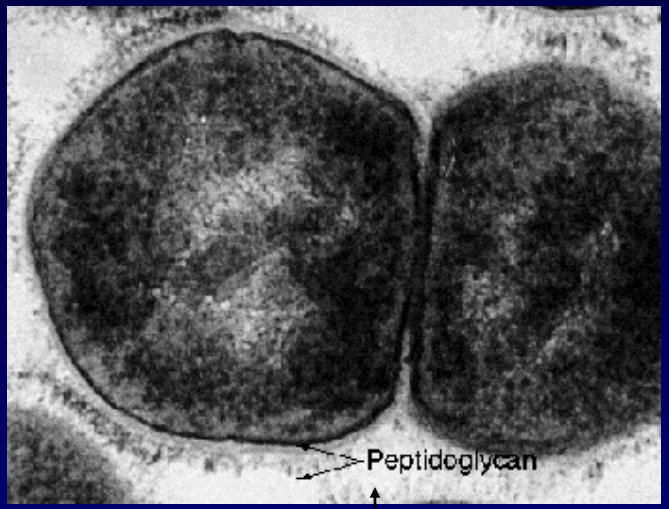


da P.R. Murray, K.S. Rosenthal, G.S. Kobayashi, M.A. Pfaller
Microbiologia
EDISES



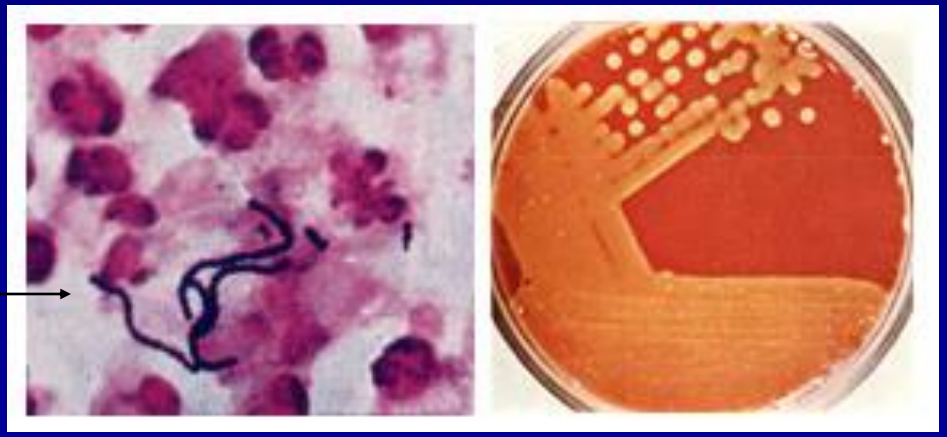
Streptococcus pneumoniae

Staphylococcus aureus

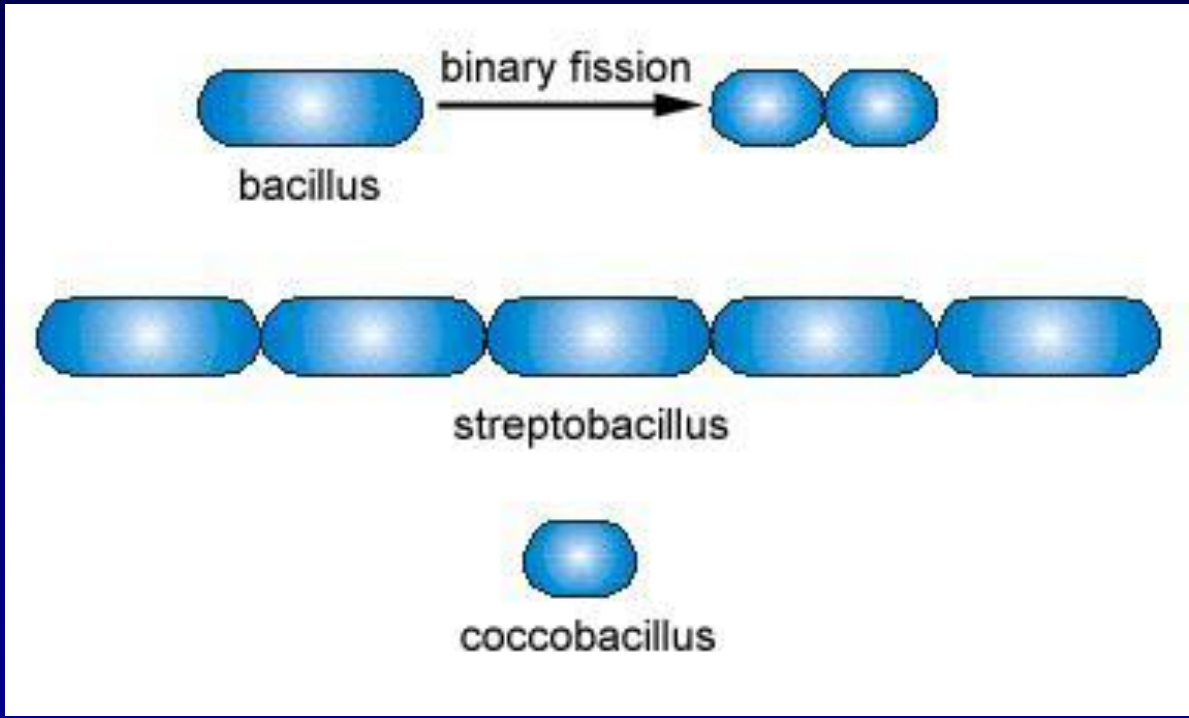


Neisseria gonorrhoeae
Neisseria meningitidis

Streptococcus pyogenes

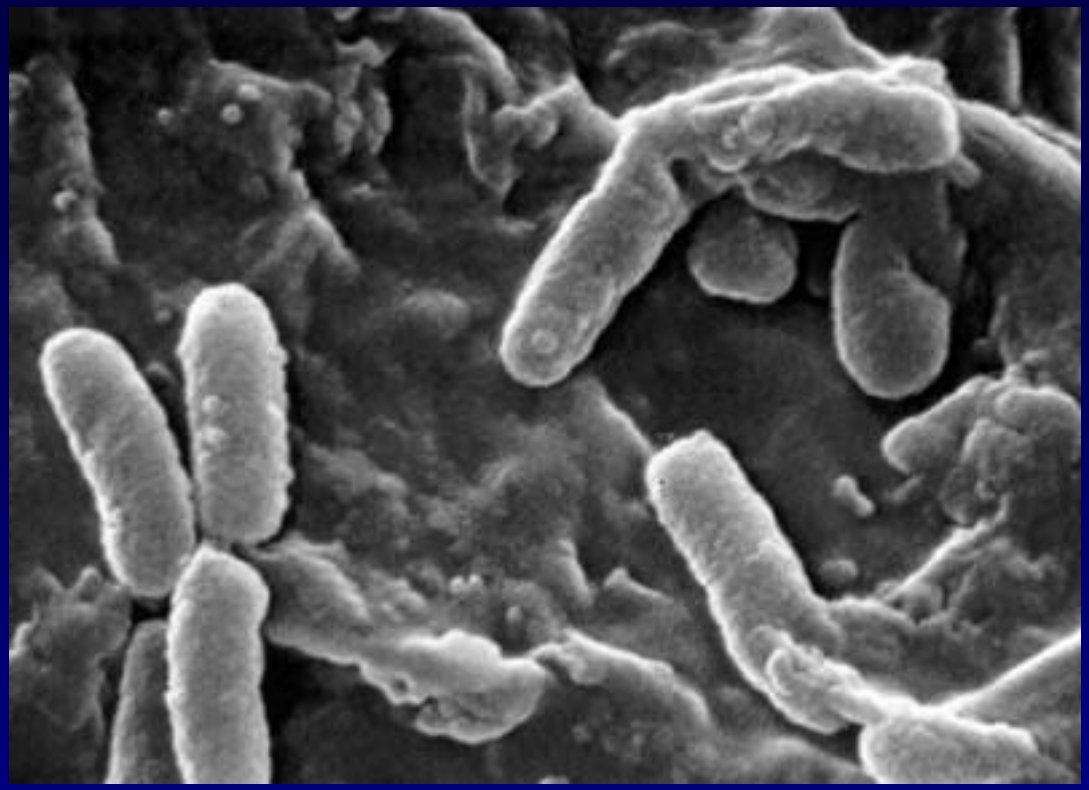


Bastoncellari



da P.R. Murray, K.S. Rosenthal, G.S. Kobayashi, M.A. Pfaller
Microbiologia
EDISES

Bacilli



Enterobacteriaceae: *Escherichia coli, Salmonella, Shigella, Yersinia pestis*

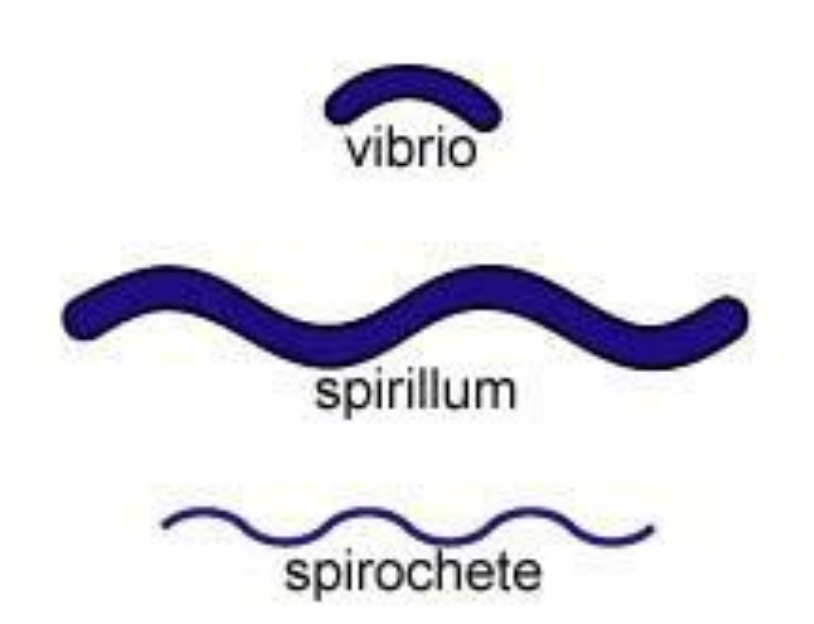
Legionella pneumophilae

Haemophilus influenzae

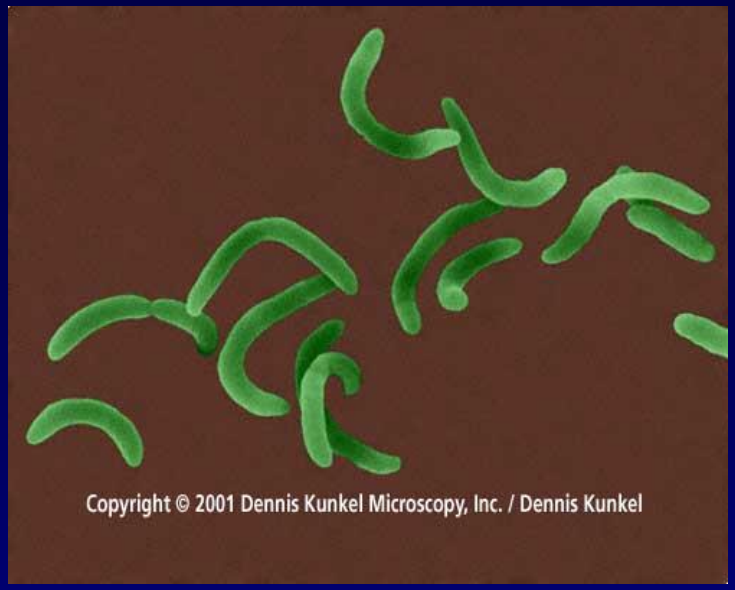
Clostridium tetani, Clostridium botulinum e Clostridium perfrigens

Bacillus anthracis

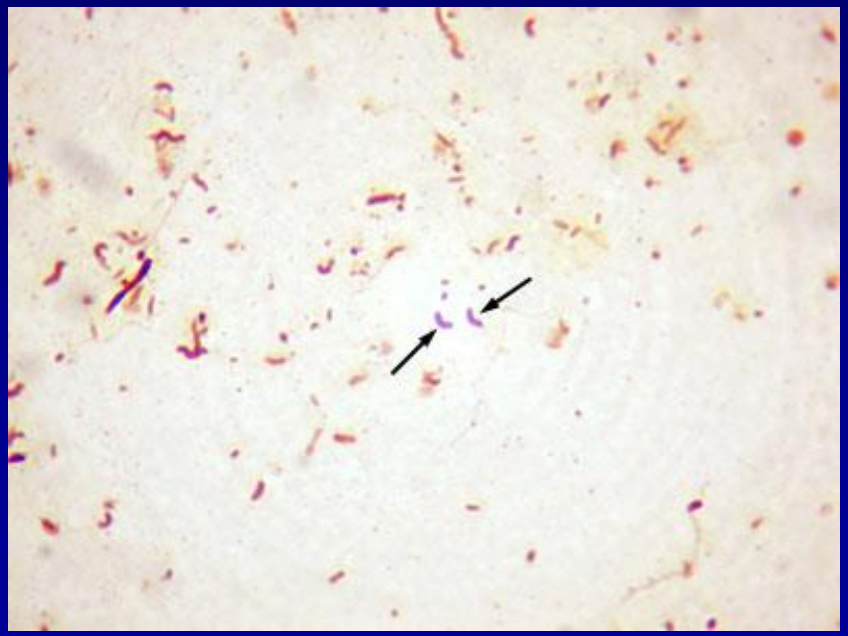
Spiraliformi



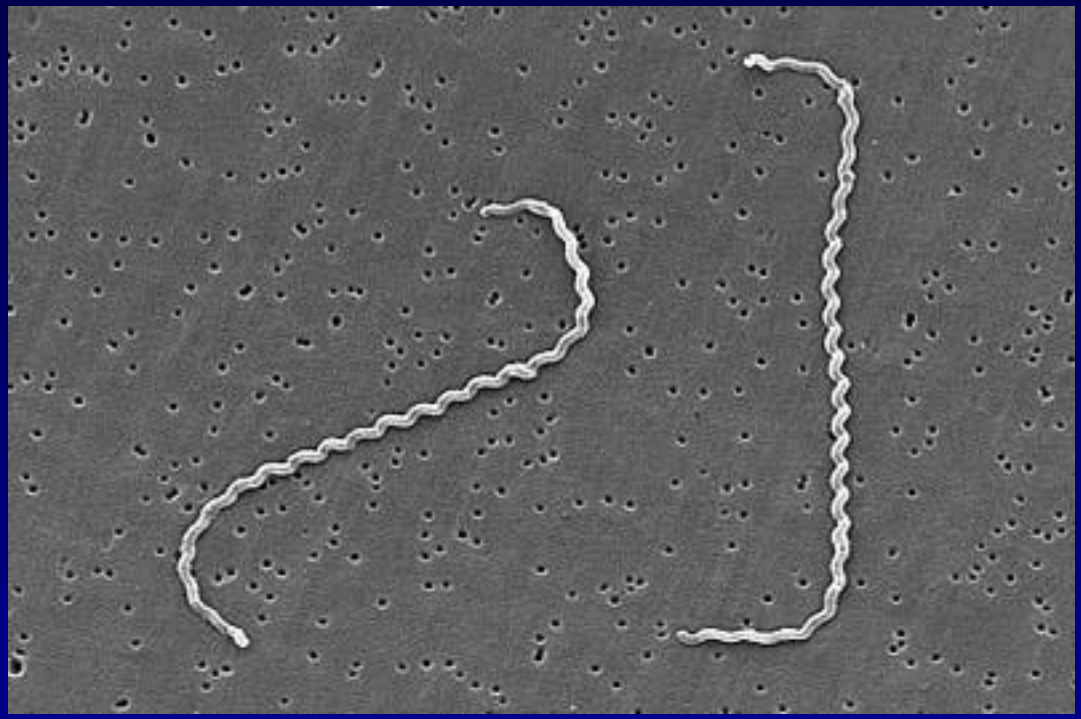
da P.R. Murray, K.S. Rosenthal, G.S. Kobayashi, M.A. Pfaller
Microbiologia
EDISES



Vibrio cholerae

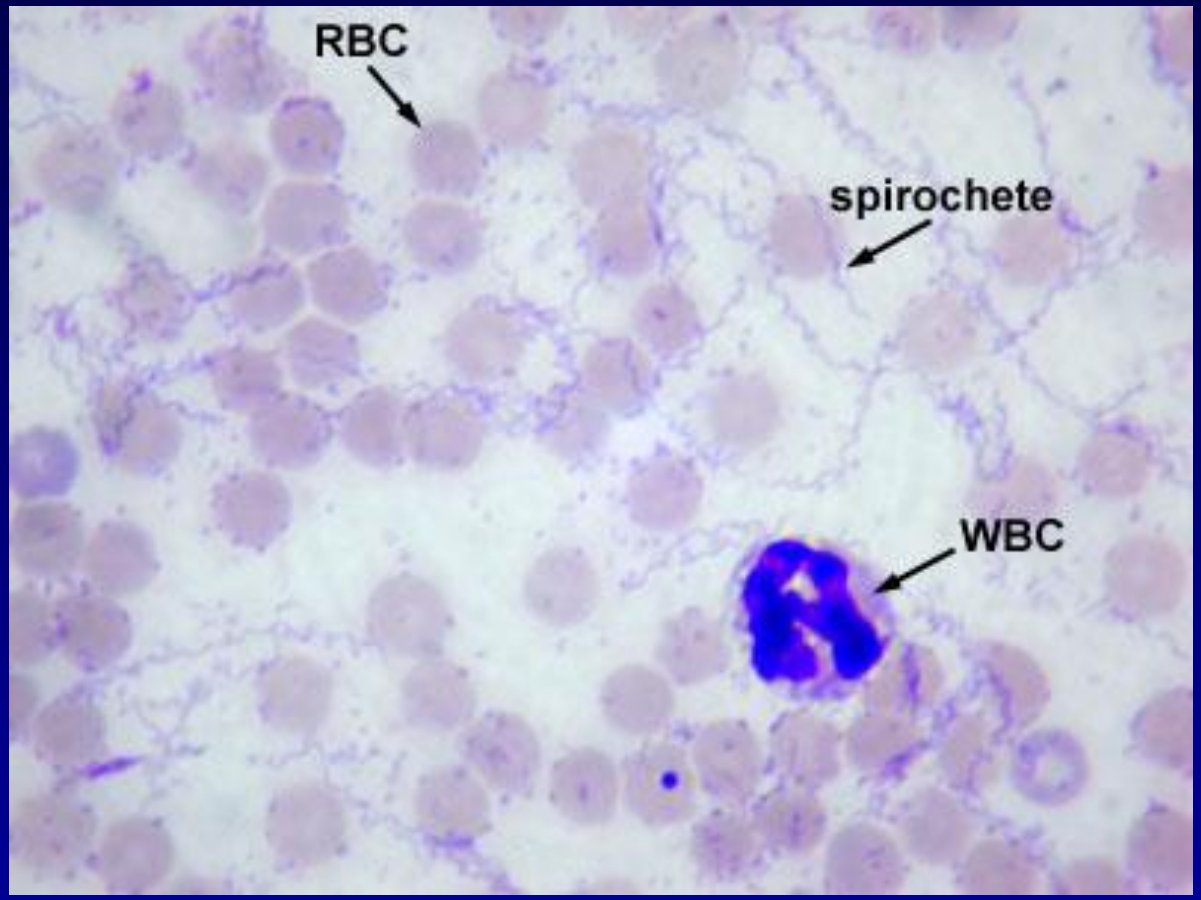


Leptospira



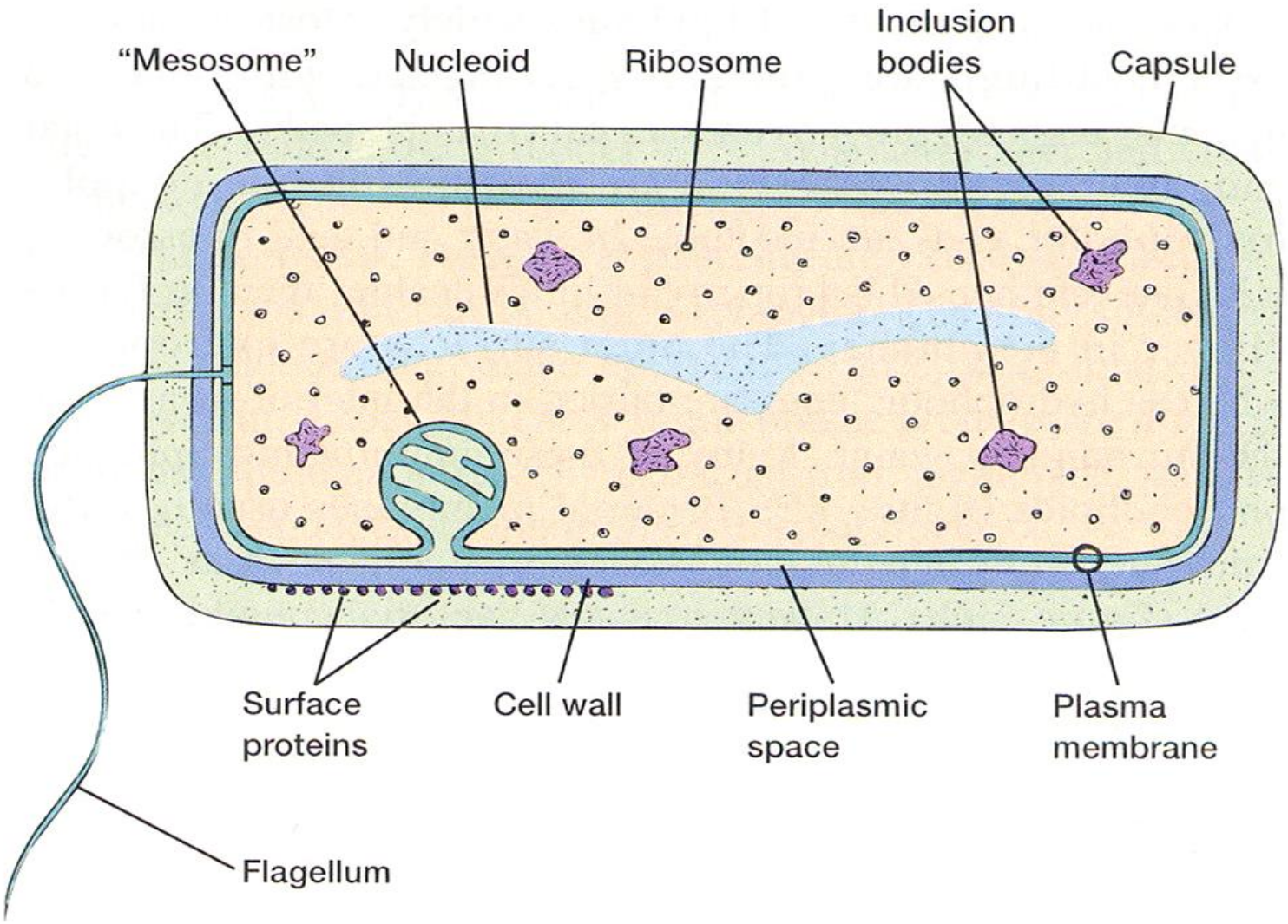
INFECTIONS: Causes leptospirosis. Transmitted by the urine and blood of infected rodents, Leptospira usually enters via cuts or contact with mucous membranes. It may eventually enter the lymphatics and blood and be carried to the liver.

Spirochaetales



Treponema pallidum = sifilide

Struttura della cellula batterica



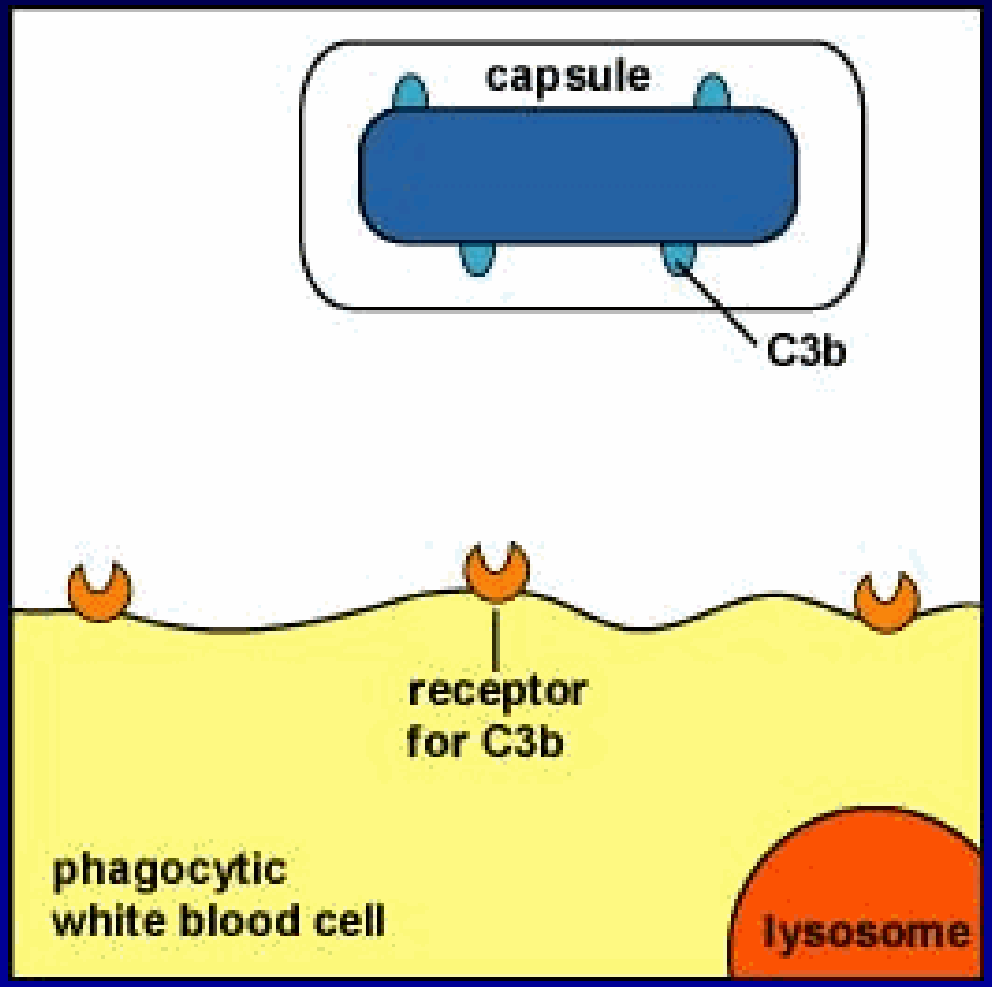
Capsula

- Espressione di benessere fisiologico
- Evidenziabile su terreni ricchi
- Di varia natura
  - polisaccaridica
  - proteica
- Dimostrabile
  - a fresco (inchiostro di china)
  - rigonfiamento capsulare
  - dopo colorazione specifica

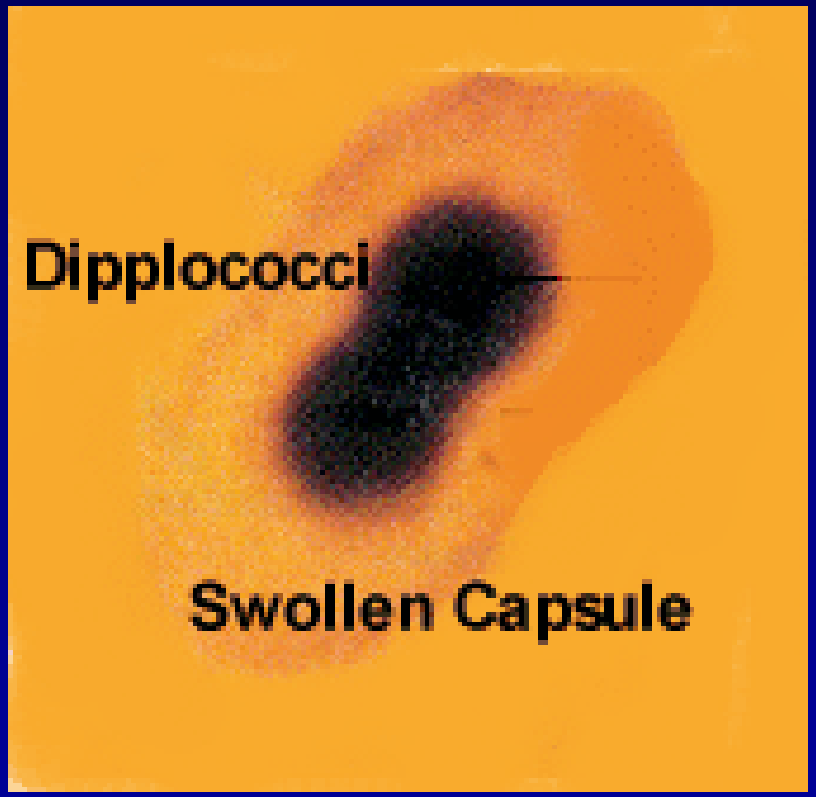
Capsula

- Fattore di virulenza
  - inibizione della fagocitosi
  - modifica l'antigenicità mascherando Ag superficiali
  - mimetismo antigenico
- Interferisce con
  - sensibilità agli antibiotici
  - scambio genico
  - accesso di soluti

Inibizione della fagocitosi



Capsula polisaccaridica



- *Streptococcus pneumoniae*
- Capsula ancorata covalentemente alla parete
- Potere antifagocitario
- Basso potere antigenico

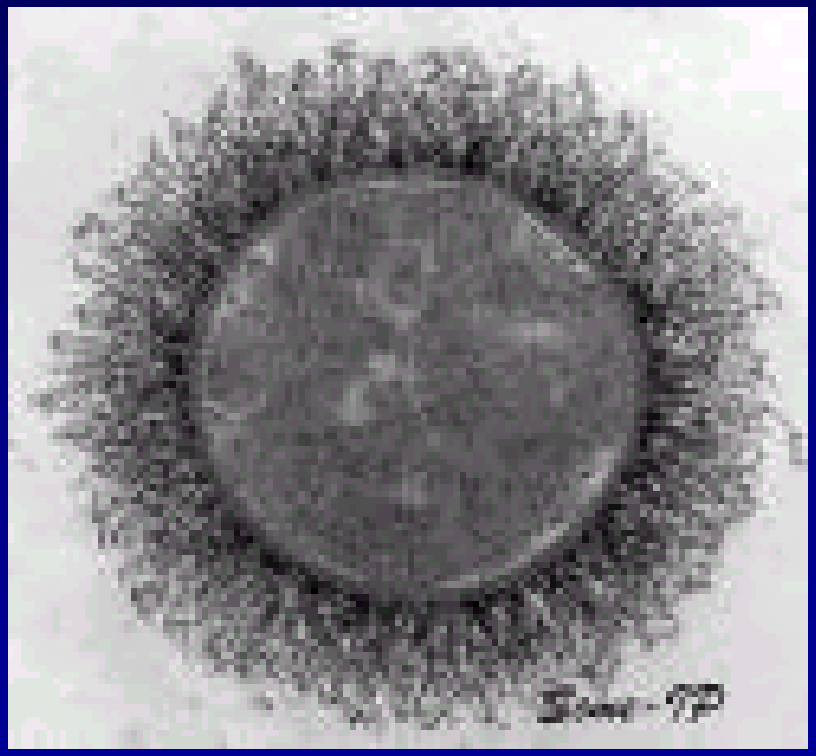
Capsula polisaccaridica

- *Streptococcus pyogenes*
- Capsula di acido ialuronico
- Potere antifagocitario
- Assolutamente non immunogena

Polisaccaridi extracellulari

Pseudomos aeruginosa
Capsula di alginato

Capsula proteica



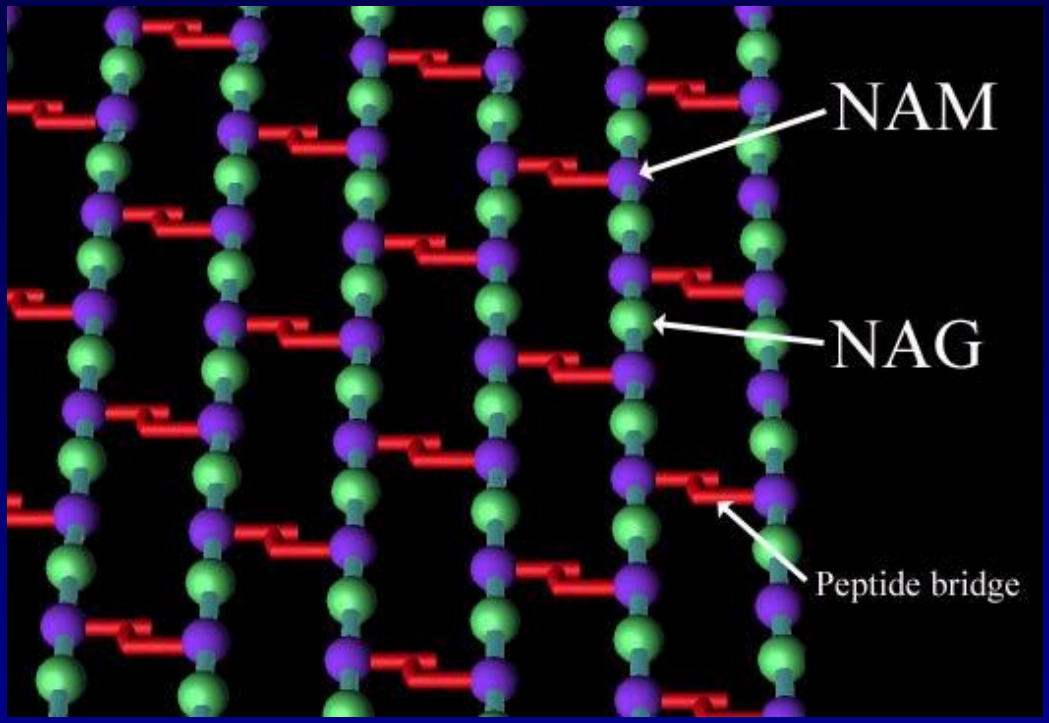
- *Bacillus anthracis*
- Capsula di acido glutammico

PARETE CELLULARE

- **La PARETE CELLULARE o *cell wall* racchiude in un contenitore rigido la cellula batterica e la protegge dalla lisi osmotica**

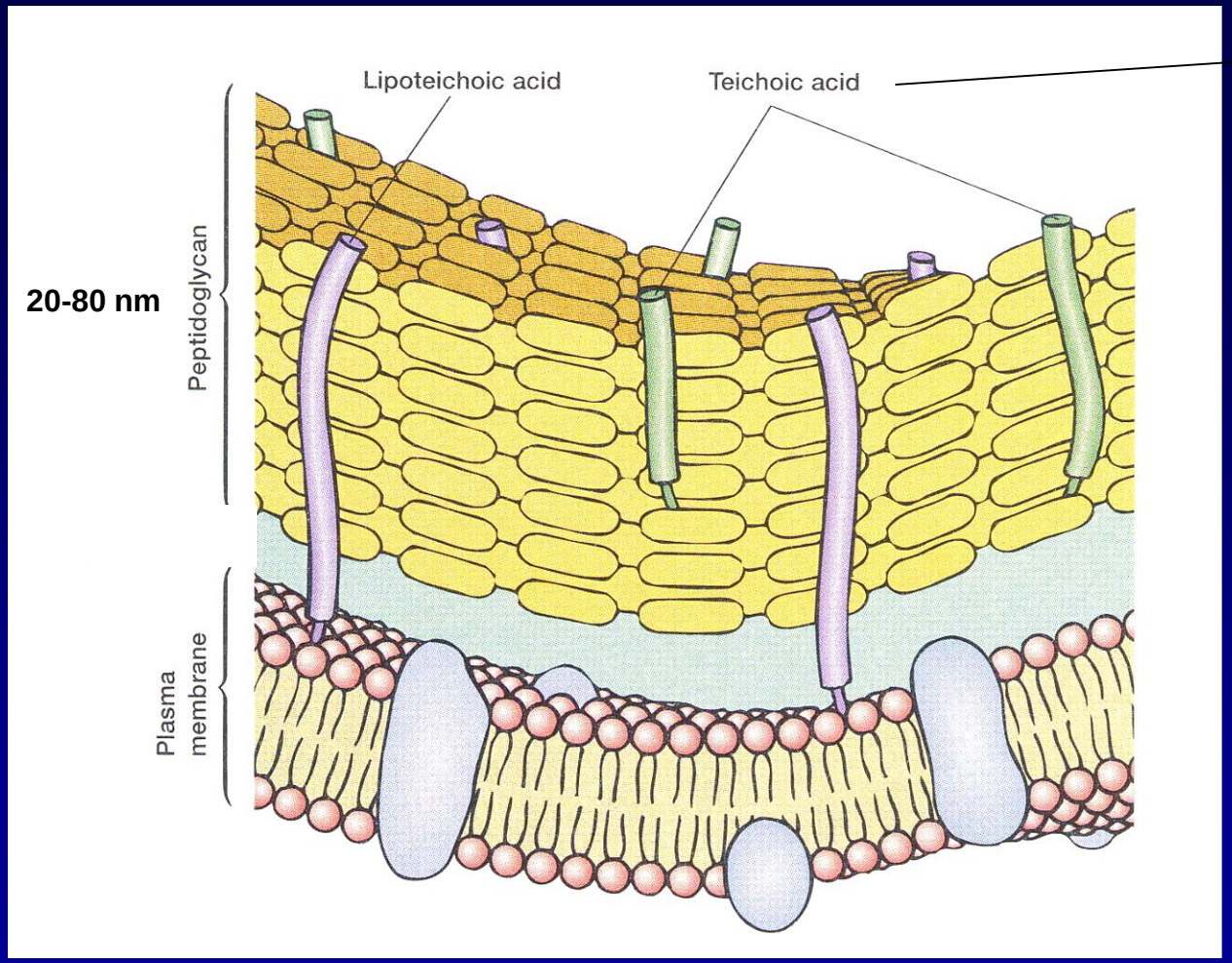
Struttura del peptidoglicano

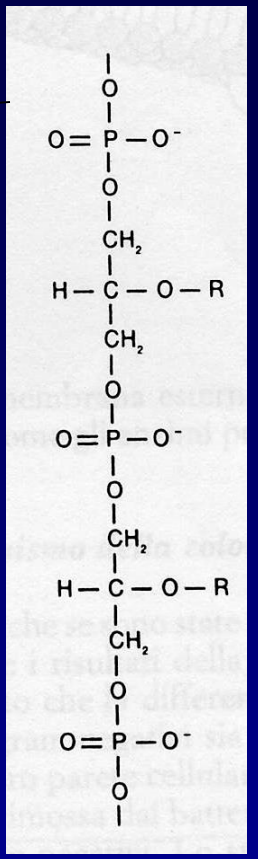
Definito anche mucopeptide batterico o mureina e' una struttura rigida di catene glicaniche di NAM e NAG legate con legami trasversali mediante ponti tetrapeptidici



- **NAM:** Acido N-acetilmuramico
- **NAG:** N-acetilglucosamina

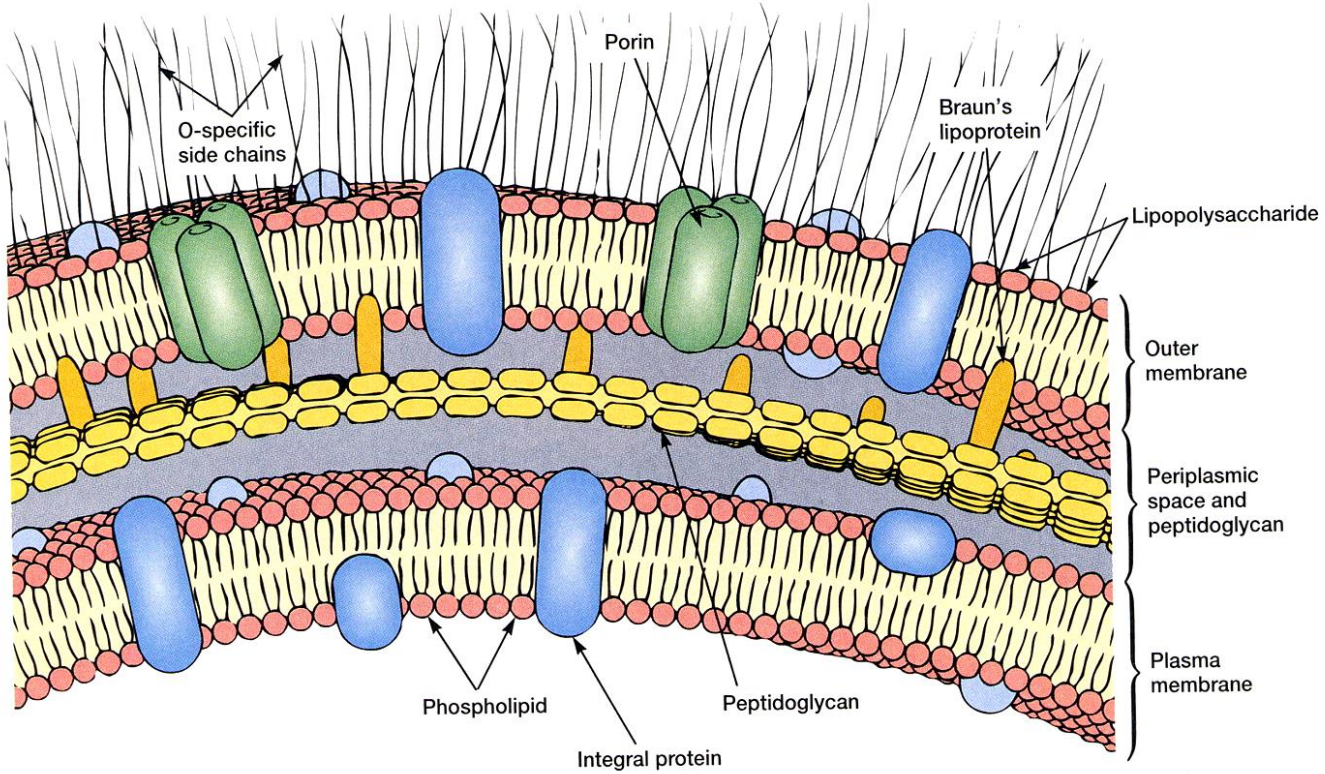
La parete dei Gram+

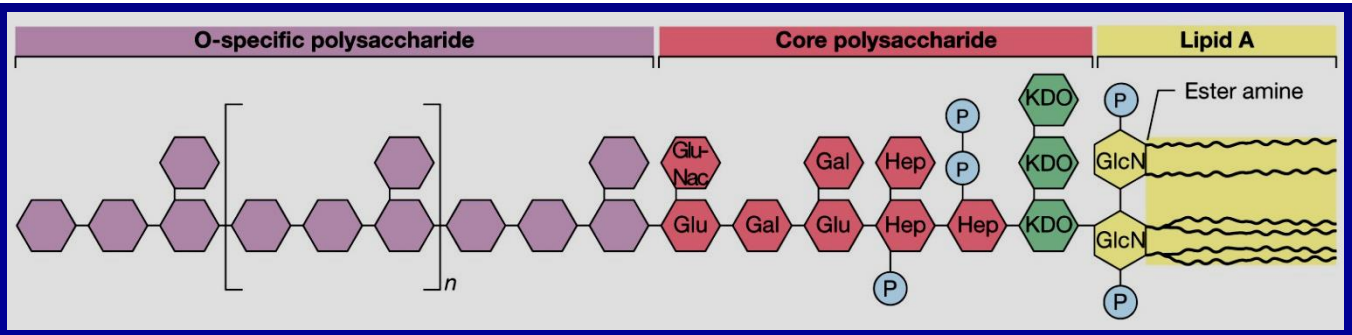




- foglietto unico di glicopeptide (40% della parete fino al 90% in Micrococcus)
- più spessa di quella dei Gram-
- Presenza di acidi teicoici (polialcoli) conferiscono carica negativa

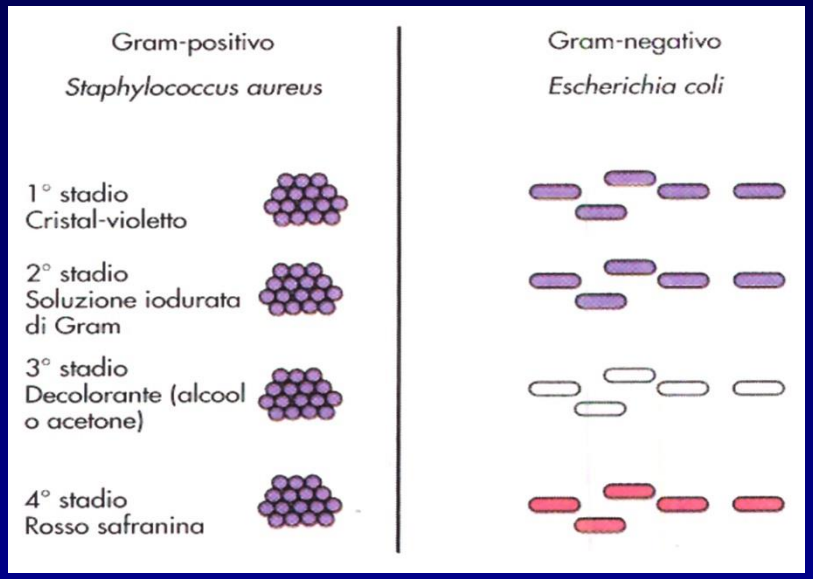
La parete dei Gram-

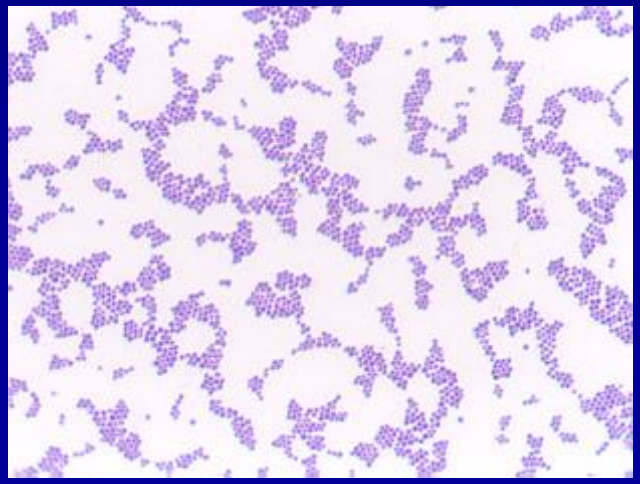




- parete più complessa dei Gram+
- costituenti peculiari della membrana esterna sono i lipopolisaccaridi (LPS)
- membrana esterna ricca di porine
- delimitazione di uno spazio periplasmico

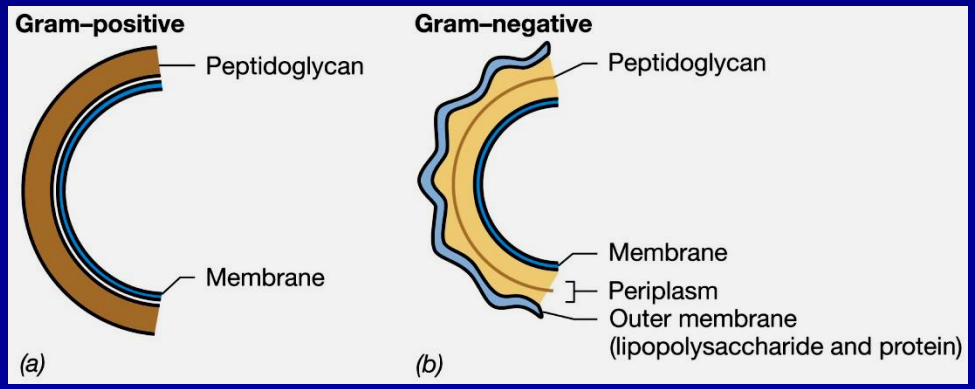
COLORAZIONE DI GRAM



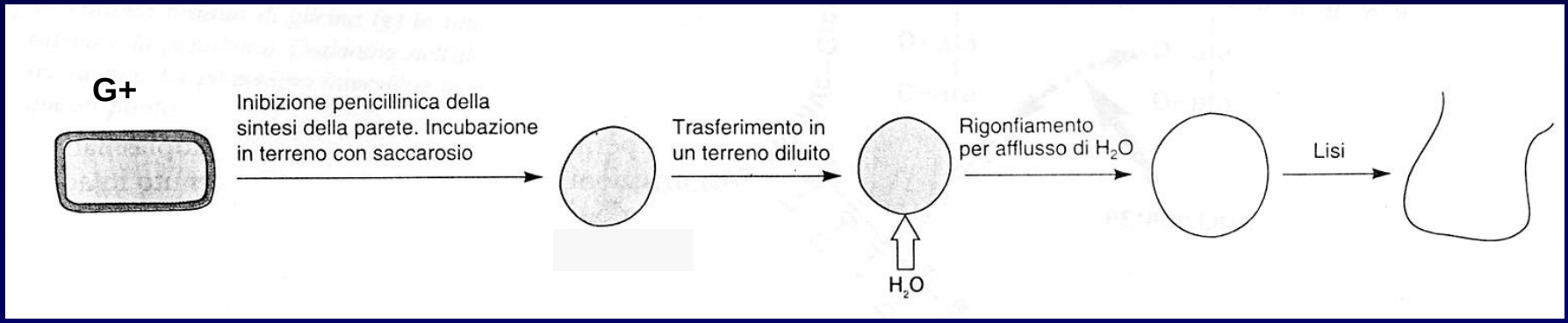


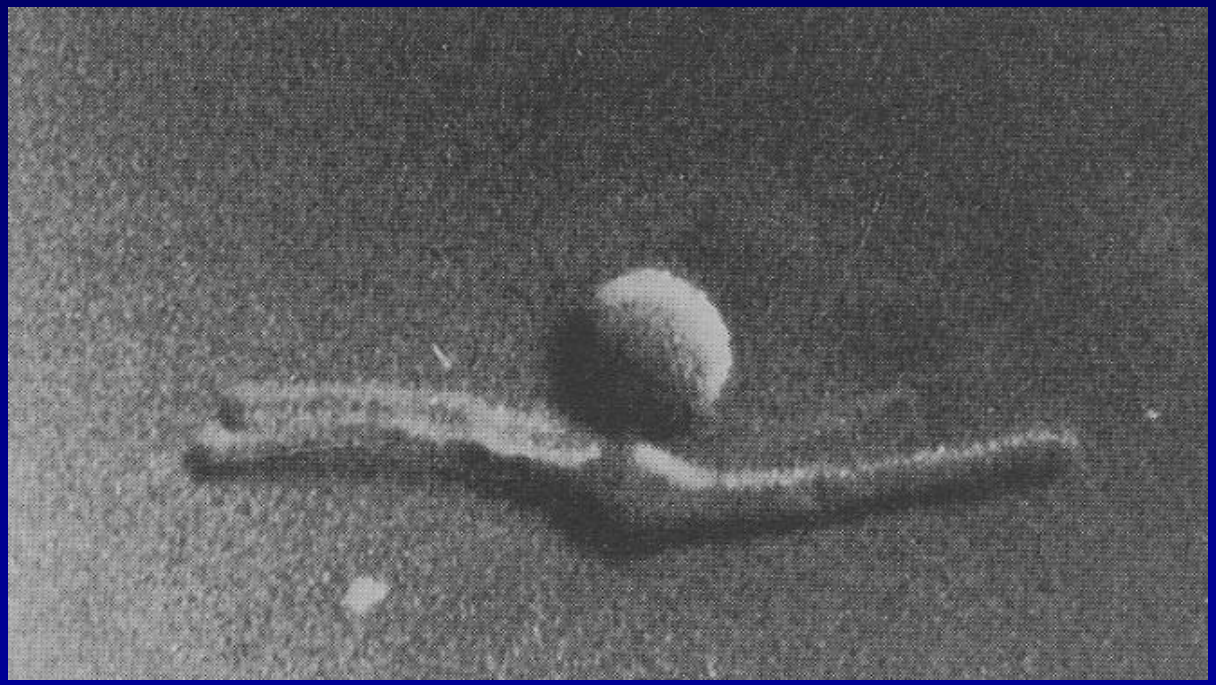
Ricapitolazione

- Gram+
  - una membrana, strato spesso di peptidoidoglicano, acidi lipoteicoici
- Gram-
  - due membrane, spazio periplasmico, strato sottile di peptidoglicano, LPS
- Eccezioni
  - micoplasmi, batteri acido-alcol resistenti



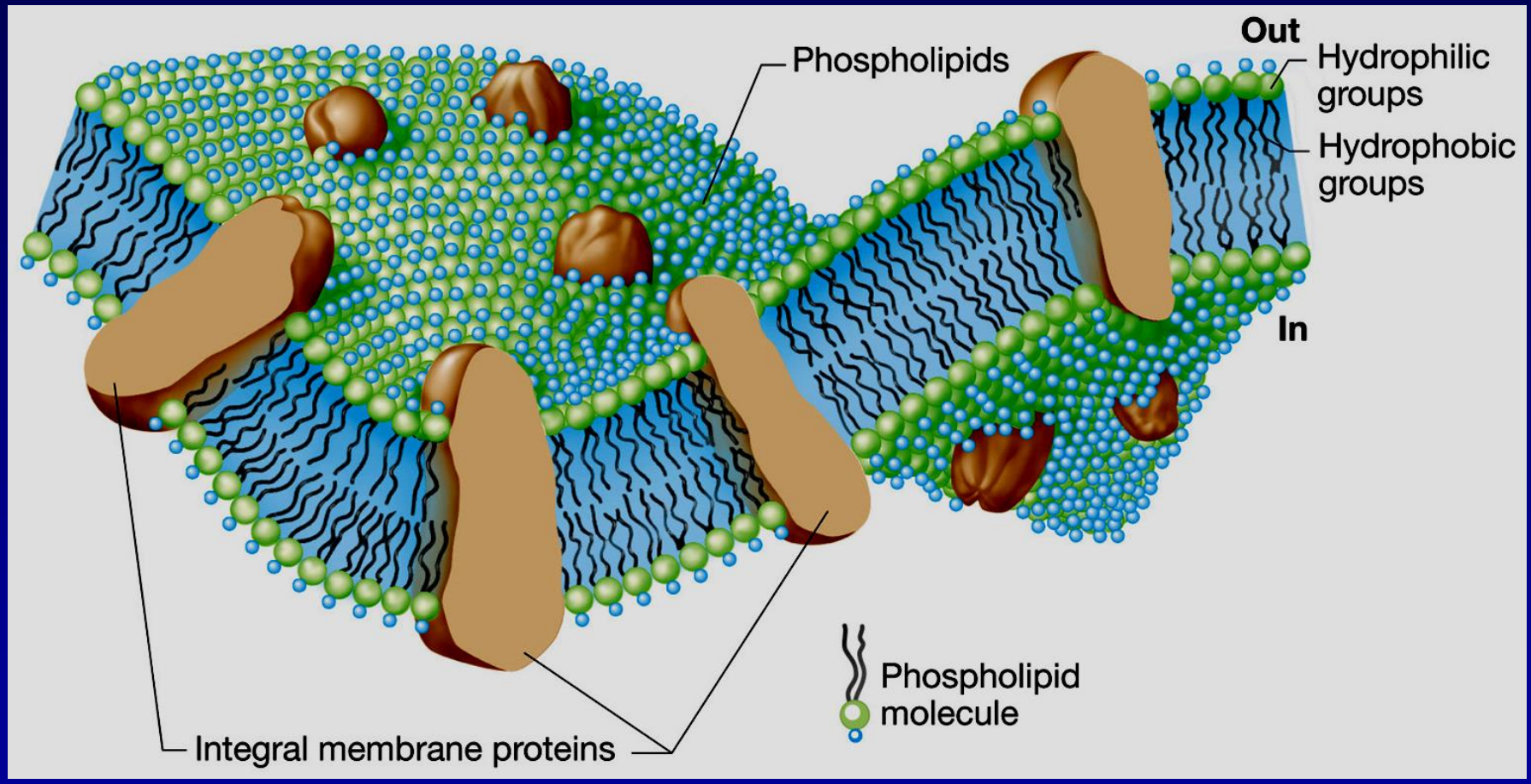
Meccanismo d'azione della penicillina



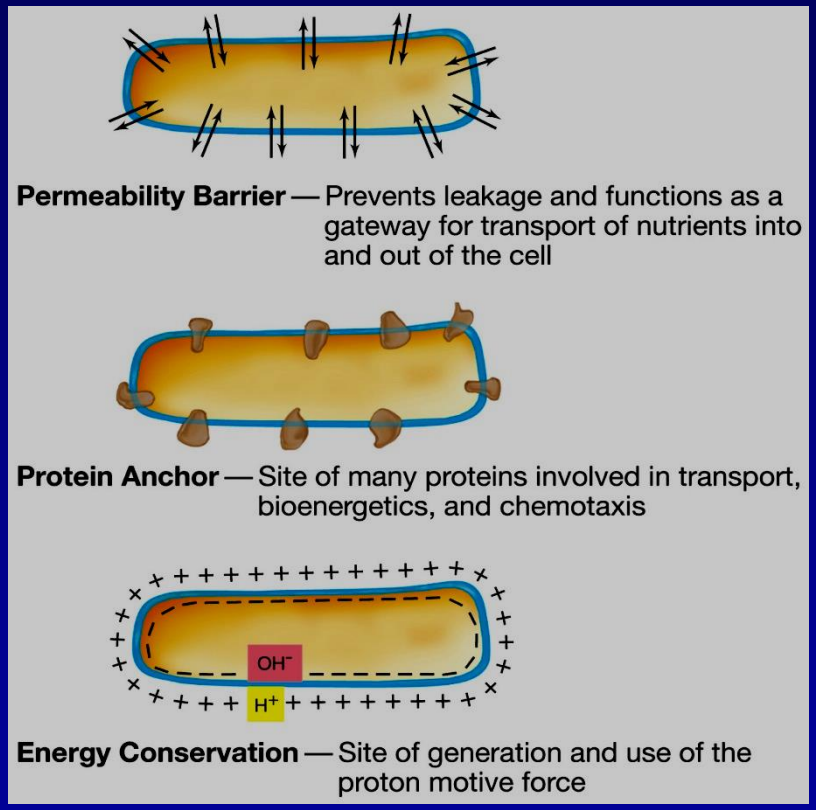


La micrografia elettronica mostra protusione di citoplasma attraverso la breccia del peptidoglicano

Membrana citoplasmatica



Funzioni della membrana citoplasmatica



- Barriera di permeabilità
- Sito di ancoraggio
- Conservazione dell'energia
- Sintesi parete
- Segregazione dei cromosomi
- Tutte le funzioni che negli eucarioti sono svolte da organelli

Sistemi di trasporto

1) PASSIVO:

   diffusione semplice

   diffusione facilitata: permeasi

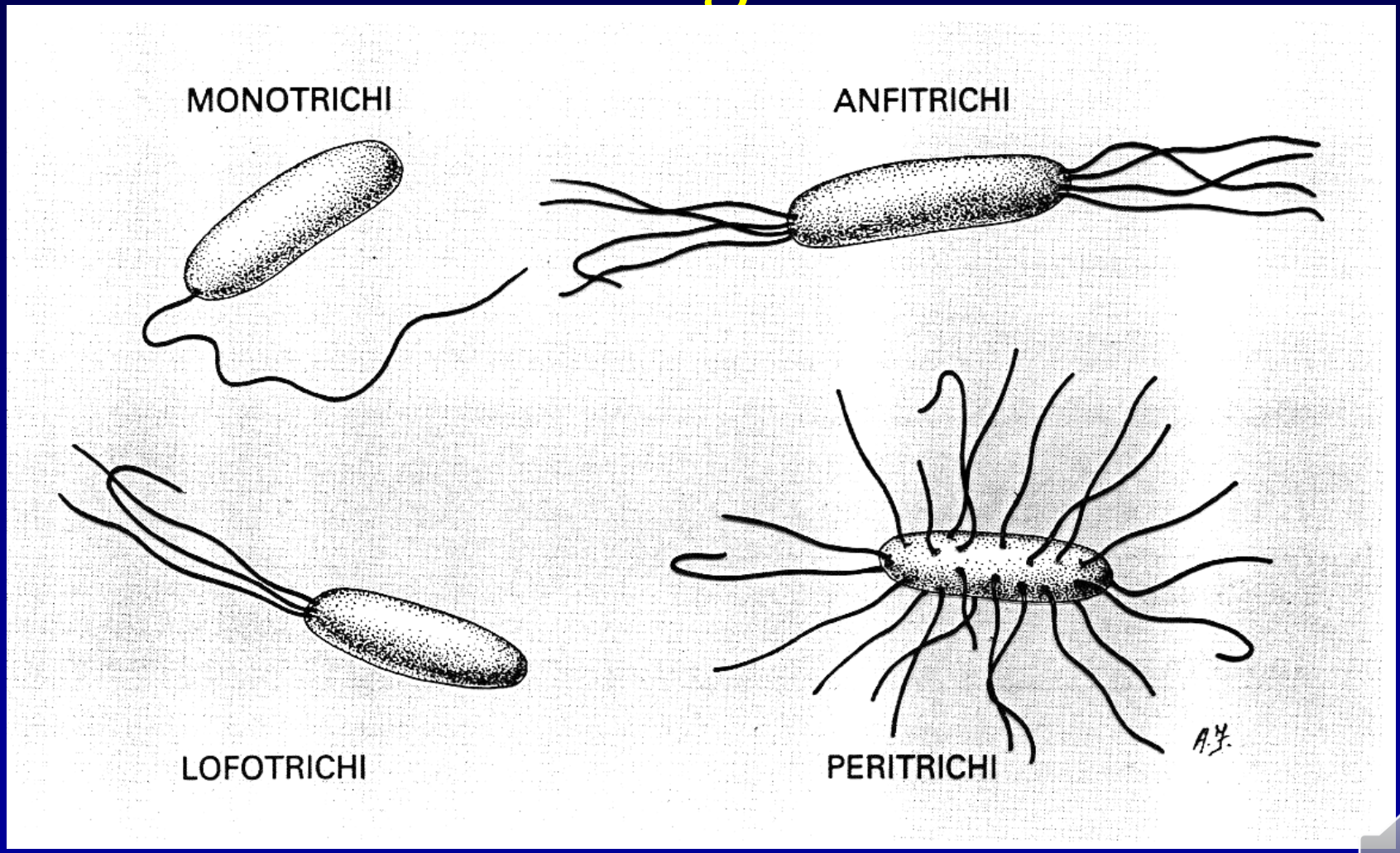
   osmosi: acquaporine

2) ATTIVO:

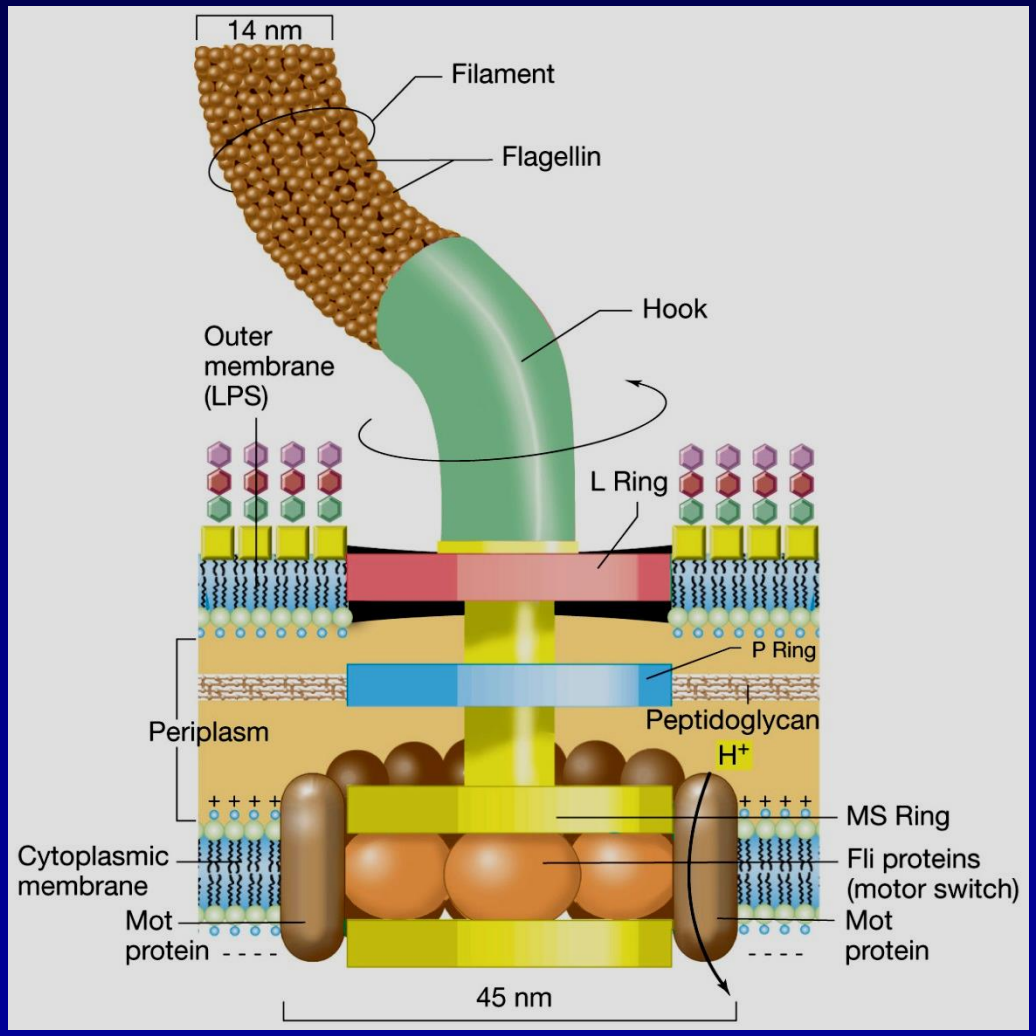
   trasporto attivo

   traslocazione di gruppo

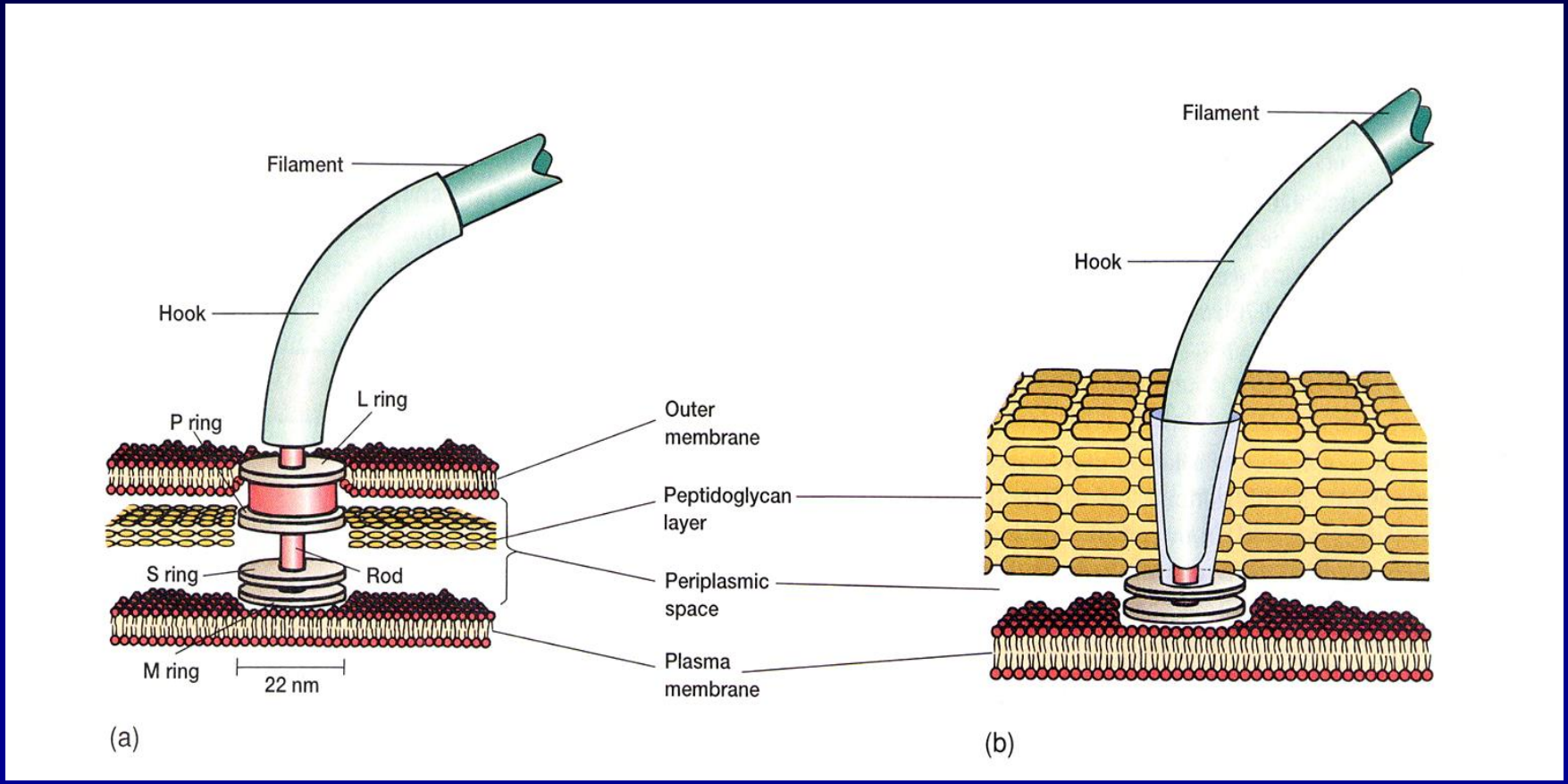
I flagelli



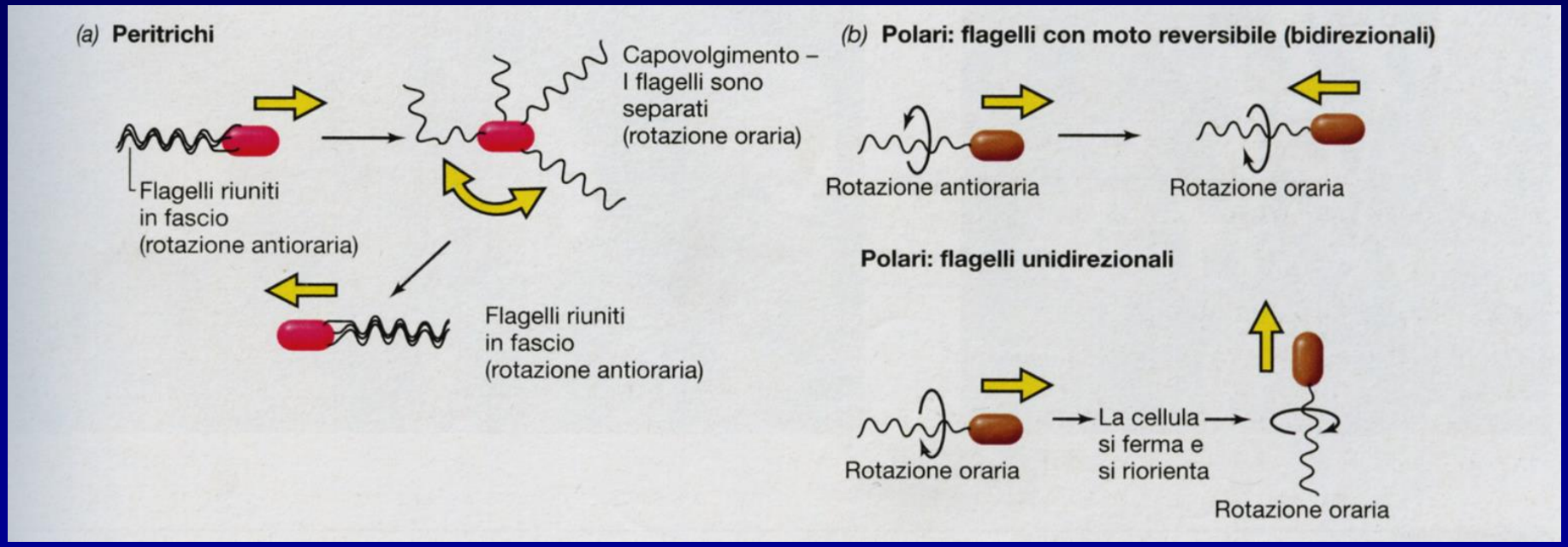
Struttura del flagello



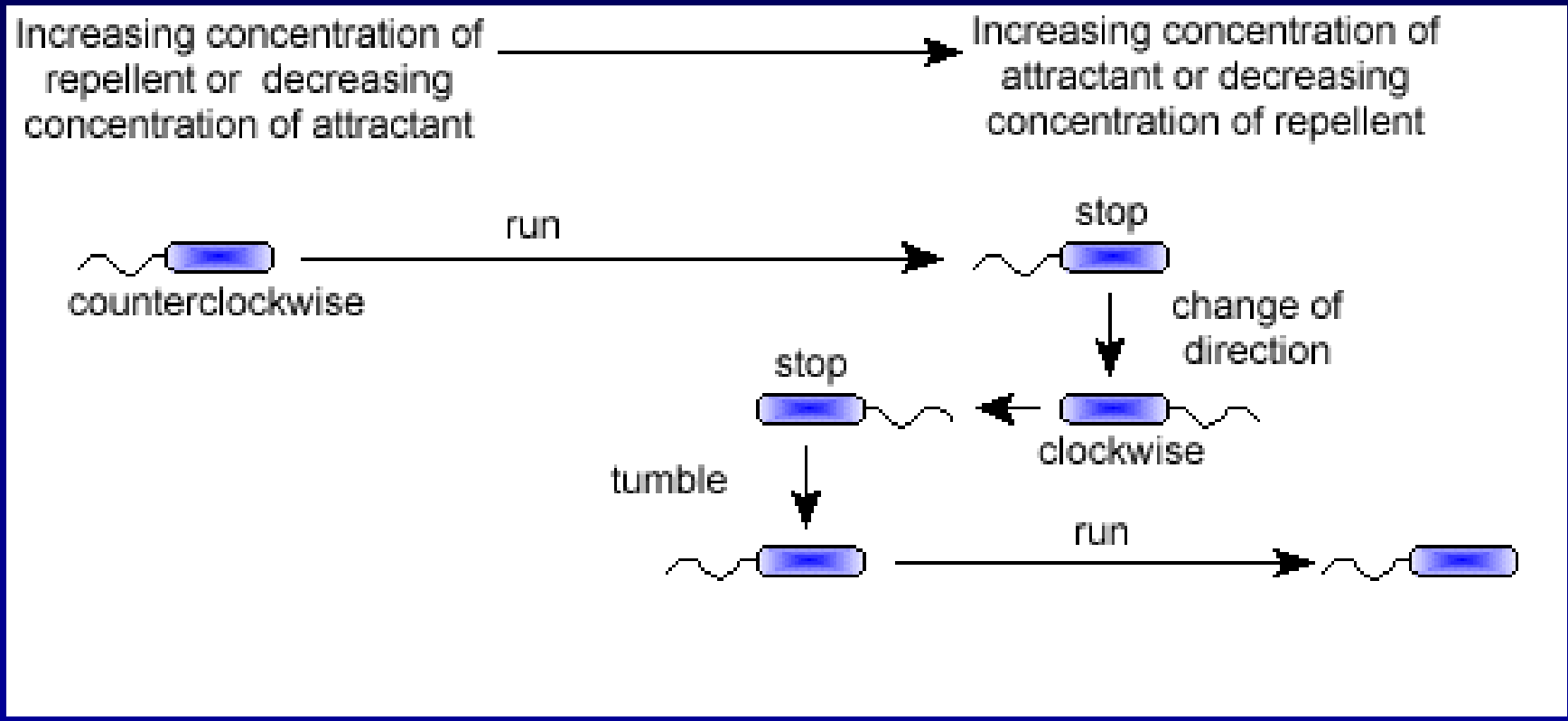
Differenze tra Gram- e Gram+



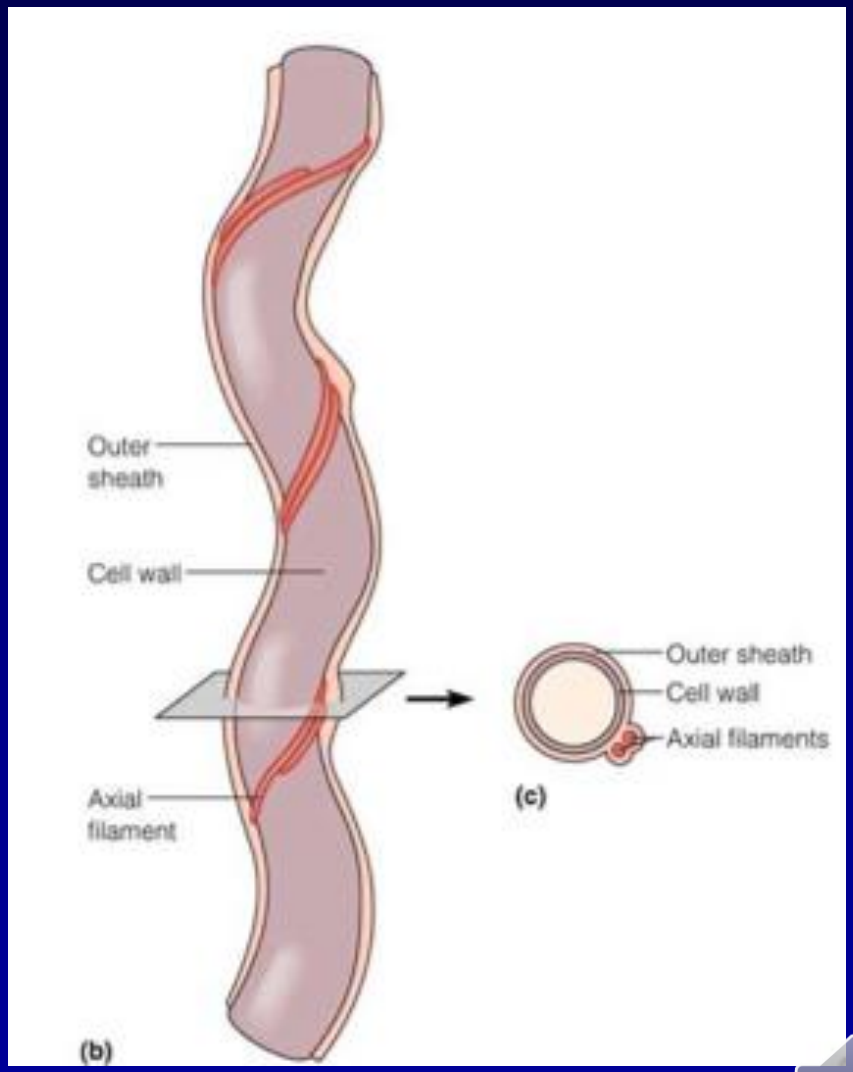
Il flagello è un organo di locomozione



Chemiotassi

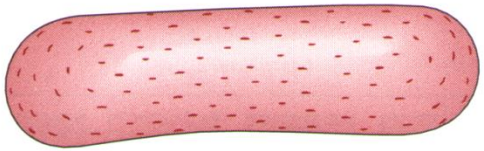


ENDOFLAGELLO



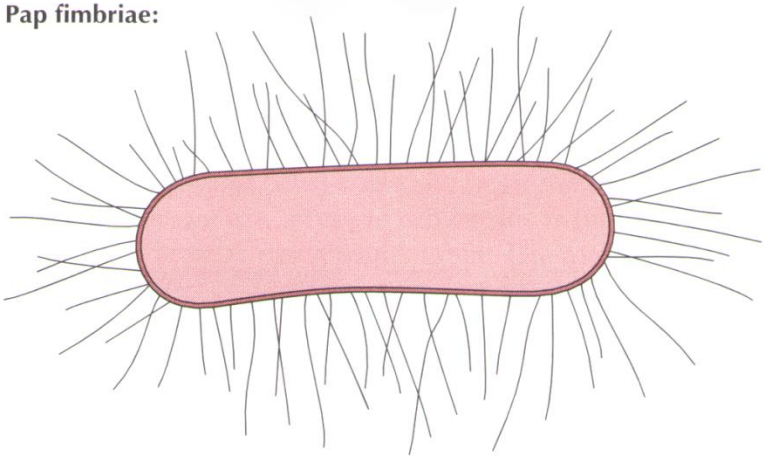
Tipi di fimbriae

Afimbrial adhesion:



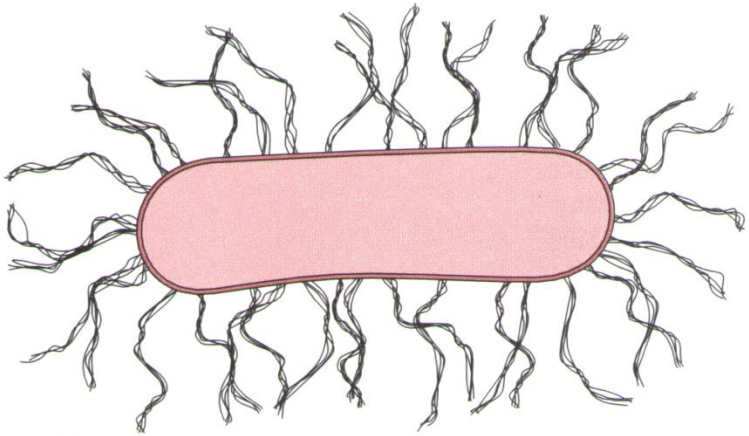
Bald bacterial surface, afimbrial adhesins embedded in surface.

Pap fimbriae:



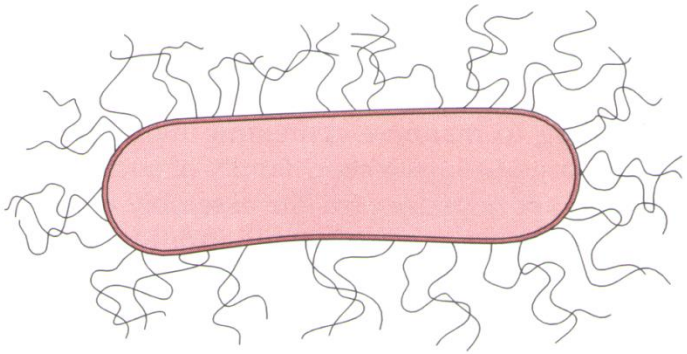
Very hairy surface, thin filaments protruding from surface.

Type IV bundle-forming pilus:



Ropelike structures made of many individual "threads" intertwined; then ropes are tangled.

Curli:



Coiled surface structure intertwined. Not ropelike like type IV. Curved/curled

FLAGELLI E PILI

PROPRIETA'	FLAGELLI	PILI
Presenza nei batteri	Gram+ e Gram–	∗Gram–
Costituente più importante	flagellina (PM 40.000)	pilina (PM 17.600)
Numero e disposizione	variabili	circa 200/cellula (peritrichi) (pilus F: 2-3/cellula)
Ancoraggio alla cellula	corpo basale	?
Classificazione	differenze antigeniche	natura dei recettori emoagglutinazione pilus
Funzione e ruolo (meccanismo di patogenicità)	movimento chemiotassi	adesività (riconoscimento di recettori specifici)

Un tipo speciale di pili (pilus F) è indispensabile alla coniugazione

∗ = nei batteri Gram+ l'acido lipoteicoico è associato a proteine e organizzato in fibrille