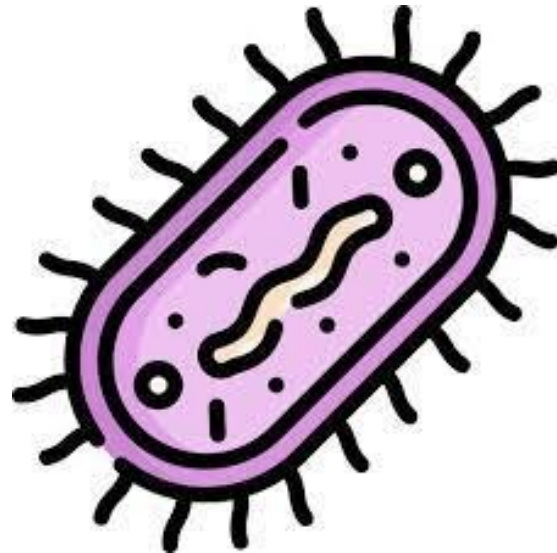




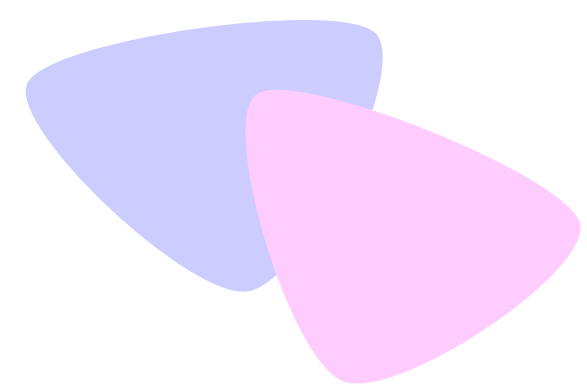
Tema 12

Bacterias Gram Positivas





Temario



→ *Mycobacterium*

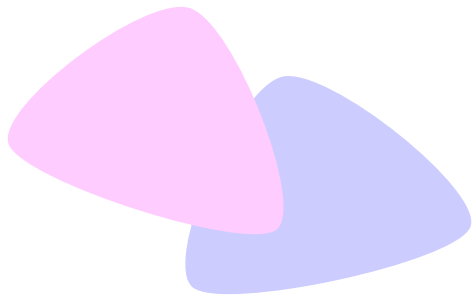
→ *Mycoplasma*

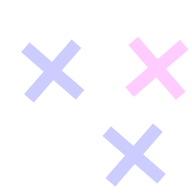
→ *Corynebacterium*

→ *Staphylococcus*

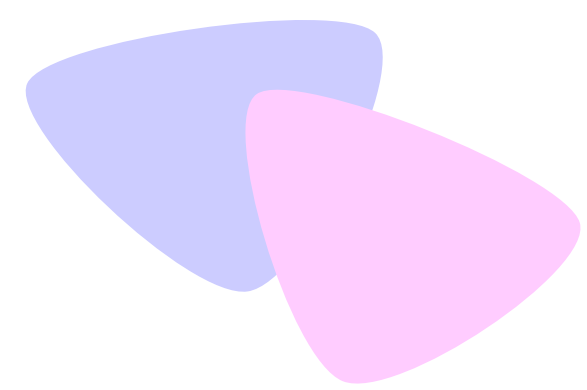
→ *Streptococcus*

→ *Enterococcus*





Mycobacterium



Género

M. bovis

M. avium

M. johnei (paratuberculosis)

Zoonosis

M. leprae

M. tuberculosis

Características

Bacilos

Gram positivo

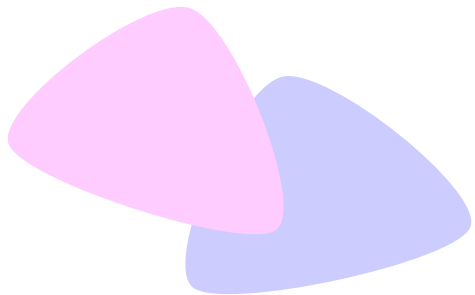
Ácido alcohol resistente

NO esporulado (controversial)

Pleomórfico

No poseen flagelo

0,5 µm ancho





Mycobacterium



Colonia

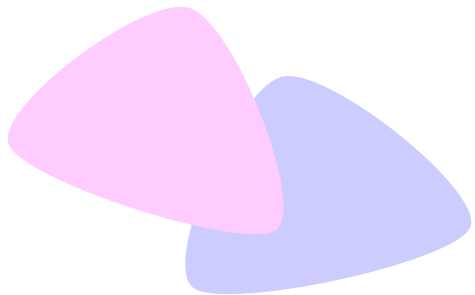
Morfología variable

Opacas y secas

No pigmentadas

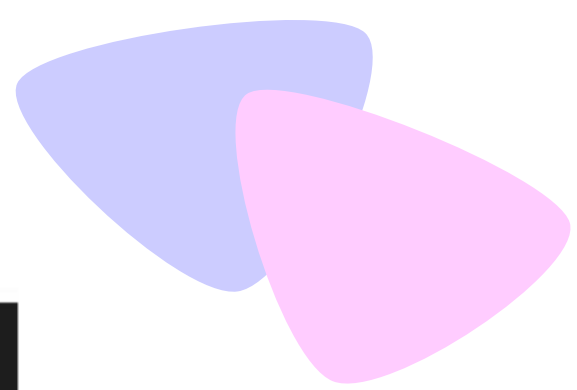
Cápsula (observaciones)

En medio líquido forman
cadenas (factor cuerda)





Mycobacterium



Tinción

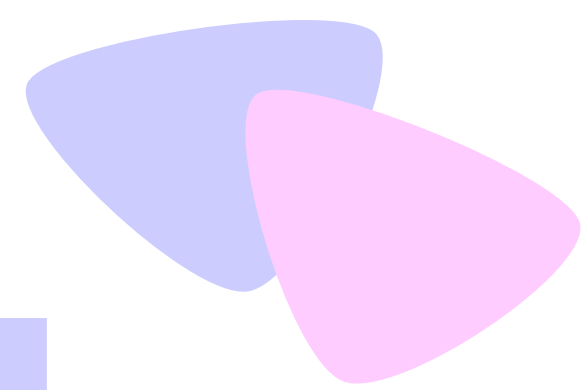
Coloración AAR+
(Ziehl-Neelsen)



Figura 5. Lectura Ziehl Neelsen de *M. tuberculosis*, se observan cordones a 1000X



Mycobacterium



Estructura

Superficie determina:

Característica de colonia

Serología

Susceptibilidad a bacteriófago

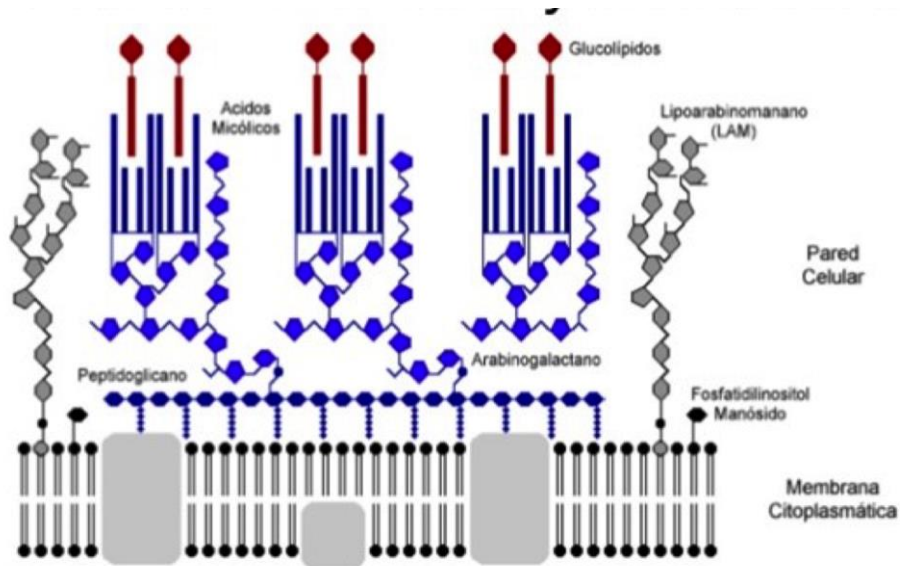
Metabolismo

→ 25 - 40°C

→ Aerobias estrictas / microaerofílico

→ Crecimiento lento / crecimiento rápido

→ Alto contenido GC

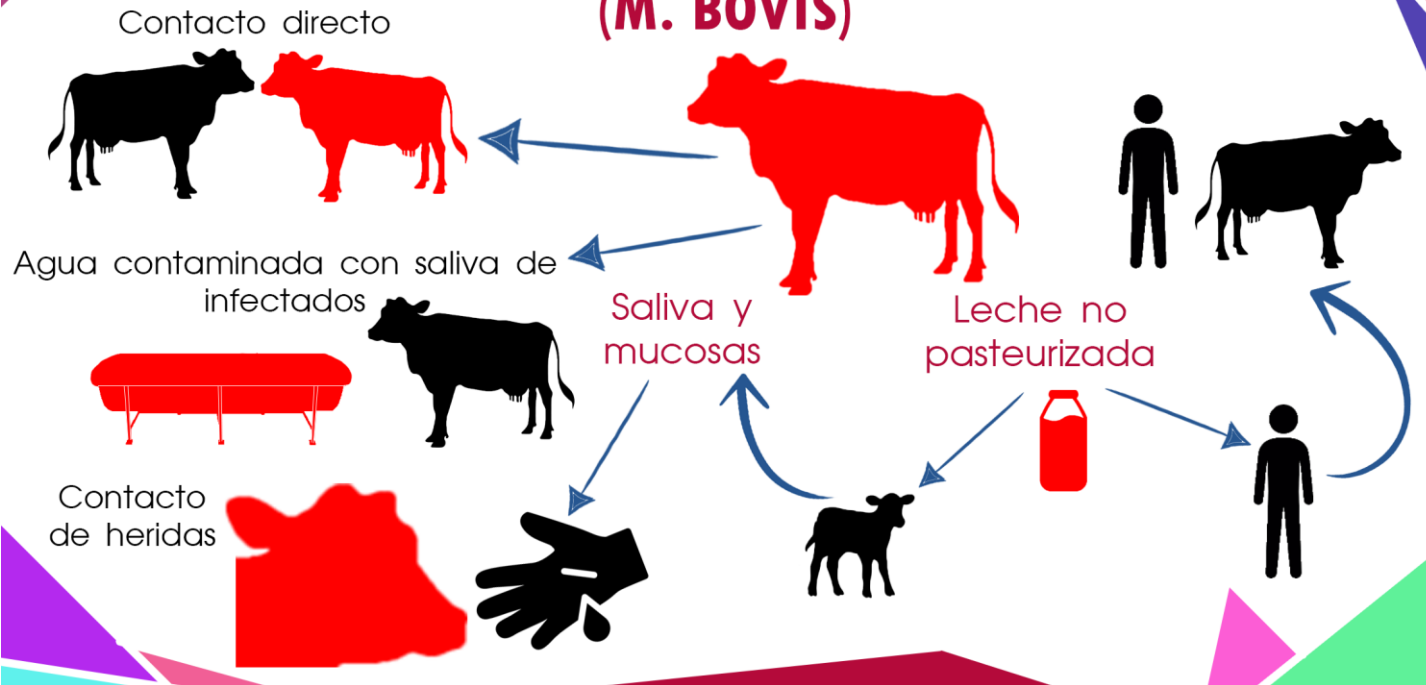


Mycobacterium

Virulencia

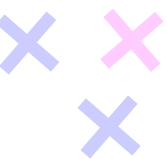
Resistencia

RUTAS DE CONTAGIO DE TUBERCULOSIS (M. BOVIS)

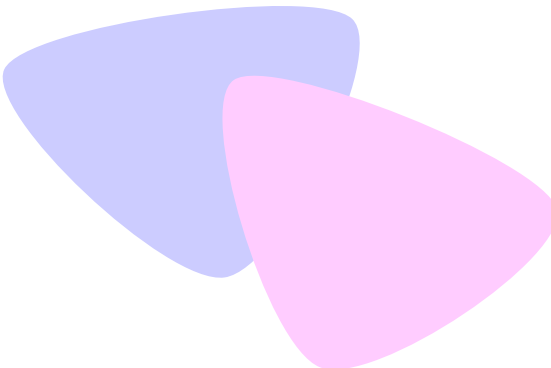


No se recomienda el uso de
ATB en *Mycobacterium*

Isoniacida, rifampicina,
estreptomina, etambutol,
pirazinamida



Mycoplasma



Género

M. mycoides
M. cvipneumoniae
M. gallisepticum
M. hyorhinis
M. hyosynoviae
M. hyopneumoniae
M. pneumoniae
M. bovis genitalum
M. agalactiae

Haemobartonella: *H. felis*, *H. Canis*
Eperythrozoon suis, *E. ovis*
Rickettsias hemotróficas
(hemoplasmas)

Características

Parásitos extracelulares de casi todos los animales
Carecen de pared celular
Tamaño y genoma pequeño
Pleomórficos
Cocoide
0,3 – 0,8 μm
Algunas filamentosas (*mycoides*)
Cápsula (algunas especies)
No coloración de Gram
Giemsa

Zoonosis



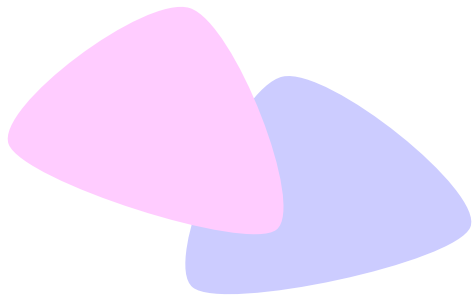
Mycoplasma



Colonia

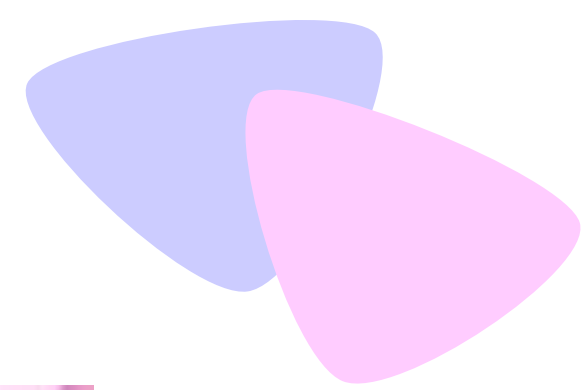
Pequeñas (0,06 – 1 mm)
Forma de “huevo frito”

Aislamiento en medio
enriquecidos y con
requerimientos específicos



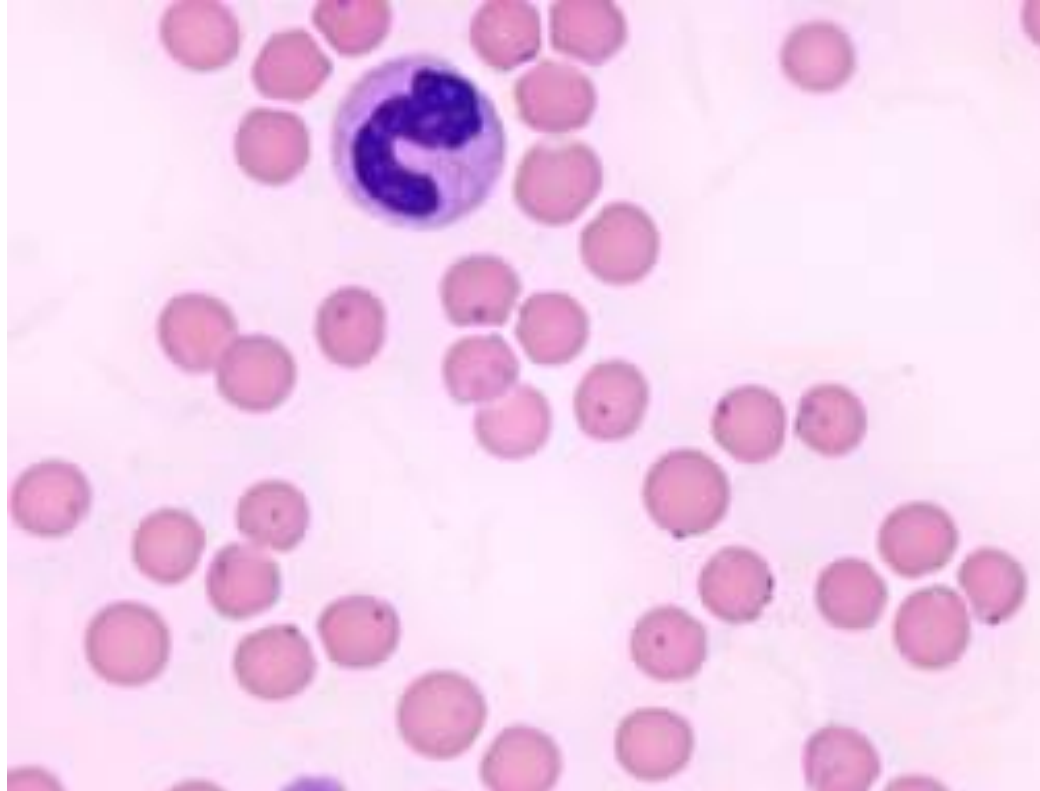


Mycoplasma

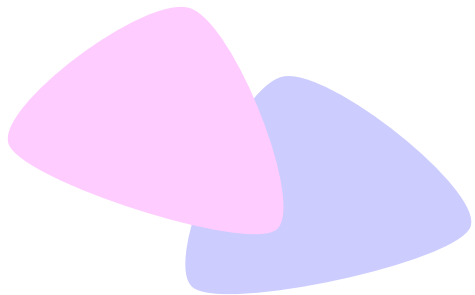


Tinción

Giemsa

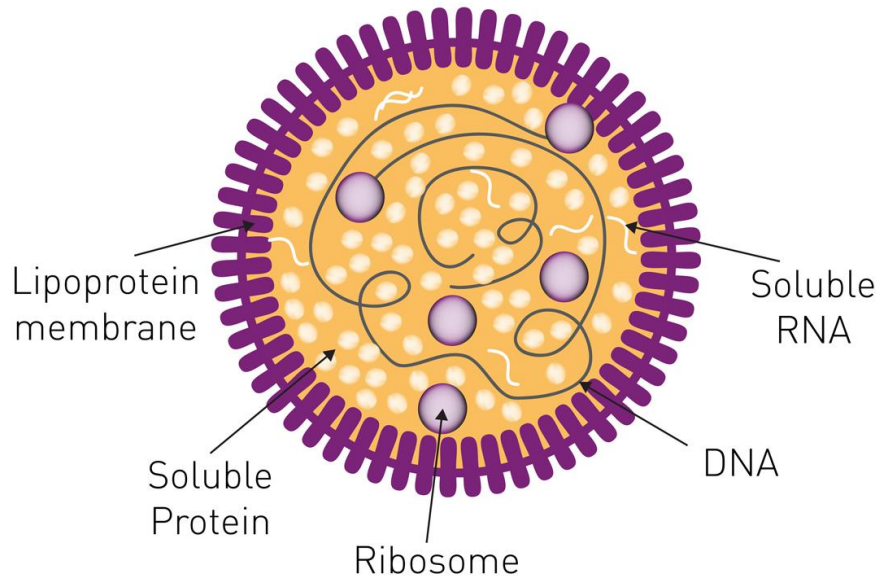


Micoplasmosis felina



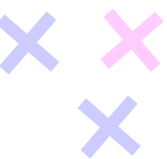
Mycoplasma

Estructura

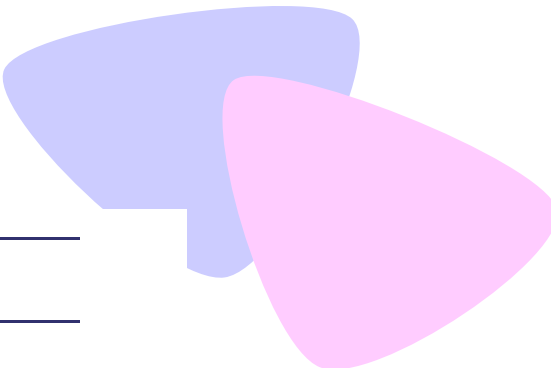


Metabolismo

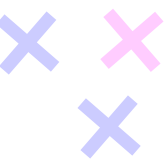
- Crecimiento lento
- 33 – 38°C
- Microaerofílicos
- No pueden sintetizar AA
- pH 6 – 8



Mycoplasma



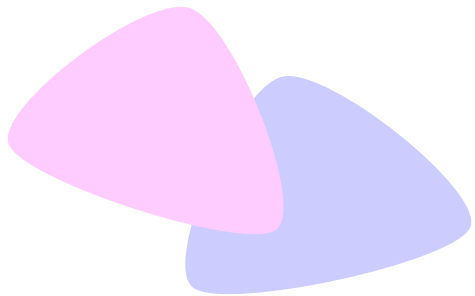
Animal species	Agent	Disease
Feline (cats)	<i>Mycoplasma felis</i>	Conjunctivitis
	<i>Mycoplasma feliminutum</i>	Respiratory disease
	<i>Mycoplasma gatae</i>	Arthritis
Bovine	<i>Mycoplasma alkalescens</i>	Arthritis, mastitis
	<i>Mycoplasma bovigentialium</i>	Infertility, mastitis, seminal vesiculitis
	<i>Mycoplasma bovis</i>	Abscesses, arthritis, mastitis, otitis, pneumonia
	<i>Moraxella bovoculi</i>	Keratoconjunctivitis
	<i>Mycoplasma californicum</i>	Arthritis, mastitis
	<i>Mycoplasma canadense</i>	Arthritis, mastitis
	<i>Mycoplasma dispar</i>	Alveolitis, bronchiolitis
	<i>Mogibacterium diversum</i>	Infertility, pneumonia, vulvovaginitis
	<i>Mycoplasma mycoides ssp. mycoides (SC)</i>	Contagious bovine pleuropneumonia (CBPP)
Avian (chickens)	<i>Mycoplasma wenyonii</i>	Anemia
	<i>Mycoplasma gallisepticum</i>	Respiratory disease
	<i>Mycoplasma synoviae</i>	Airsacculitis, sternal bursitis, synovitis
Canine	<i>Mycoplasma canis</i>	Urogenital tract disease
	<i>Mycoplasma cynos</i>	Pneumonia
	<i>Mycoplasma spumans</i>	Arthritis
Felids (wild cats)	<i>Mycoplasma felifaucium</i>	Respiratory disease
	<i>Mycoplasma leocaptivus</i>	Respiratory disease
	<i>Mycoplasma leopharyngis</i>	Respiratory disease
	<i>Mycoplasma simbae</i>	Respiratory disease



Mycoplasma



Animal species	Agent	Disease
Cat	<i>Mycoplasma haemofelis</i>	Feline infectious anemia
Cattle	<i>Mycoplasma wenyonii</i>	Anemia
Dog	<i>Mycoplasma haemocanis</i>	Anemia
Mice	<i>Mycoplasma coccoides</i>	Anemia
	<i>Mycoplasma haemomuris</i>	Anemia
Sheep	<i>M. ovis</i>	Anemia
Swine	<i>Mycoplasma suis</i>	Anemia



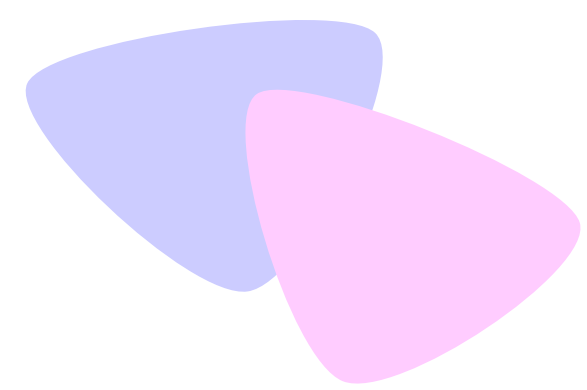
Resistencia

Sensibilidad a tetraciclinas, macrólidos, cefalosporinas, quinolonas, lincosamidas, pleuromutilinas y fluoroquinolonas.

Se ha perdido eficacia a campo – Elección: macrólidos, tiamulina, lincomicina



Corynebacterium



Género

C. pseudotuberculosis

C. renale

Rhodococcus equi

Características

Bacilos - cocoides

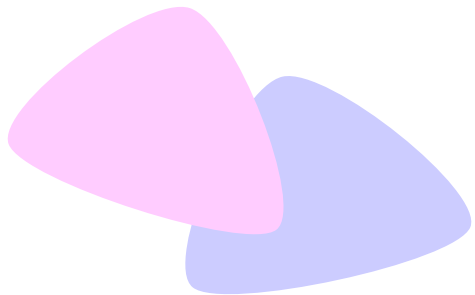
Gram positivo

NO esporulado

Pleomórfico

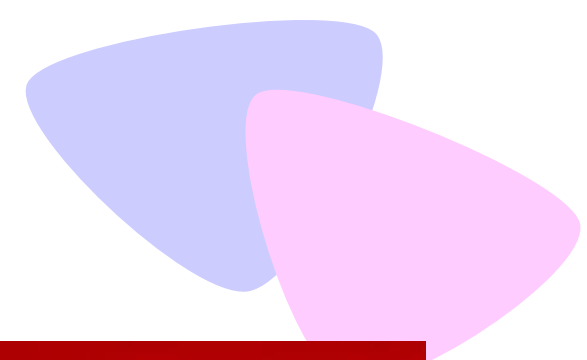
No móvil

0,5 – 3 μm



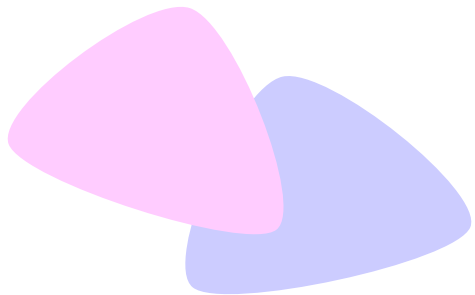


Corynebacterium



Colonia

1 mm diámetro
Hemolítica
Brillosas – blancas
Compactas

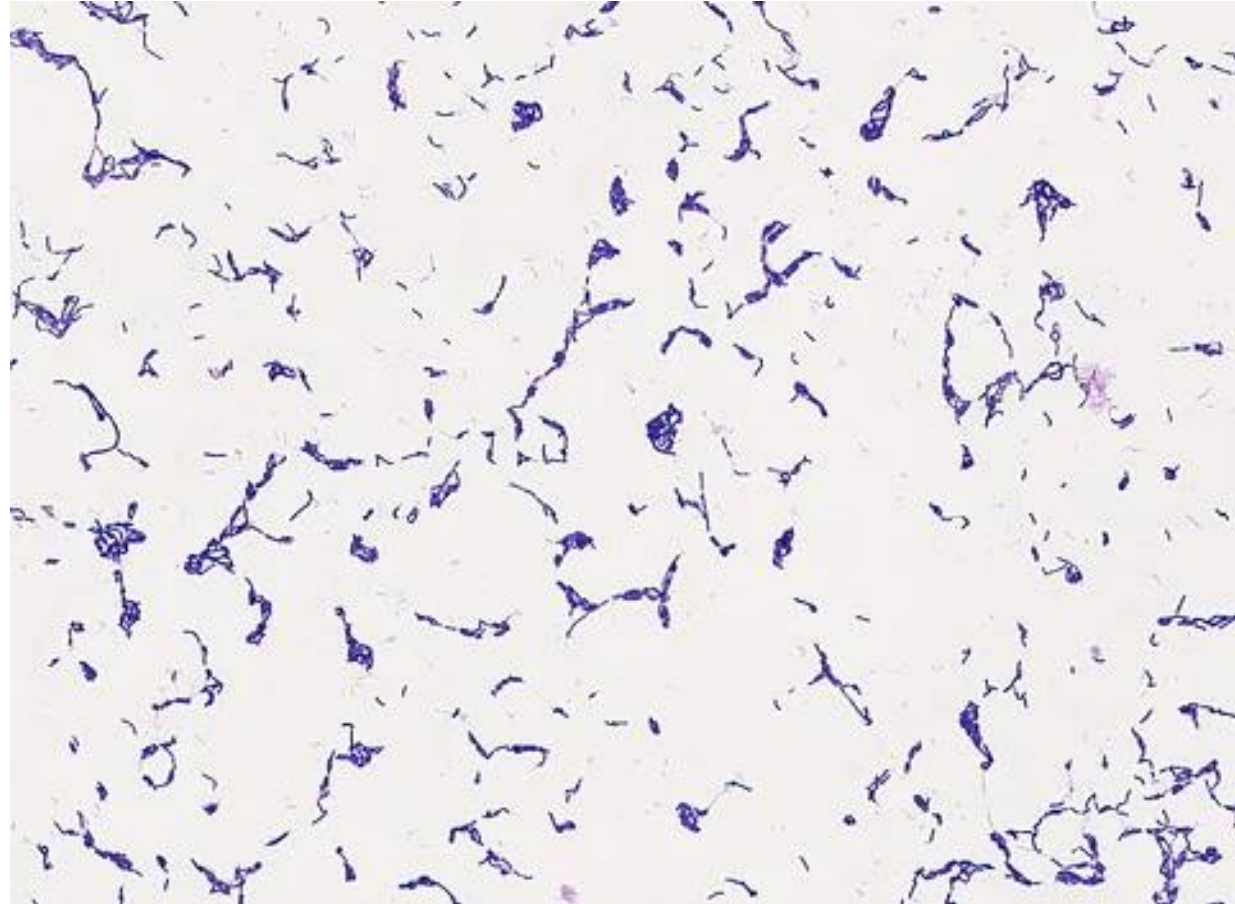




Corynebacterium

Tinción

Gram positivo





Corynebacterium

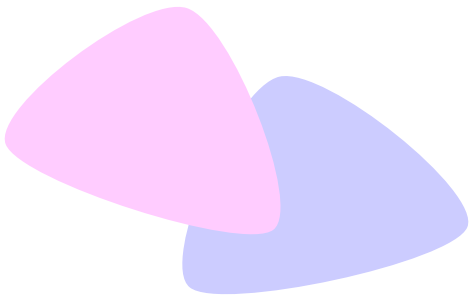


Metabolismo

- 35 - 37°C
- Anaerobio facultativo
- 48 h de crecimiento en agar sangre
- Alto contenido GC
- pH 7 – 7,2
- Catalasa y ureasa positiva

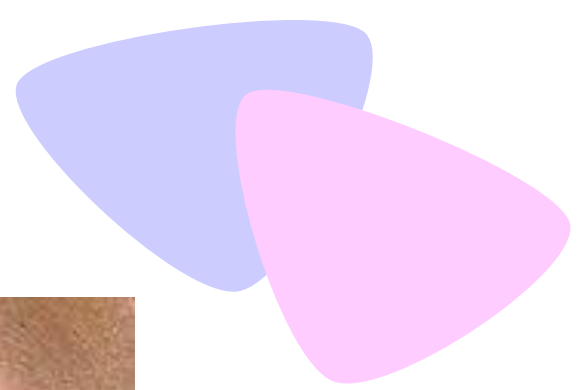
Resistencia

Sensibles a beta-lactamicos, eritromicina, cloranfenicol, lincomicina, tetraciclina, penicilinas





Corynebacterium

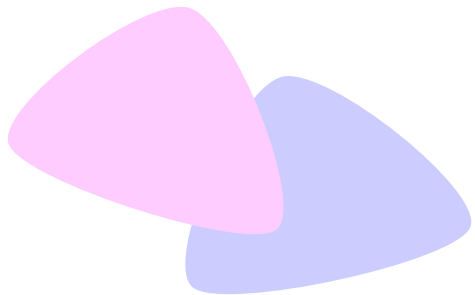


Infecciosas humanas

C. diphtheriae

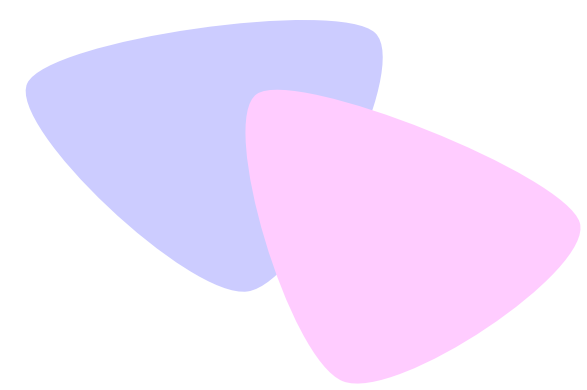
C. ulcerans

Producen exotoxinas – Toxina diftérica
Toxina A-B y un factor de virulencia





Staphylococcus

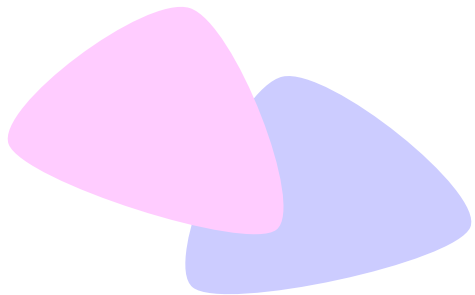


Género

S. aureus
S. intermedius
S. epidermidis

Características

Cocos
Gram positivo
NO esporulado
Poseen *slime*
No móvil
0,5 – 1,5 μm
S. aureus - produce toxinas





Staphylococcus



Colonia

3-5 mm diámetro

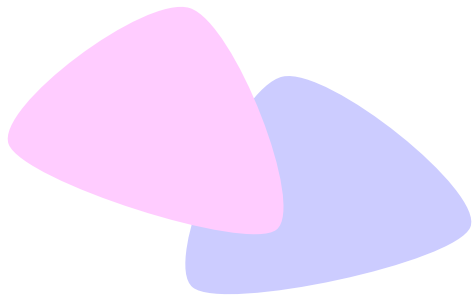
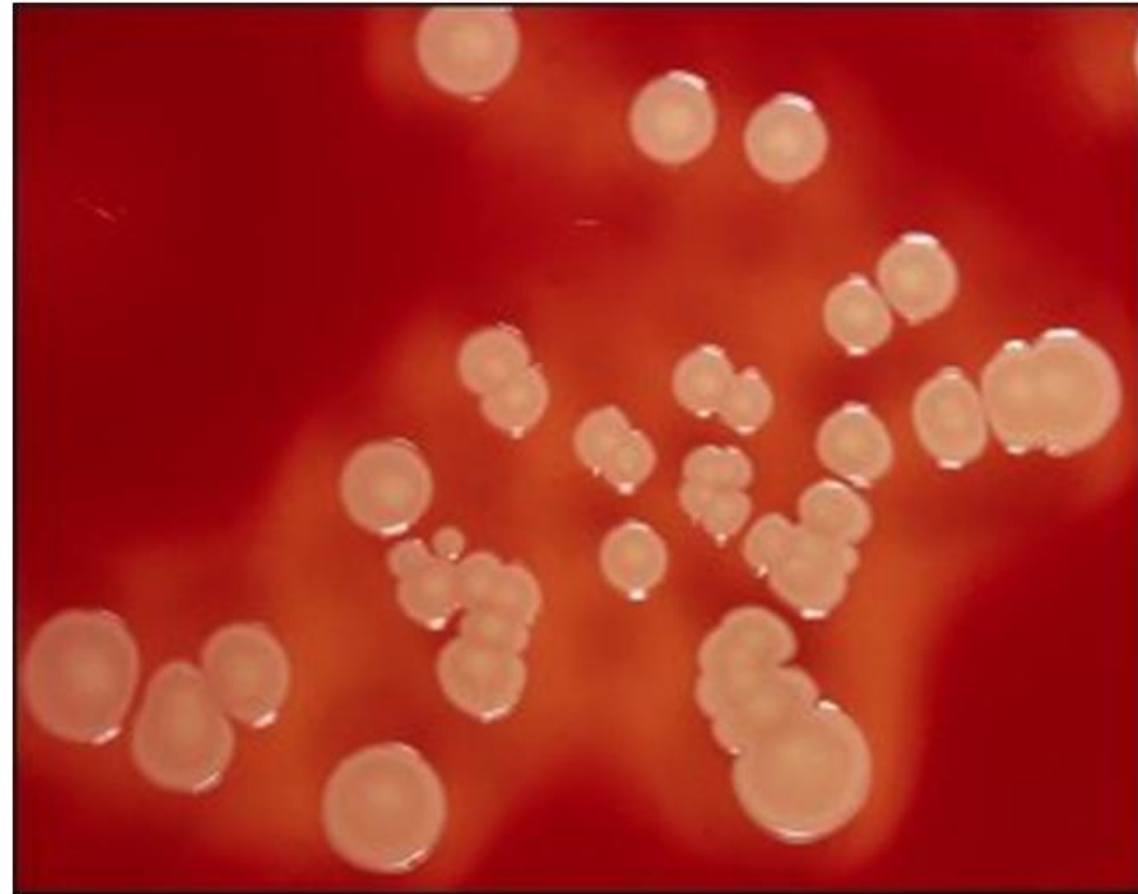
Color oro o no-pigmentada

Medios con alto contenido de sal (7,5% NaCl)

Crecimiento en 24 h

Colonias lisas, cremosas

Pigmentadas





Staphylococcus

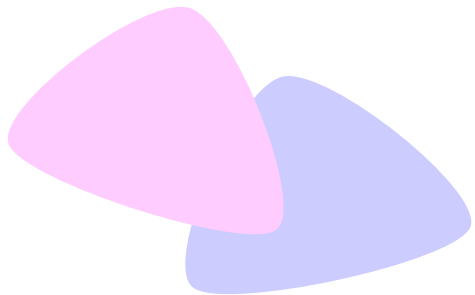


Tinción

Gram positivo

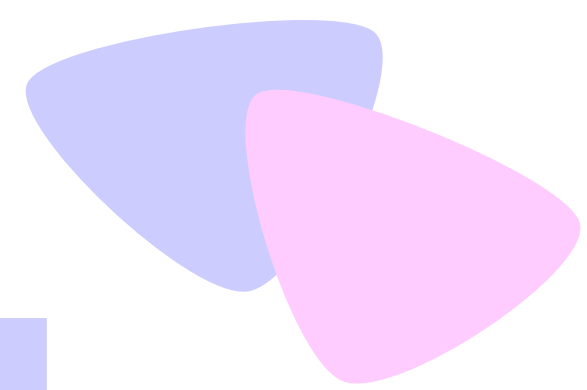


ASM MicrobeLibrary.org © Smith





Staphylococcus

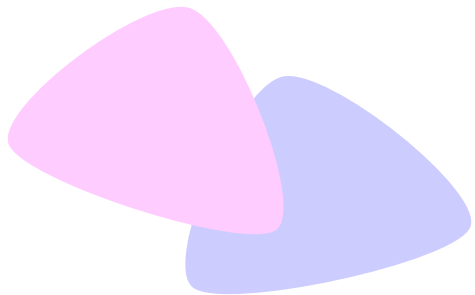


Resistencia

Resistentes a penicilina,
metecilina (vancomicina)

Metabolismo

- Anaerobios facultativos (algunos microaerófilicos y anaeróbicos)
- Actividad coagulasa
- 35 – 40°C
- pH 7 – 7,5
- Soportan NaCl hasta 15 %



Staphylococcus

Test coagulasa

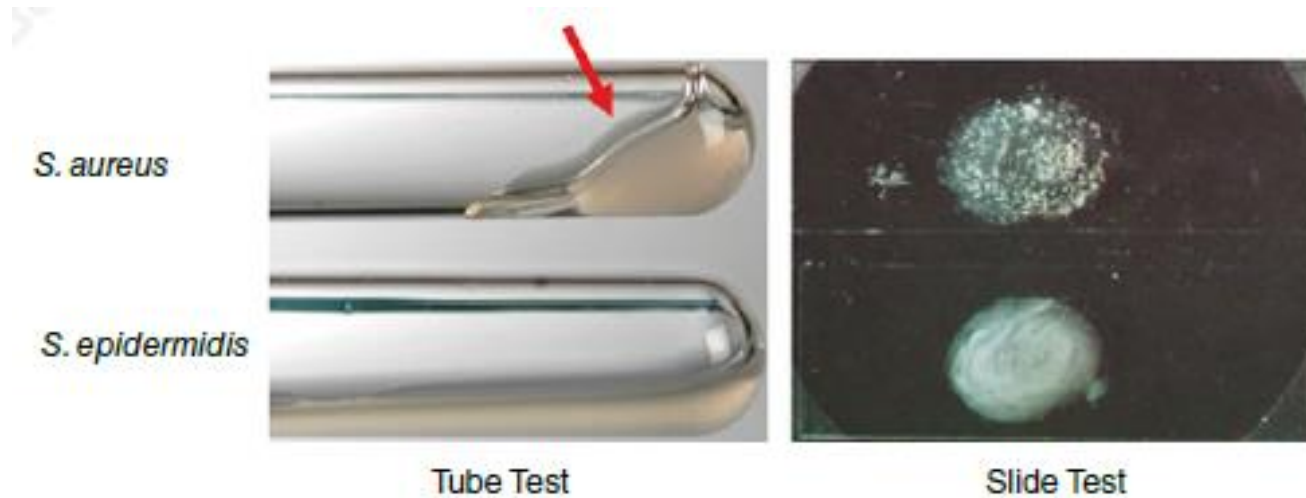


Figure 25.2 The “coagulase” tube and slide tests with the coagulase-positive *Staphylococcus aureus* and coagulase-negative *Staphylococcus epidermidis* strains. The left panel shows the results of the tube test, which measures production of coagulase or von Willebrand factor binding protein. The organisms are inoculated into tubes containing rabbit plasma, and following incubation, a positive result is indicated by the formation of a fibrin clot (denoted by the arrow in the upper tube). With the slide agglutination test (right-hand panel), the rabbit plasma is placed on a glass microscope slide and the bacteria are emulsified into the plasma. *S. aureus* expresses fibrinogen-binding proteins on its surface, and the binding to fibrinogen in plasma results in a visible clumping of the bacteria. The clumping-factor-negative *S. epidermidis* remains uniformly suspended in the plasma.

Staphylococcus

Toxina hemolítica

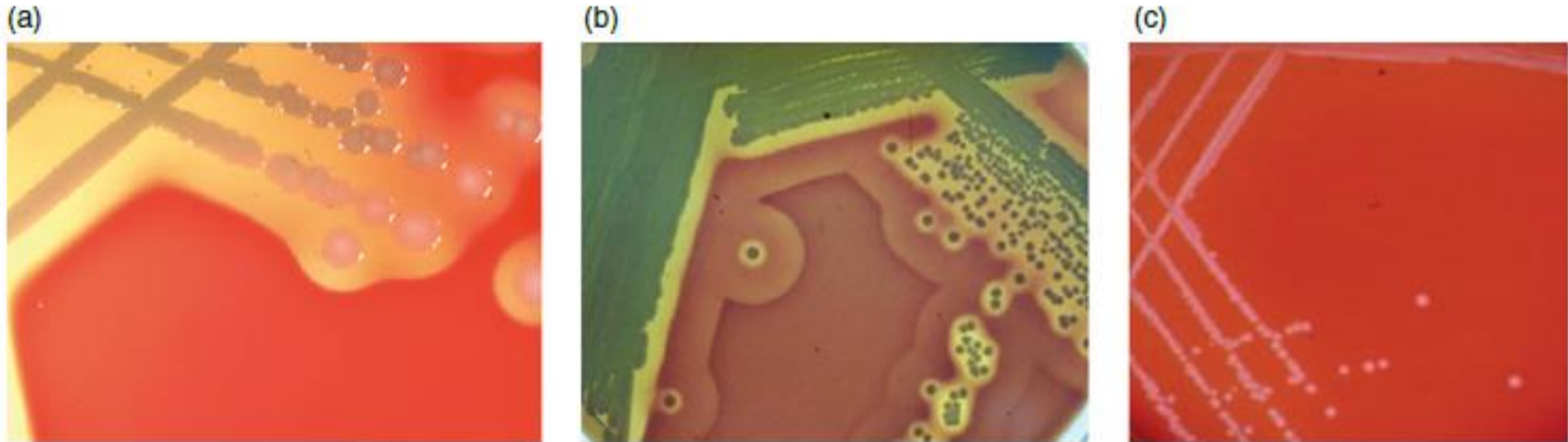
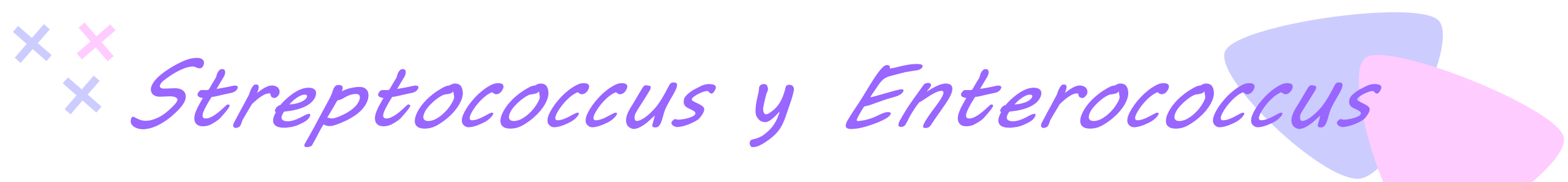


Figure 25.1 Sheep blood agar plate cultures of *Staphylococcus aureus* strains exhibiting the α -toxin mediated complete zone of hemolysis (panel A) or the double zones of hemolysis with the narrow complete zone from α -toxin production and the larger incomplete zone resulting from the production of β -toxin (panel B). In panel C is a culture of the non-hemolytic *Staphylococcus epidermidis*.



Streptococcus y Enterococcus

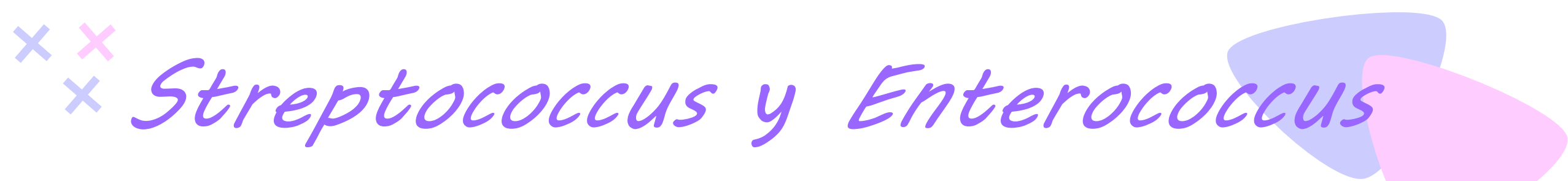
Género

S. pyogenes
S. agalactiae
S. dysgalactiae
S. equi
S. equisimilis
S. zooepidemicus

E. faecalis

Características

Cocos
Gram positivo
 α -hemolíticos $\rightarrow$ no lisan eritrocitos
 β -hemolíticos $\rightarrow$ lisan eritrocitos
 γ -streptococcus $\rightarrow$ no son hemolíticos
1 μ m
Cápsula (*Enterococcus*)
Pili (*Enterococcus*)



Streptococcus y Enterococcus

Clasificación

Piógenos: usualmente beta-hemolíticos. Causan infecciones piógenas

Orales: comensales en piel y mucosas. Alfa o no hemolíticos

Lácticos: asociado a la leche o productos diarios (actualmente *Lactococcus*)

Enterococcus: flora normal intestinal, patógenos oportunistas

Anaeróbicos: las especies anaeróbicas o microaerofílicas

Streptococcus y Enterococcus

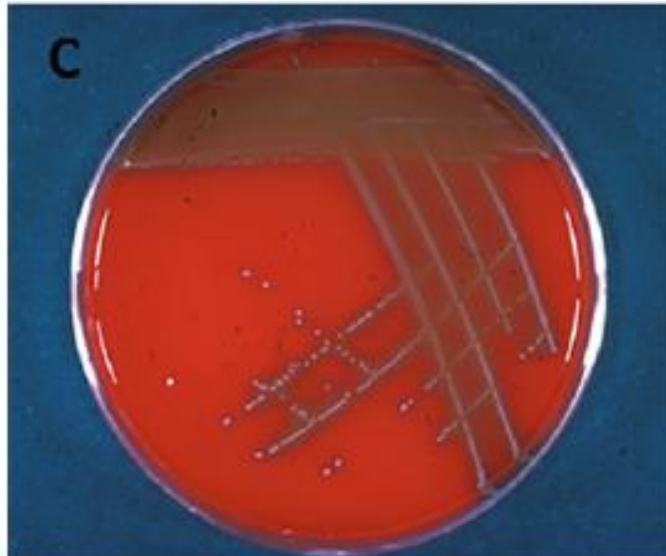
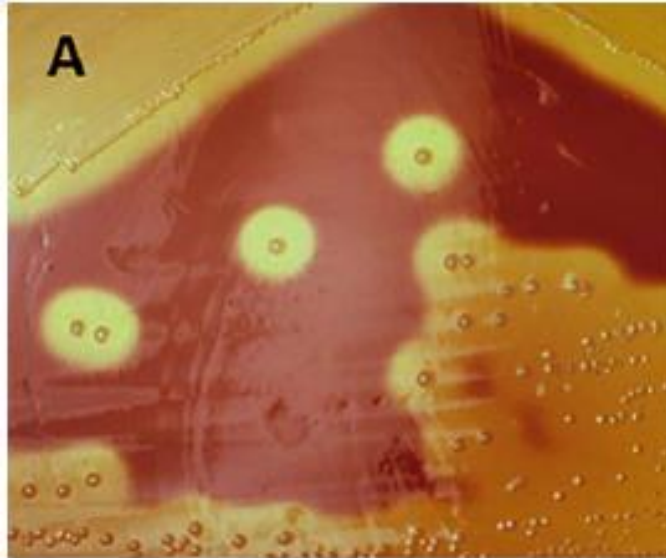
Colonia

1 mm diámetro

Colonias mucosas

Color claro-blanco

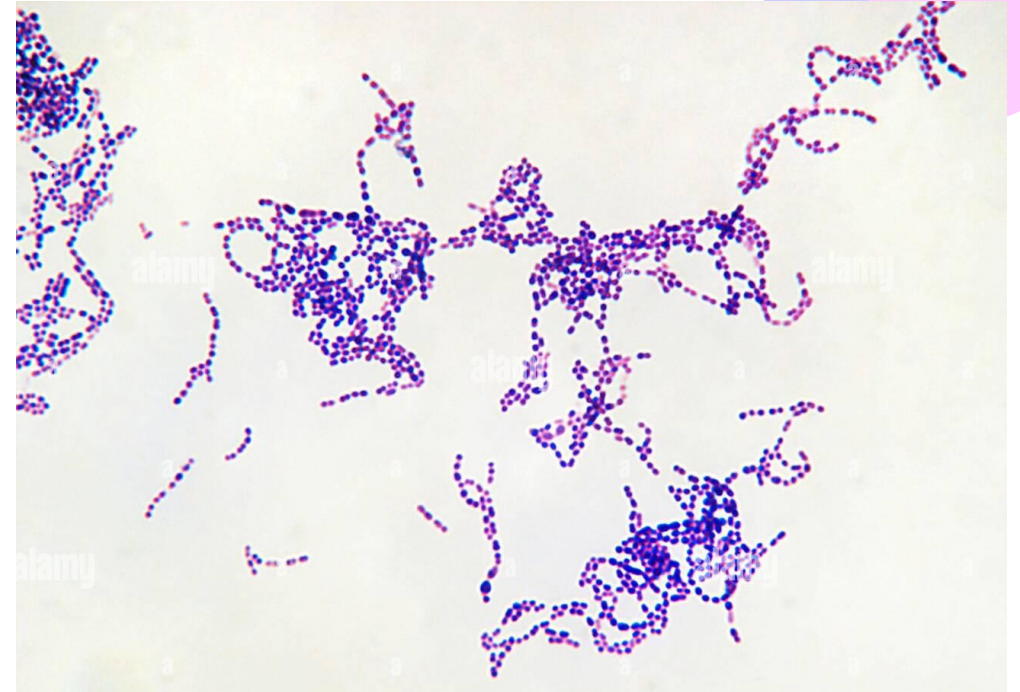
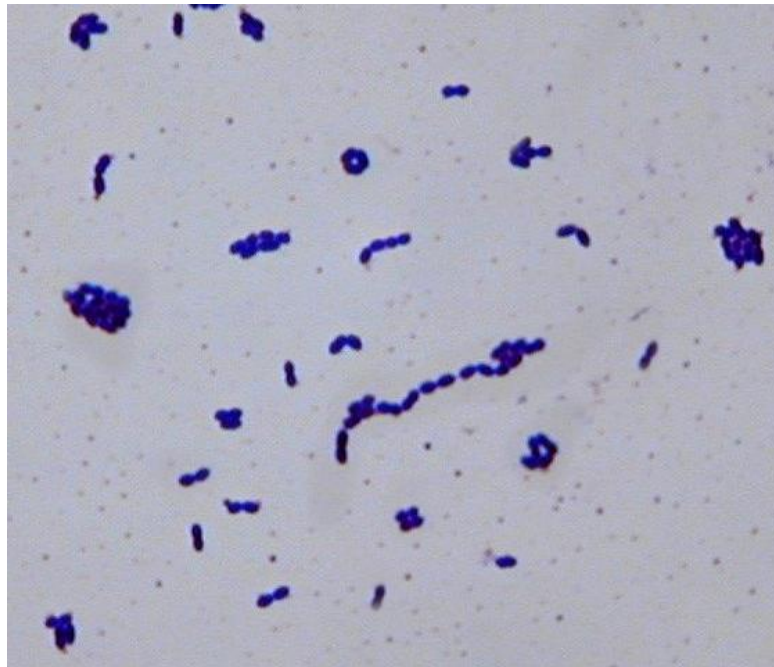
Capacidad de crecimiento en
medios específicos (6,5% NaCl,
40% bilis, azul de metileno)

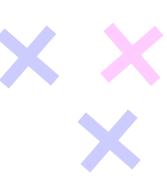


Streptococcus y Enterococcus

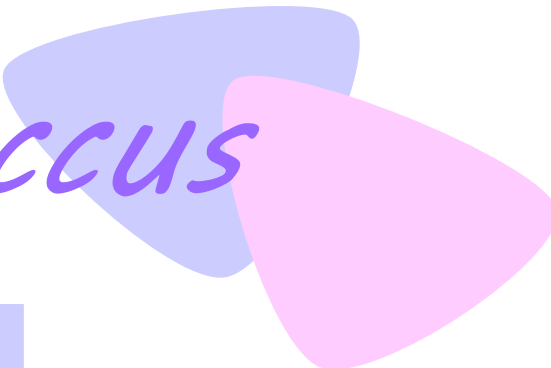
Tinción

Gram positivo





Streptococcus y Enterococcus



Resistencia

Tetraciclina, benzylpenicilina,
streptomycin, kanamicina,
eritromicina

Beta-lactámicos (*Enterococcus*)
Vancomicina

Metabolismo

- Catalasa negativos
- Fermentativos obligados
- Anaerobios facultativos (*Enterococcus*)
- Pueden crecer en presencia de oxígeno, pero no respiran
- 37 °C / 10 – 45°C (*Enterococcus*)
- Crecen en elevados niveles de CO₂



Muchas gracias por su atención