

# **Campylobacter**

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# General Characteristics

- Slender, curved Gram negative rods
- Daughter cells which remain joined have a characteristic ***gull-winged appearance***
- Motile by polar flagella
- Campylobacter species were previously classified in the genus “Vibrio”



# Campylobacter species

- Microaerophilic organism
- *5 to 10% oxygen and 1 to 10% CO<sub>2</sub>* for growth
- Commercially-available generator envelopes which deliver 6% oxygen, 10% carbon dioxide and 84% nitrogen.

# Isolation

- A selective enriched medium such as *Skirrow agar* is usually used for primary isolation
- Most pathogenic species grow optimally at 37 °C
- *C. jejuni* requires up to 5 days at 42°C for optimum growth.
- They are non-fermentative- Campylobacter species do not ferment carbohydrates
- Oxidase-positive and catalase variable

# Microcapsule

- *Campylobacter fetus subspecies venerealis*

- *C. fetus subspecies fetus*

possess a ***microcapsule or S layer***, which consists of high molecular-weight proteins arranged in a lattice formation.

- This S layer confers resistance to serum-mediated destruction and phagocytosis

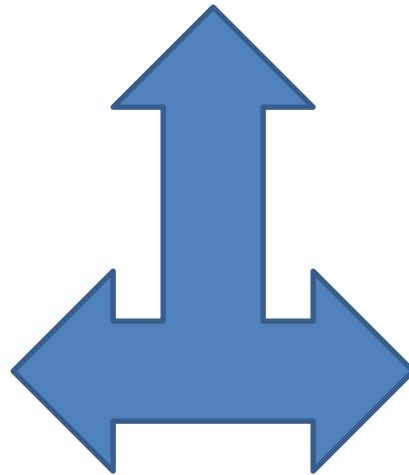
# Habitat

- Worldwide occurrence
- Found in the intestinal and genital tracts of domestic animals
- *Campylobacter jejuni* colonize the intestines of birds
- *Campylobacter fetus subspecies venerealis* appears to be adapted to bovine preputial mucosa.

# Species

- Three species:
  - *C. fetus subspecies venerealis*,
  - *C. fetus subspecies fetus* and
  - *C. jejuni subspecies jejuni*

**Intestinal infections**



**Genital, causing infertility  
or abortion.**

# Important Diseases

- Bovine genital campylobacteriosis
- Ovine genital campylobacteriosis
- Avian vibriotic hepatitis
- Intestinal campylobacteriosis in dogs
- Intestinal campylobacteriosis in humans



# Bovine genital campylobacteriosis

- Caused by- *Campylobacter fetus subspecies venerealis*
- Bacteria adapted to prepuce of bulls
- Bulls may remain infected indefinitely
- Transmission during coitus
- About one-third of infected cows become carriers- organism persist in vagina

# Bovine genital campylobacteriosis

- From vagina they ascend to uterus causing endometritis – salpingitis
- The infertile period following uterine invasion can last for 3 to 5 months
- IgA antibodies, which predominate in the vagina, limit spread of the infection
- IgG antibodies produced in the Uterus mediates clearance
- This natural immunity may last for up to 4 years.

# Bovine genital campylobacteriosis

- The disease is characterized by:
  - temporary infertility
  - early embryonic death,
  - return to oestrus at irregular periods
  
  - by sporadic abortion at mid pregnancy
- *Campylobacter fetus subspecies fetus*, an enteric organism acquired by ingestion, can cause sporadic abortions in Cows.

# Diagnosis

- Isolation and identification of *C. fetus subspecies venerealis* from preputial or vaginal mucus is confirmatory.
- *Vaginal mucus agglutination test* detects about 50% of infected, infertile cows on a herd basis.
- Culture and isolation under microaerophilic condition.
- Smear from specimen - stained with dilute carbol fuchsin (DCF) for 4 min
- PCR based methods ; FAT

# Ovine genital campylobacteriosis

- Campylobacteriosis in ewes caused by either
  - *C. fetus subspecies fetus*
  - *C. jejuni*
- One of the most common causes of ovine abortion in some countries
- *Campylobacter fetus subspecies fetus* is found in the faeces of cattle and sheep
- *C. jejuni* may be present in the faeces of birds and mammals.
- Transmission of both of these organisms is by the *faecal-oral route*.

**Bacteraemia**



**Localization in Uterus**



**Necrotic placentitis**



**abortion late in pregnancy  
stillborn lambs  
weak lambs**

# Ovine genital campylobacteriosis

- Aborting ewes are major sources of infection for susceptible animals in a flock.
- Up to 20% of ewes in a susceptible flock may abort.
- Recovered ewes are immune for at least **3 years**
- **Flock fertility** in subsequent breeding seasons is usually good.

# Diagnosis

- **Typical hepatic lesions** in aborted lambs are *pathognomonic*.
  - Round, necrotic lesions up to **2 cm in** diameter with pale raised rims and dark depressed centres
- A presumptive diagnosis is made by demonstrating the organisms in foetal abomasal contents
- Isolation and identification of *C. fetus subspecies fetus* or *C. jejuni* is *confirmatory*.
- **Bacterins** may be used for control of infection.



# Avian vibriotic hepatitis

- Birds commonly harbour *C. jejuni* in their intestinal tracts and shed the organisms in their faeces
- Infection in chickens and turkeys is usually asymptomatic
- Outbreaks of disease, which are uncommon
- Characterized by a substantial drop in egg production in the flock.
- Listlessness and lose condition
- There may be haemorrhage and multifocal necrosis in livers.
- A presumptive diagnosis is made by demonstrating curved rods with darting motility in bile, using phase contrast microscopy.

# Intestinal campylobacteriosis in dogs

- *Campylobacter species*, particularly *C. jejuni* may cause diarrhoea in dogs
- *Confirmation is difficult because* healthy animals may shed *Campylobacter species* in their faeces.
- Large numbers of campylobacter in *DCF-stained* may be indicative of infection
- *Campylobacter species* may contribute to the severity of enteric disease in dogs
  - *Enteric viruses,*
  - *Giardia species, helminths etc*
- ***Dogs shedding C. jejuni are a potential source of human infection.***

# Intestinal campylobacteriosis in humans

- Agent- *Campylobacter jejuni*
- *Food borne infection* - the most frequent cause of food poisoning in many countries
- Poultry meat is a major source of human infection.
- Fever, abdominal pain and diarrhoea
- Sometimes with blood

**Thanks**