# Spirochaetes

## Genus: Leptospira

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# Taxonomy and classification

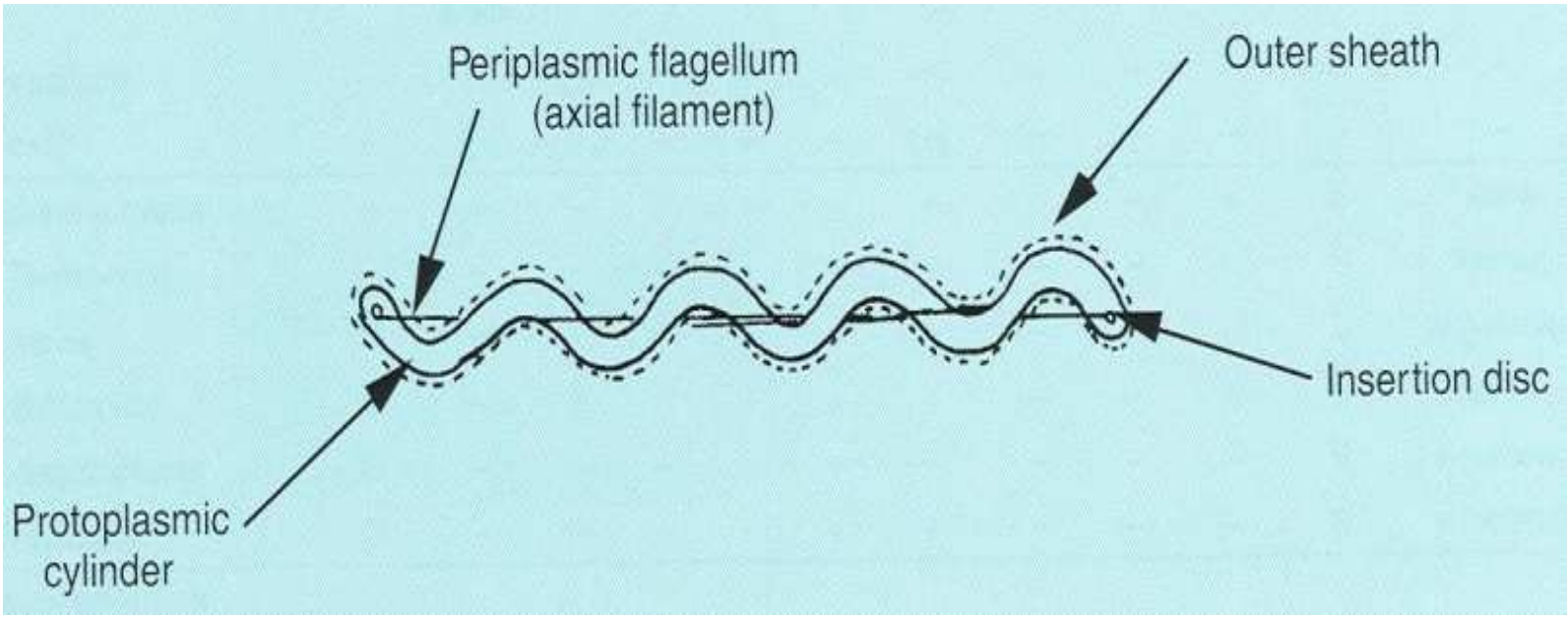
- Order :Spirochaetales  includes two families
- Family: Spirochaetaceae
- Family: Leptospiraceae
- Genus: Serpulina, Treponema, Borrelia (Spirochaetaceae) and Leptospira (Leptospiraceae)
- non-pathogenic spirochete
- pathogenic spirochete (Leptospira, Treponema, Borrelia)

# General characteristics

- The Spirochaetes are slender, motile, flexuous, unicellular, helically coild bacteria
- Ranging 0.1-3.0µm in width
- The outer sheath the outer most layer of spirochaete cell is multilayered membrane that completely surrounds the periplasmic cylinder
- The cylinder consist of the nuclear material ,cytoplasmic membrane and the peptidoglycan portion of the cell wall

# General characteristics

- The periplasmic flagella are wrapped around the cylinder and are in the periplasmic space of these Gram negative bacteria
- One end of each flagellum near a pole of the protoplasmic cylinder and attached by plate-like structure called insertion disc
- The distal end of each flagellum is not inserted and extends to the centre of the cell and may overlap the flagellum from the opposite end
- The periplasmic flagellum facilitate the motility of the bacteria in the viscid environments



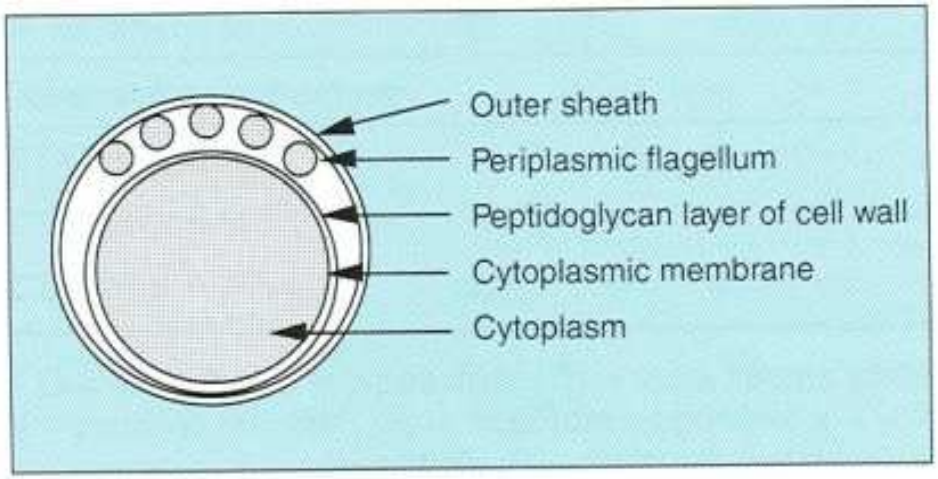




**Diagram 36. Section through a spirochaete demonstrating structural features.**

# Leptospira interrogans serovars

The genus Leptospira divided in to two species

pathogenic:

- *Leptospira interrogans* (parasitic)

non-pathogenic:

- *Leptospira biflexa* (saprophytic)

## Natural habitat

- Leptospira are present in human and animals: cattle, horse, dogs, pigs many wild animals.
- Leptospira are present in tubules of mammalian kidneys and occurred in urine for several months
- The reservoir shoe no clinical signs

# Pathogenesis

- Leptospira gain entry through mucous membrane or damaged skin from direct or indirect contact
- After penetration the epithelial there is haematogenous spread with localization and proliferation in parenchymatous organ particularly the liver ,kidney, spleen and sometime meninges.

# Pathogenesis

- In the kidneys the organisms reach the localies in the lumen of proximal convoluted tubules.

- Penetration and multiplication in the foetus can occur in pregnant animals leading to foetal death and resorption, abortion or week offspring.

# Pathogenesis

- Some serogroups of serovars produced a haemolysin toxin that responsible for hemoglubinuria (red water) in young calves infected with these serovars
- Cytotoxic protein is produced by virulent strain but the role of the toxin is unknown.

# Pathogenesis

- The pathogenicity attributed to:

1.produced a haemolysin toxin that responsible for hemoglubinuria (red water) in young calves infected with these serovars

2.Cytotoxic protein is produced by virulent strain but the role of the toxin is unknown.

# Leptospirosis

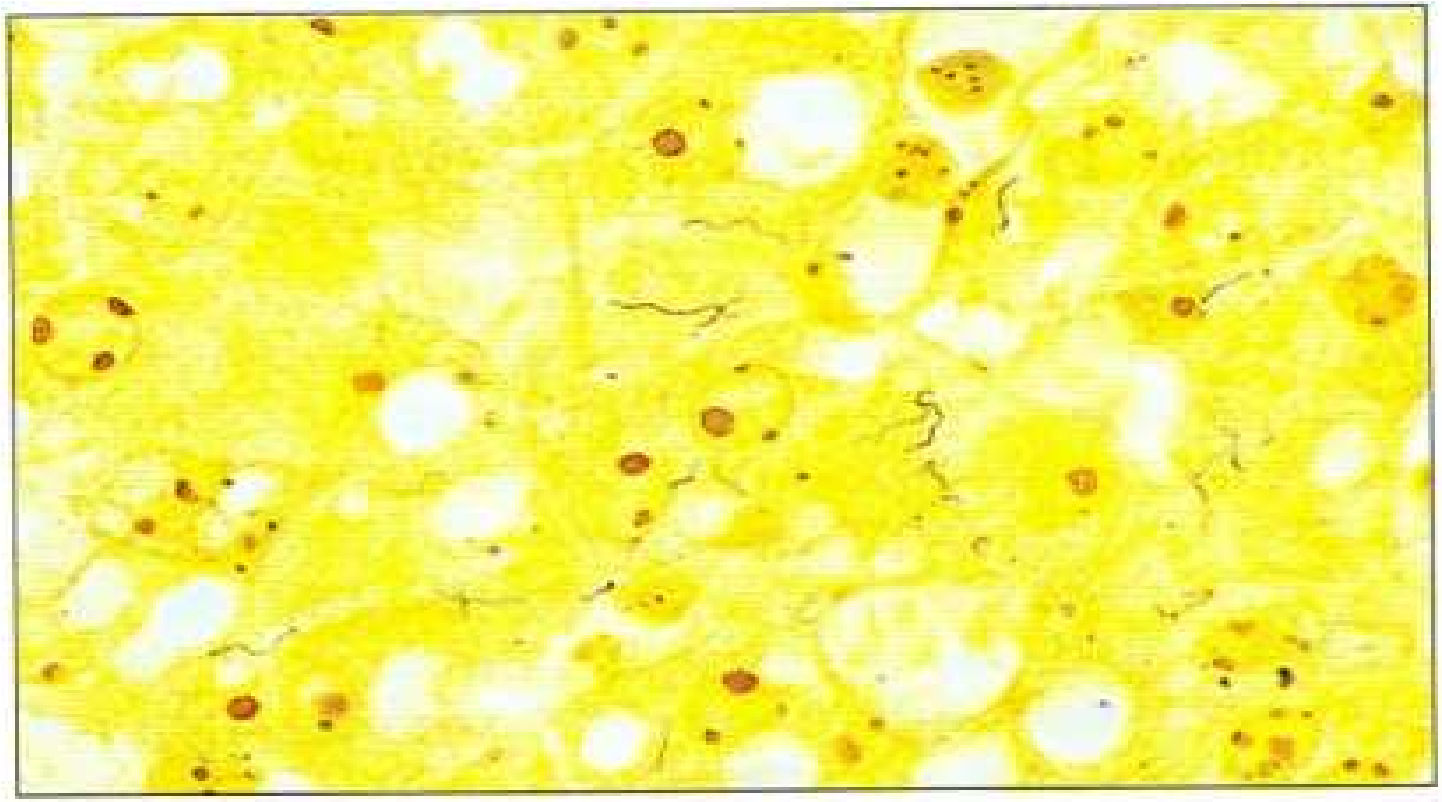
**Canine typhus or infectious jaundice**

- The disease misdiagnosed with diseases cause hepatic or renal damage as:
- Infectious hepatitis
- Canine distemper

# Laboratory Diagnosis
# Samples

- Blood (serum) for serological test
- Mid-stream urine for dark field examination
- A small mass of kidney taken from inside the organ and examined under dark – field microscope
- Kidney tissues used for culture
- Section from kidney and liver 10% formalin for histopathology examination
- Foetal abomasal contents, and uterine discharge also collected for differential diagnosis

# Laboratory Diagnosis
# Samples



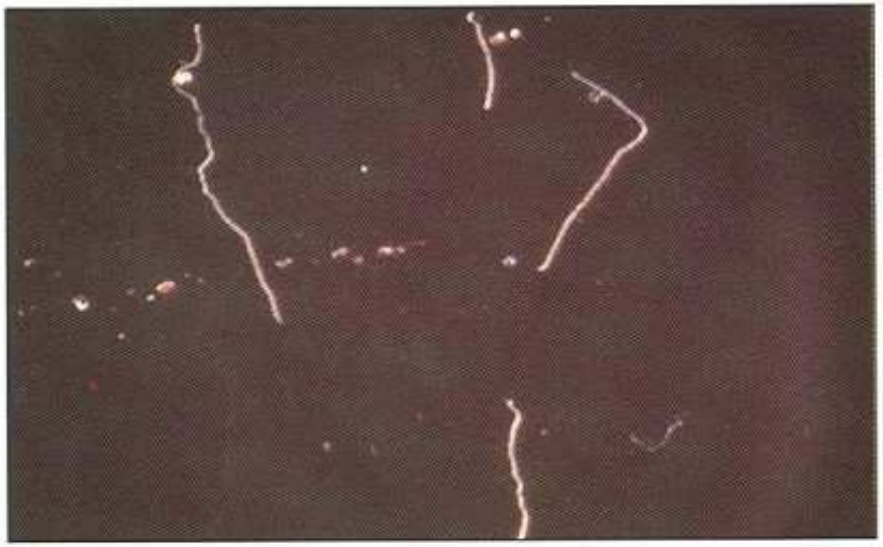
**354** *Leptospira interrogans* serovar *icterohaemorrhagiae* in a section of canine liver. (Levaditi stain, ×1000)

# Identification

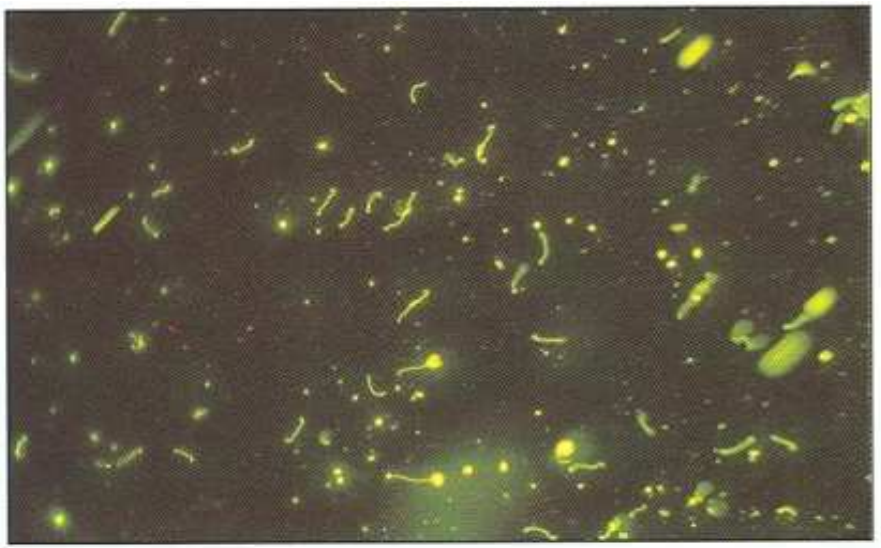
## Direct microscope

1.using Dark field microscope examination

2.using fluorescent antibody technique (FA)



**355** *Leptospira interrogans* serovar *canicola* from a young, actively dividing culture. (Darkfield, ×1000)

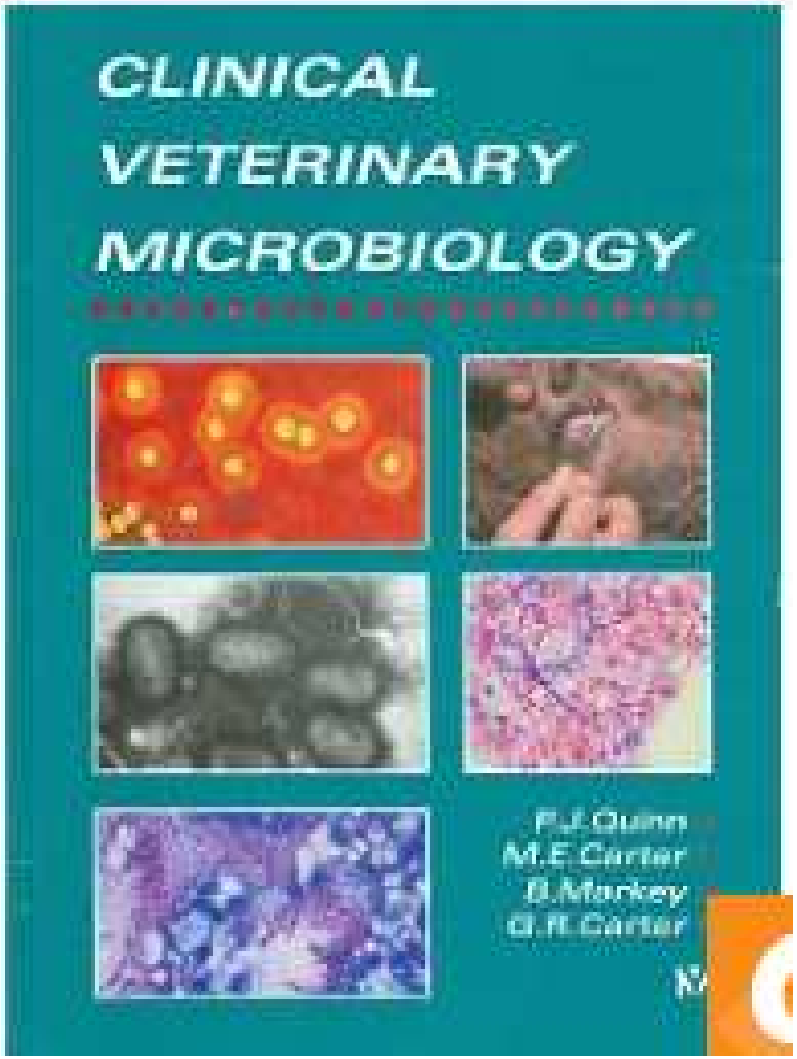


**356** *Leptospira interrogans* serovar *hardjo* in a bovine urinary deposit. (Direct FA technique, ×400)

# Culture

- Using the Korthof and Stuart broths
- Fletcher semisolid media

# References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# Any Question