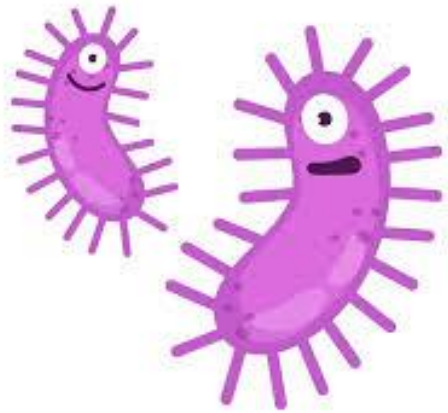
Tema 13

Bacterias Gram negativo



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Temario

Género *Coxiella*

Género *Actinobacillus*

Género *Haemophilus*

Género *Mannheimia*

Género *Pasteurella*

Género *Pseudomonas*

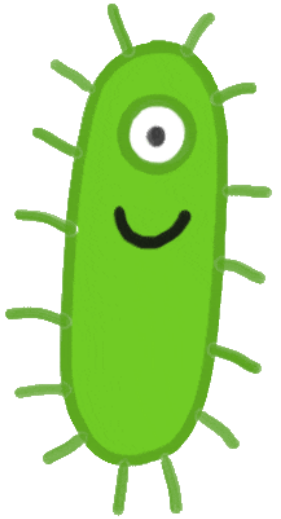
Género *Moraxella*

Género *Dichelobacter nodosus.*

Género Fusobacterium necrophorum

Género *Chlamydia*

Género *Leptospira*



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Coxiella

Género *Coxiella burnetii*

Características

Gram negativa
Afecta a macrófagos
Coco o bastón corto
Giemsa
Aeróbicos
Medio común

ZOONOSIS
Fiebre Q
Primer brote en 2022
1 sola bacteria es suficiente para producir enfermedad

Bovino, ovino, caprino
Puede sobrevivir largos períodos en el ambiente

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Coxiella

Resistencia

Vive en medios ácidos

Tx
Tetraciclina
Cloranfenicol
Enrofloxacina

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Actinobacillus

Género

Actinobacillus pleuropneumoniae	Pleuroneumonía porcina
A. suis	Enfermedad respiratoria porcina y equina
A. equuli	Septicemia neonatal equina
A. lignieressi	Proceso piogranulomatosas (Wood tongue)
A. seminis	Orquitis/epididimitis
A. capsulatus	

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Actinobacillus

Características

Gram negativo
NO AAR
Cocobacilos
Anaerobios facultativos – microaerófilos
Inmóviles
NO esporulan
Oxidasa positivo
Ureasa positivos

Colonia

Grises
Traslúcidas
Pegajosas
Cerosas
Adherencia
No hemolíticas (mayoría)
Medios enriquecidos
5% CO2

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Actinobacillus

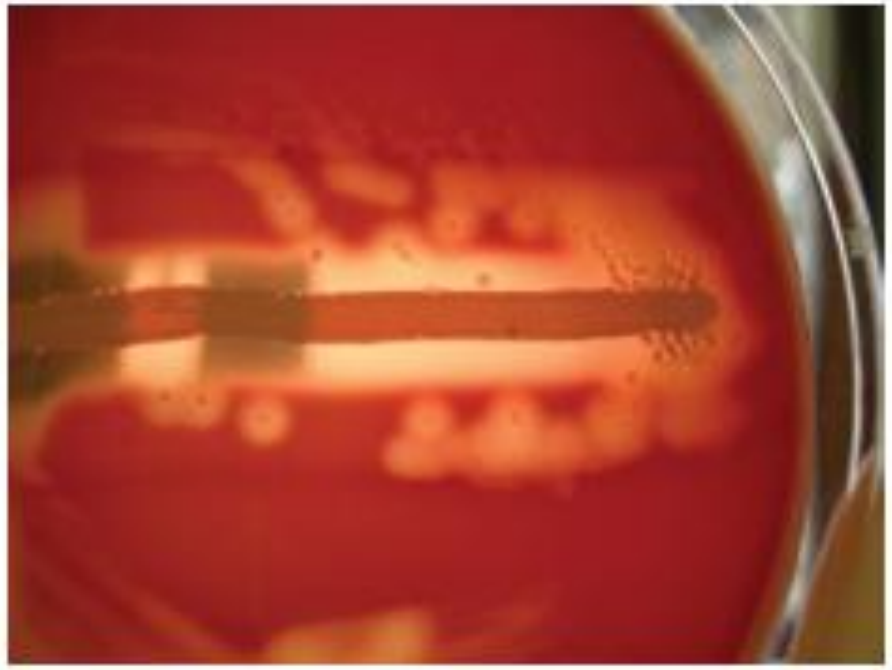

Figure 11.1 A primary culture of *Actinobacillus pleuropneumoniae* from a lung lesion shows both satellitism (NAD-dependence) and CAMP effect (co-hemolysin) visible around a central streak of β-toxin producing *Staphylococcus*, on sheep blood agar after 24 hours at 37 °C.

Virulencia

Adhesinas
Cápsula
Biofilm
Toxinas
Ureasa
Proteasas

Resistencia

Uso indiscriminado de ATB

Tx
Penicilina G
Tetraciclina
Gentamicina
Otros

UCSF FCA

Haemophilus y Histophilus

Género

Table 12.1 Some members of the genera Haemophilus and Histophilus of importance in animal disease.

Genus and species	Associated disorder or site
Canicola (formerly Haemophilus) *haemoglobinophilus*	Cystitis, vaginitis, and balanoposthitis in dogs; neonatal infection of puppies
Glaesserella (formerly Haemophilus) parasuis[a]	Fibrinous polyserositis, polyarthritis, and meningitis (Glässer's disease) in swine; respiratory disease in swine
Haemophilus aegyptius	Meningoencephalitis in sheep
Haemophilus paracuniculus	Mucoid enteritis in rabbits
Haemophilus parahaemolyticus	Respiratory disease in swine
Haemophilus parainfluenzae	Respiratory disease in rabbits and guinea pigs
Histophilus somni[a]	In ruminants: respiratory disease, bacteremia/septicemia, myocarditis and pericarditis, reproductive infection and abortion, septic polyarthritis, thrombotic meningoencephalitis (TME), suppurative meningitis

[a] Organisms that cause disease of particular importance, as defined by relatively frequent identification of infection and relative severity of disease associated with infection.

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Haemophilus y Histophilus

Características

Gram negativo
Cocobacilos
Anaerobios facultativos
Inmóviles
NO esporulan
Oxidasa positivo
Tiene LOS en lugar de LPS

Colonia

Turbidez en medios líquidos
Medios Enriquecidos

Virulencia

Ibp A (Inmunoglobulin Binding Protein A)
Biofilm

Resistencia

Por ser Gram negativo

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Mannheimia

Género

Mannheimia haemolitica

Características

Gram negativo
Cocobacilos
Anaerobios facultativos
Inmóviles
NO esporulan
Oxidasa positivo
Cápsula

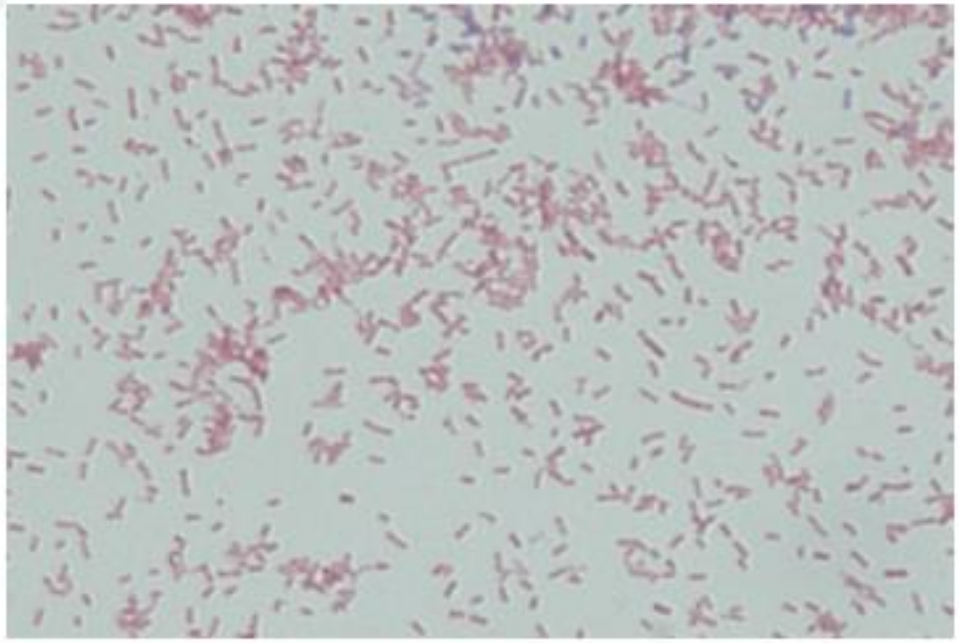

Figure 10.1 *Mannheimia haemolytica*, gram stain.

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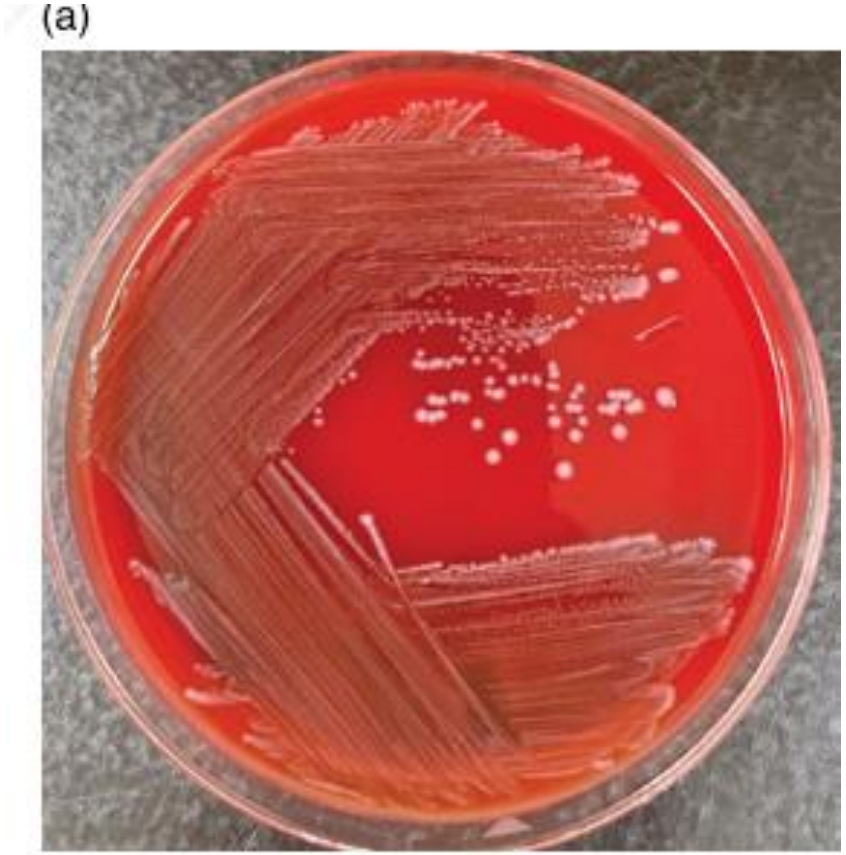
Mannheimia

Colonia

Medios enriquecidos (suero/ sangre)
35-37°C
Claras a grisáceas
Lisas o mucosas
Hemolisis



Virulencia

Adhesinas
Toxinas

Resistencia

Penicilina – Tetraciclina – Macrólidos

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Pasteurella

Género

Pasteurella multocida

Características

Gram negativo
Cocobacilos
Anaerobios facultativos
Inmóviles
NO esporulan
Oxidasa positivo
Cápsula

Similar a *Mannheimia* por ser la de misma familia

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Pasteurella

Colonia

Medios enriquecidos (suero/ sangre)
35-37°C
Claras a grisáceas
Lisas o mucosas
Hemolisis

Virulencia

Adhesinas
Leucotoxina
Toxina Dermonecrótica

Resistencia

Penicilina – Tetraciclina – Macrólidos

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Pseudomonas

Género

Pseudomona aeruginosa

Características

Gram negativo
Bacilos
Aerobios estrictos
Móviles
NO esporulan
Cápsula
Producen pigmentos

Table 18.1 Morphological and biochemical features of *Pseudomonas aeruginosa*.

Features	*Pseudomonas aeruginosa*
Colonial morphology on blood agar	>1 mm, gray (gunmetal), and flat with serrated edges
Diffusible pigment production	Positive
Colony odor	Grape-like
Growth at 42 °C	Positive
Motility	Positive
Catalase	Positive
Oxidase production	Positive
Indole production	Negative
Methyl red test	Negative
Voges–Proskauer test	Negative
Citrate test	Positive
Oxidation of:	
Glucose	Positive
Lactose	Negative
Sucrose	Negative

Adapted and modified from *Veterinary Microbiology and Microbial Disease* (second edition).

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Pseudomonas

Colonia

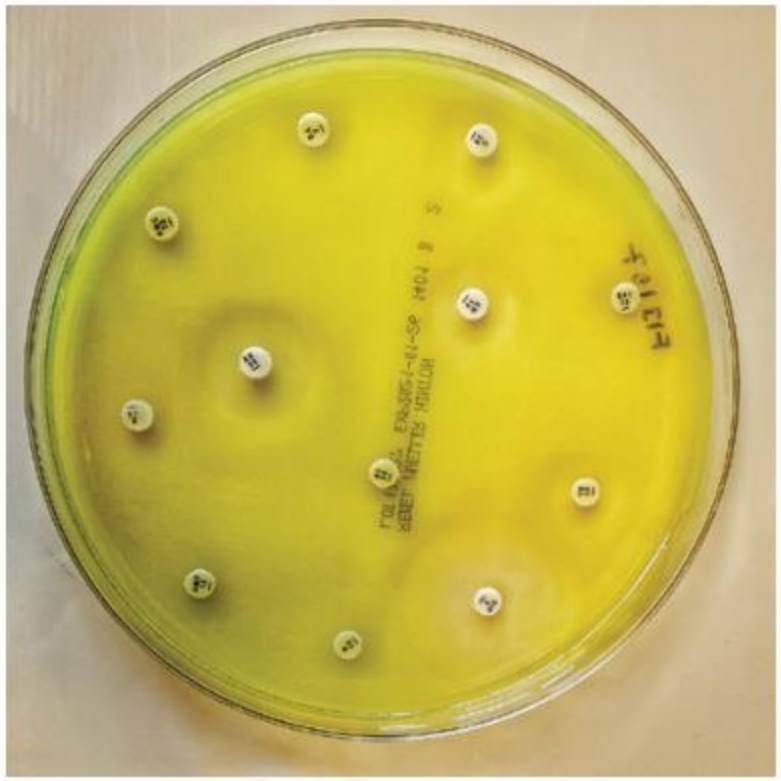

Figure 18.2 Pyoverdin pigment (fluorescent green) produced by *Pseudomonas aeruginosa* on a Muller Hinton Agar.

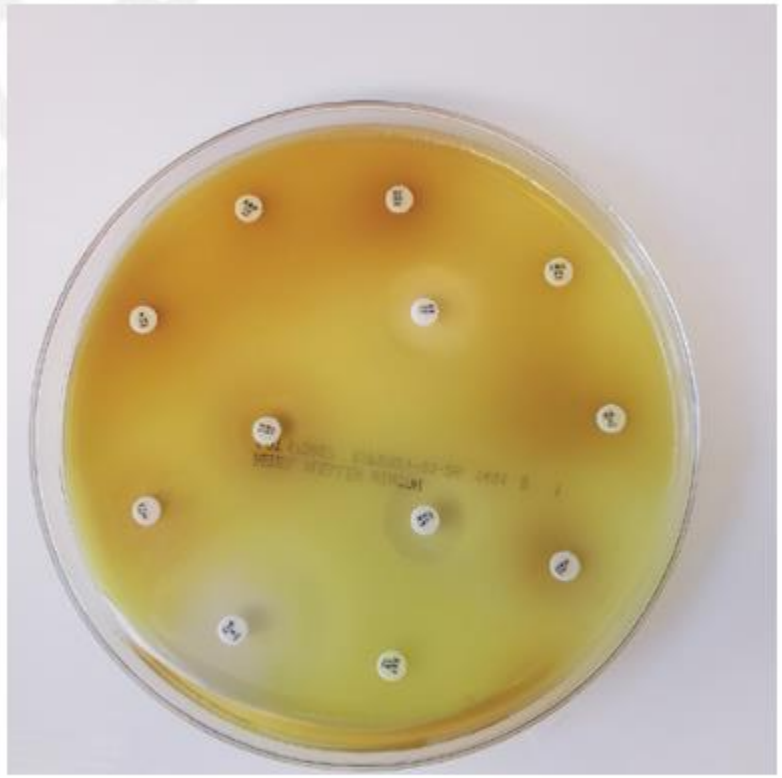

Figure 18.3 Pyorubin pigment (reddish brown) produced by *Pseudomonas aeruginosa* on a Muller Hinton Agar.

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Pseudomonas

Virulencia

Contaminaciones secundarias
Adhesinas
Biofilm
Toxinas
- Exotoxina A
- Fosfolipasa C
- Elastasa
- Proteasa

Gel (previene la fagocitosis)

Resistencia

Saben evadir el sistema inmune

Intrínseca
- Impermeabilidad
- Eflujo
- β Lactamasa
- Aminoglucosidasa

Adquirida
- Mutación (Quinolonas)
- Plásmidos

Adaptativa
- Biofilm (Tobramicina, Gentamicina, Ciprofloxacina)

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Pseudomonas

Moraxella

Género

B. Isolated from lesions in pure culture			
M. bovis	Cattle	Ocular surface	Infectious bovine keratoconjunctivitis
M. bovoculi	Cattle	Ocular surface	Infectious bovine keratoconjunctivitis
	Horses		Conjunctivitis
M. ovis	Sheep	Ocular surface	Conjunctivitis
M. ovis[a], *M. bovis*	Mule deer, moose	Ocular conjunctiva	Keratoconjunctivitis*
M. caprae	Goat	Ocular surface	Infectious keratoconjunctivitis
Moraxella lacunata	Elk, eland	Lung	Pulmonary abscess, considered rare, also a human pathogen
Moraxella catarrhalis	Cynomolgus macaque (*Macaca fascicularis*)	Nasal cavity	"Bloody nose syndrome," sneezing, epistaxis and mucohemorrhagic nasal discharge
M. osloensis	Cat	Pericardium	Fibrinous pericarditis, suspected secondary to respiratory infection
C. Isolated from lesions as part of a mixed flora			
Moraxella equi	Horse	Ocular surface	Conjunctivitis
M. osloensis	Bowhead whale (*Balaena mysticetus*)	Skin lesions	Not found on normal skin
M. caprae	Sheep	Gingival pockets	Broken mouth periodontitis in sheep grazed on rough pasture
M. bovis	Sheep and goats	Lung	Pneumonia

[a] May overlap with *M. bovoculi*.

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Moraxella

Características

Gram negativo
Cocos o Bacilos
NO esporulan
Cápsula (en algunos)
Tienen LOS en lugar de LPS
Oxidasa positiva

Colonia

Medios enriquecidos (suero/ sangre)
35°C
Blanco a crema
Lisas, Friables
Hemolisis

Virulencia

Adhesinas (pili)
Hemolisina
Proteasas
Leucotoxinas

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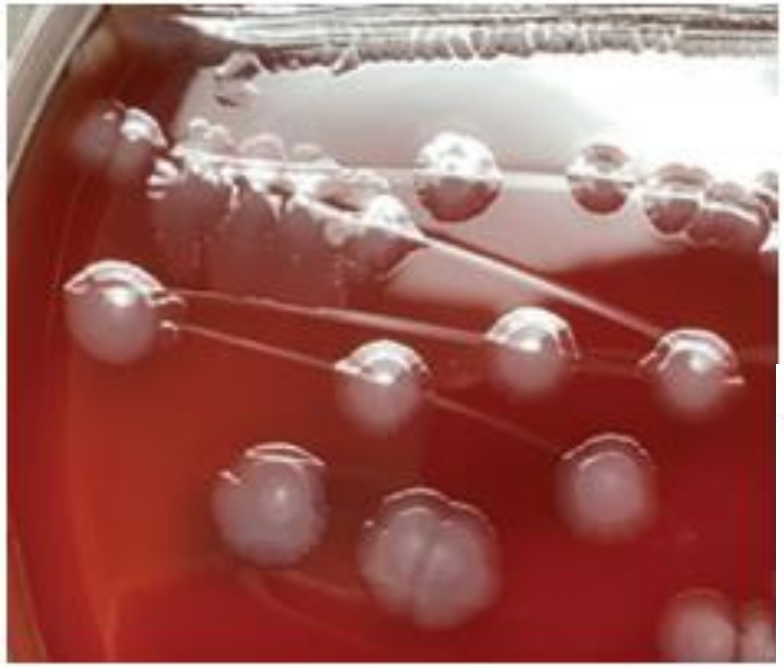
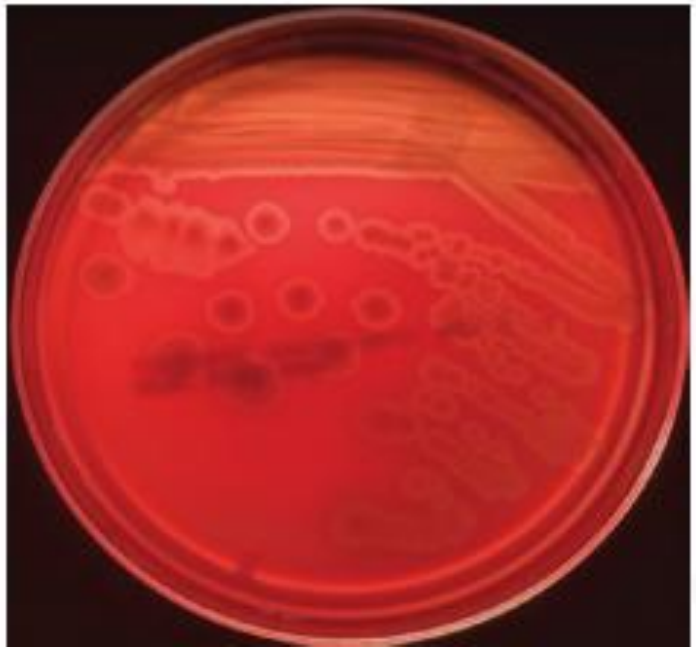
Moraxella

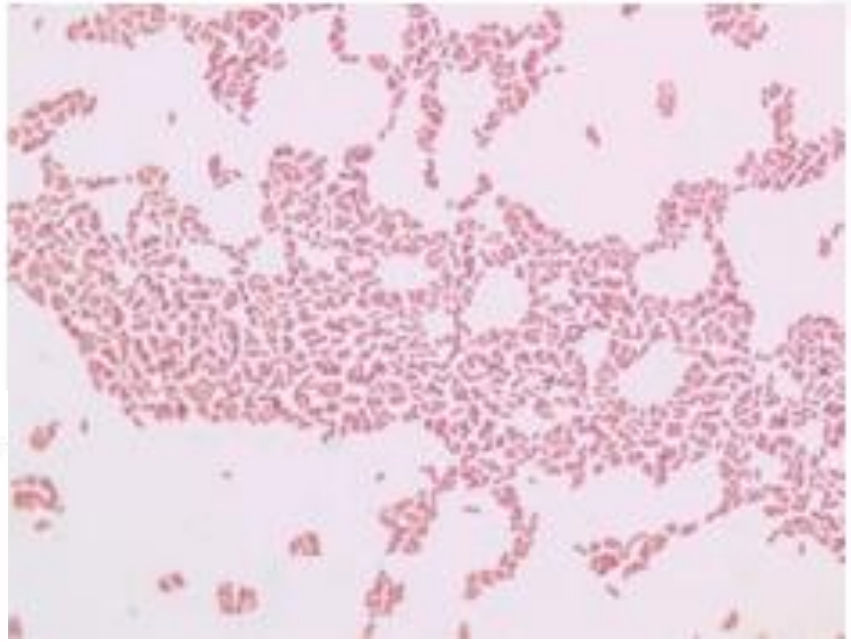
(a)



(c)



(e)



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Moraxella

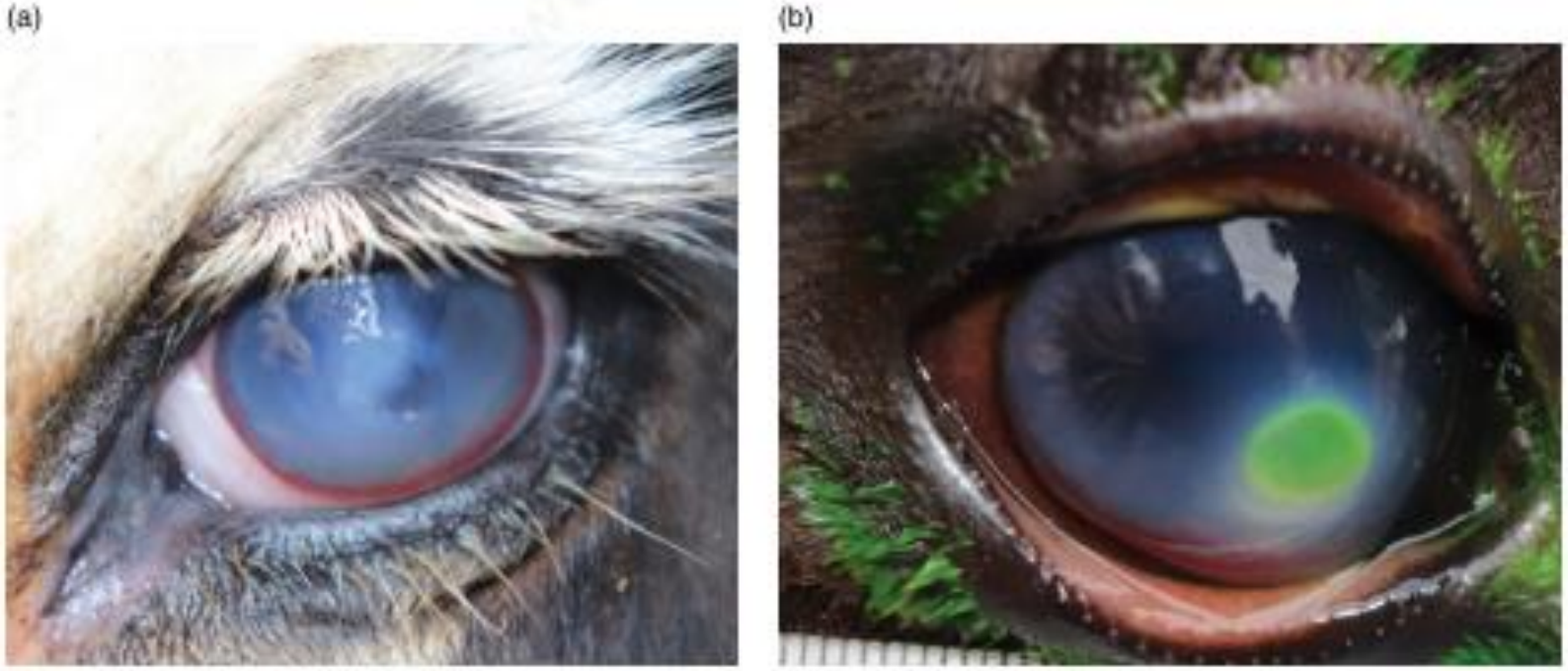

Figure 17.3 (a) Calf with infectious bovine keratoconjunctivitis. (b) Corneal ulcer is visualized via fluorescein sodium stain. *Source:* Courtesy of Gabriele Maier, University of California-Davis.

Resistencia

En general es sensible a los ATB comunes

Biofilm

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Dichelobacter

Género

Dichelobacter nodosus

Colonia

Medios enriquecidos
CO2

Características

Gram negativo
Bacilo recto o ligeramente curvo
Móvil (por fimbrias no flagelos)
Aerotolerantes

Virulencia

Fimbrias
Proteasas

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Fusobacterium

Género

Fusobacterium necrophorum

Características

Gram negativo
Pleomórfico
Inmóvil
NO esporula
Anaeróbico (Aerotolerante)

Characteristics	ssp. *necrophorum*
Colony morphology	Umbonate with irregular edges, opaque, and grayish to white in color
Microscopic morphology	Highly pleomorphic, short to long rods, and many of the rods are filamentous (2–100 µm)
Growth in broth, sedimentation	–
Biochemical characteristics	
Indole production	+
Phosphatase	+
Proteases	++
DNase	+
Lipase	+
Virulence in mice, % mortality	92–97
Biological activities	
Leukotoxin production	+++
Hemagglutinin titer	+++
Lipid A, % of LPS	15
Molecular characteristics[a]	
rpoB gene	+
Hemagglutinin (*haem*) gene	+
Leukotoxin (*lkt*) operon promoter length (bp)	548

[a] PCR amplification methods.

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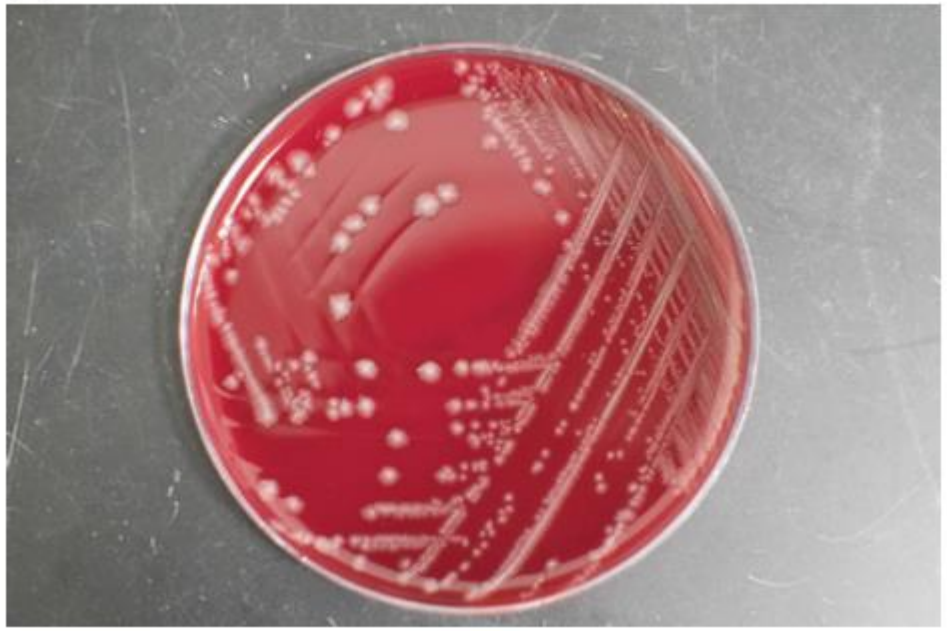
Fusobacterium

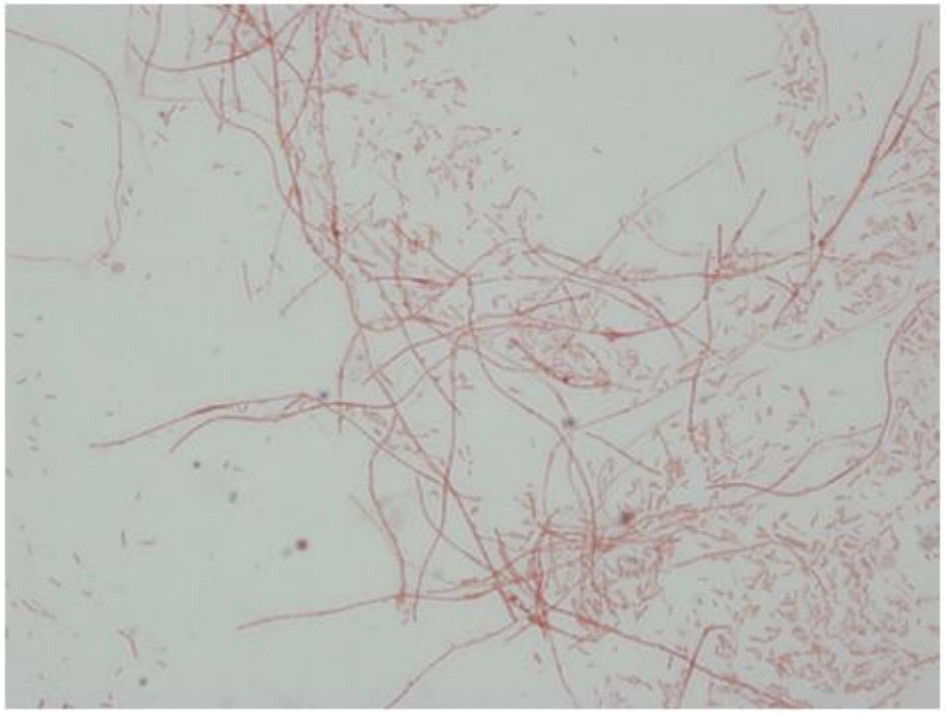
(a)



Colonia

Medios enriquecidos
CO2
Genera turbidez

(a)



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Fusobacterium

Virulencia

Table 33.3 Virulence factors of *Fusobacterium necrophorum*.

Factor	Characteristics	Mechanism of action.	Role in infections.
Leukotoxin	Extracellular protein (molecular weight 336 kDa).	Cytotoxic to neutrophils, macrophages, hepatocytes, and possibly to ruminal epithelial cells.	Protects against phagocytosis by neutrophils and macrophages, damages tissues by the release of cytolytic products.
Endotoxin	Outer membrane component, lipopolysaccharide.	Inflammatory and necrotic effects; induces disseminated intravascular coagulation.	Creates anaerobic microenvironment conducive to anaerobic growth.
Hemolysin	Extracellular but cell-associated protein.	Lyses erythrocytes of various animals.	Helps acquire iron, which stimulates bacterial growth, from the host; creates an anaerobic microenvironment.
Hemagglutinin	Cell-wall-associated protein.	Agglutinates erythrocytes of various animals.	Mediates attachment to epithelial cells.
Adhesins	Outer membrane proteins.	Affinity binding to host cells.	Mediates attachment to epithelial and endothelial cells.
Dermonecrotic toxin	Cell wall associated.	Causes necrosis in the epithelial cells.	Helps penetrate the epithelium or skin.
Proteases	Extracellular protein.	Breaks down cell protein.	Helps penetrate the ruminal epithelium or skin.

Resistencia

Aminoglucósidos - Ionóforo

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Dichelobacter y Fusobacterium

Vaca 2149

inicio tratamiento
octubre 2011

UCSF FCA

Chlamydia

Género

Chlamydia psittaci

C. pneumoniae

C. abortus

C. trachomatis

C. pecorum

Características

Gram negativo
Cocos
Giemsa
Intracelulares obligados

Colonia

Medios con células

ZOONOSIS

Virulencia

Hemoaglutininas

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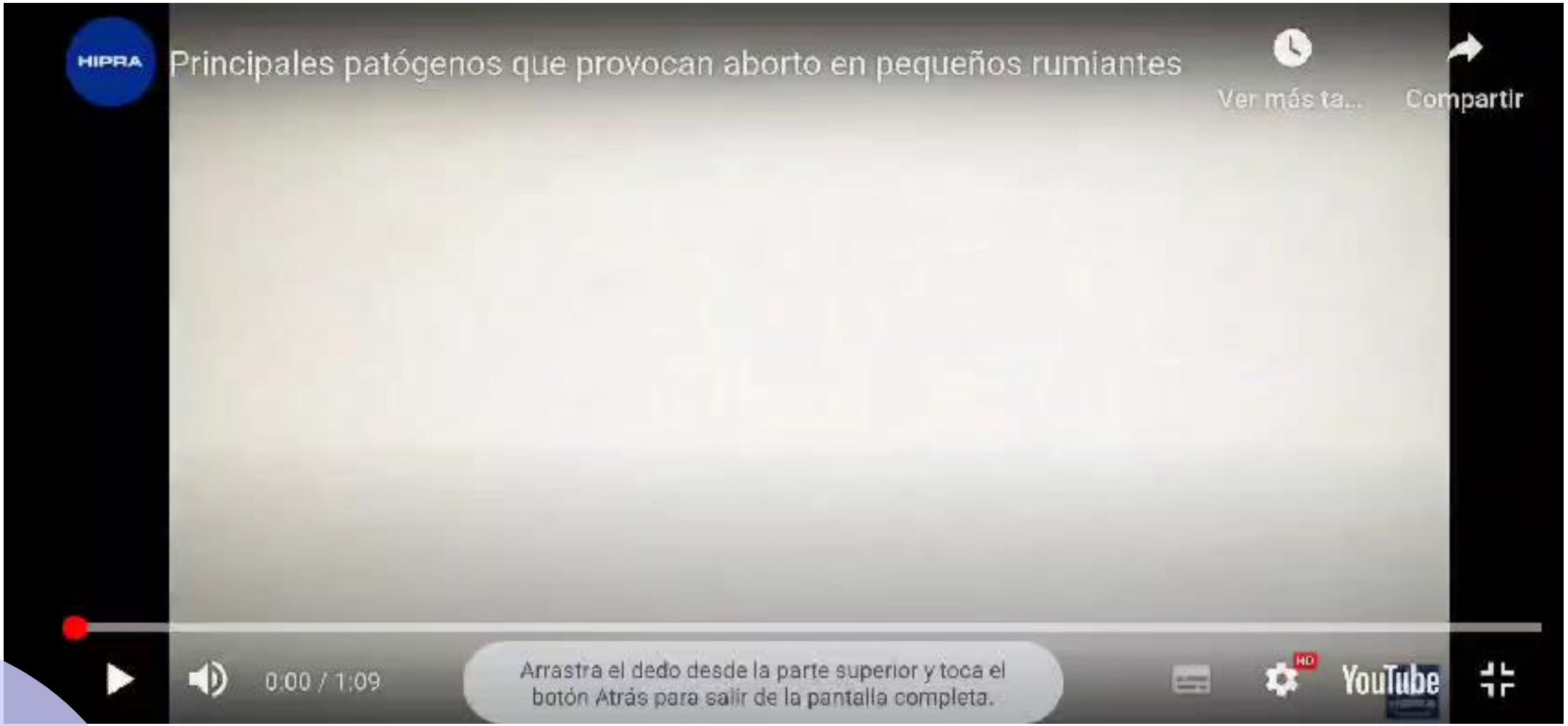
Chlamydia



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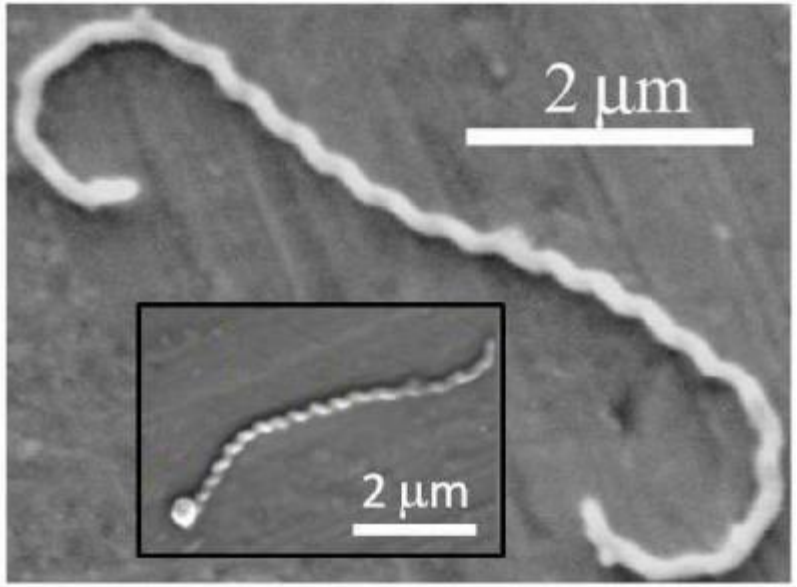
Leptospira

Género

Leptospira interrogans

Se divide en serovares

ZOONOSIS



Características

Gram negativo
Espiroqueta (termina en gancho)
Móvil
NO esporula
Aeróbico (microaerófilo)

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Leptospira

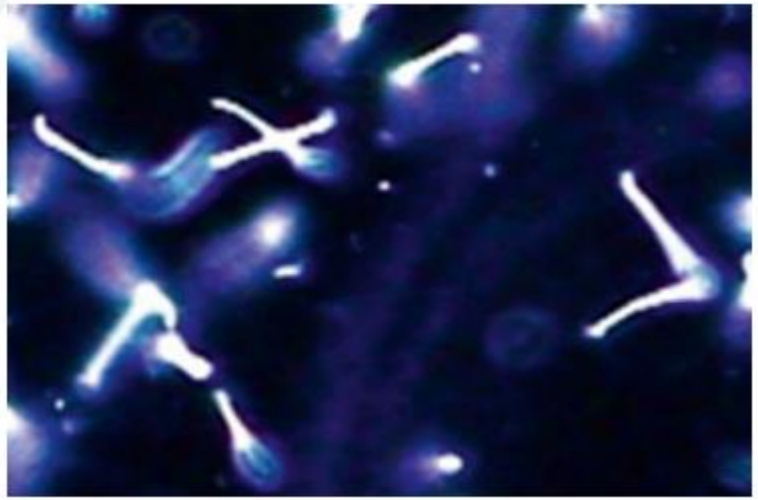

Figure 24.1 *Leptospira* observed under a dark-field microscope.

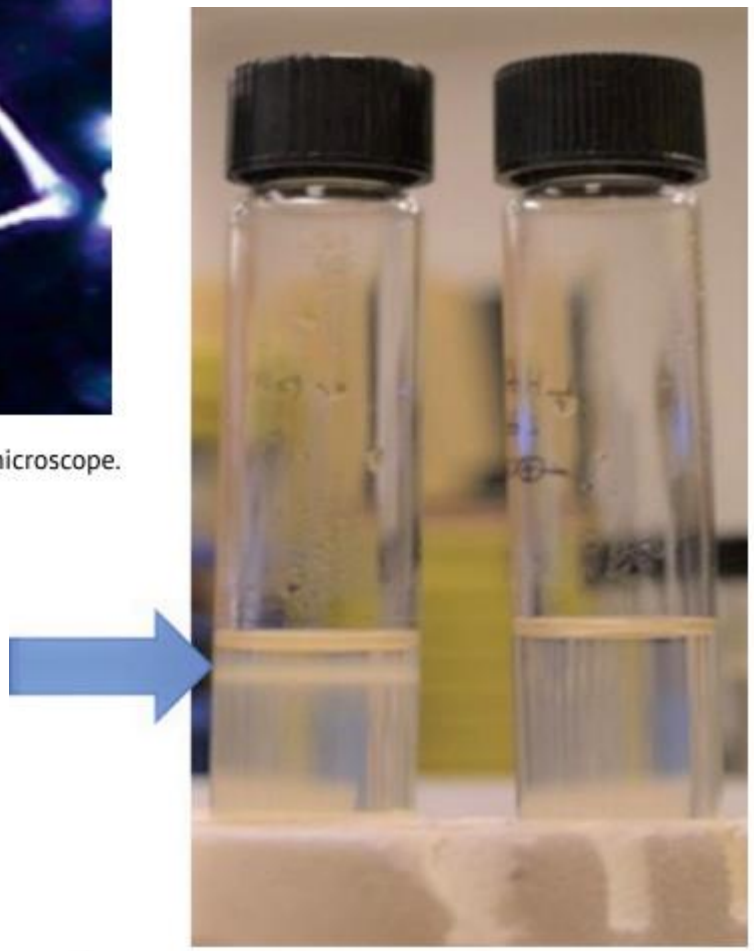

Figure 24.3 *Leptospira* growth in semisolid media. The blue arrow points to the Dinger zone.

Cultivo

Aislamiento es complejo
- Medios específicos
- Períodos largos (12 semanas)
- 28-30°C
- ATB para evitar la contaminación
- Medio semisólido hace una formación densa DINGER ZONE

UCSF FCA

Leptospira

MAT

GOLD STANDARD
Detecta AC aglutinantes
Se incuba suero del paciente con serovares de *Leptospira*

50% de aglutinación es positivo

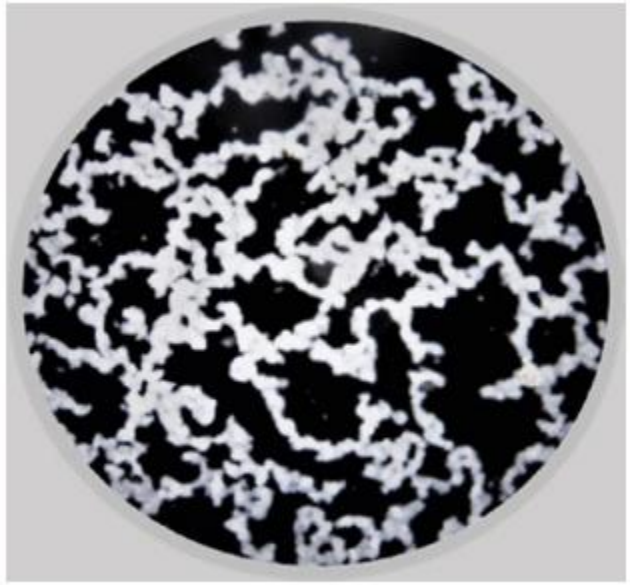

Figure 24.4 Microscopic agglutination test. *Leptospira* serovar Grippotyphosa agglutinated by a positive serum.

Tratamiento

Combinación de ATB + terapia de sostén

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Muchas gracias por su atención

UCSF FCA