

# CAMPYLOBACTER JEJUNI

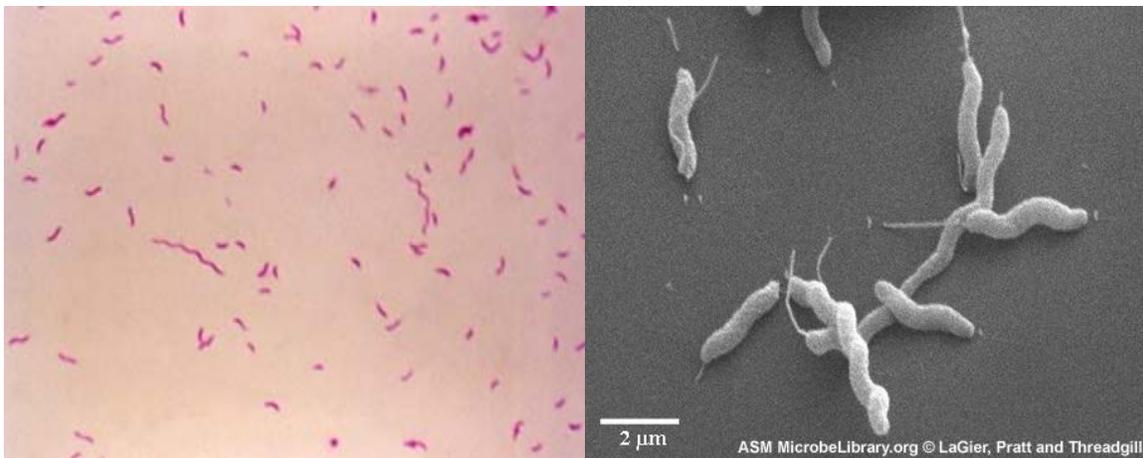
## PATHOGEN SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

### INFECTIOUS AGENT

**NAME:** *Campylobacter jejuni*

**SYNONYM OR CROSS REFERENCE:** *Campylobacter jejuni* subsp. *jejuni*, *C. jejuni* subsp. *doylei*. Formerly known as *Campylobacter fetus* subsp. *jejuni*. Disease known as Campylobacteriosis or *Campylobacter* enteritis.

**CHARACTERISTICS:** *Campylobacter jejuni* is a microaerobic, non-spore forming, gram-negative bacteria of the *Campylobacteraceae* family. They form motile, spiral shaped rods that are 0.2-0.9  $\mu\text{m}$  wide and 0.5-5  $\mu\text{m}$  long, and move by a corkscrew-like motion. One unsheathed polar flagella is present at the end (or both ends) of the cell, which gives the bacterium a slender "S" shape, and this spiral appearance is its most distinguishable feature. *C. jejuni* grows slowly in culture and have an optimum growing temperature of 42°C. Old cultures or ones exposed to air for extended periods tend to become spherical or coccoid.



*Campylobacter jejuni*, gram-stained<sup>1)</sup>

*Campylobacter jejuni* cells<sup>2)</sup>

### HAZARD IDENTIFICATION

**PATHOGENICITY:** *Campylobacter jejuni* cause gastroenteritis, with the most common symptom being diarrhea (sometimes bloody) that lasts 2-10 days, as well as mild to severe abdominal pain, fever, malaise, nausea and vomiting. Symptoms last for about a week but relapses occur in 5-10% of untreated cases. Although a large number of *Campylobacter* infections are asymptomatic and mild, many complications have been reported in young

children and immunocompromised patients. All strains of *C. jejuni* possess a gene coding for cytolethal distending toxin, however not all strains produce it. The role of these toxins in disease is not known. Motility is required for full virulence, and some effectors associated with virulence are secreted through the flagellum.

**EPIDEMIOLOGY:** Infections occur worldwide, and are common in both developed and developing countries. In developed countries, *Campylobacter* is the leading cause of bacterial gastroenteritis with the majority of these cases caused by *C. jejuni*. Infection is primarily associated with handling and consumption of raw meat. The prevalence of campylobacter on chicken carcasses is very high and cross contamination can easily occur during food preparation. The majority of cases are sporadic with outbreaks accounting for only a small number of cases. However, there have been outbreaks caused by the distribution of water or milk, which have infected 3000 people at a time. Asymptomatic cases in adults and children are common.

**HOST RANGE:** *C. jejuni* subsp. *jejuni*: humans, cattle, wild birds, poultry, pigs, sheep, dogs, cats, water, mink, rabbits, and insects.

**INFECTIOUS DOSE:** 500 organisms by ingestion. One volunteer study found that 9000 bacteria were required to infect 50 percent of subjects.

**MODE OF TRANSMISSION:** Oral ingestion of bacteria from fecal contaminated food (primarily chicken) or drinking water is the main mode of transmission. Contact with animals and their feces is also a source of infection.

**INCUBATION PERIOD:** 1 to 10 days.

**COMMUNICABILITY:** Low, person-to-person transmission is unusual.

## DISSEMINATION

**RESERVOIR:** *C. jejuni* subsp. *jejuni*: humans, cattle, wild birds, poultry, pigs, sheep, dogs, cats, water, mink, rabbits, and insects.

**ZOONOSIS:** Yes – Transmitted from a variety of animals (birds and mammals).

**VECTORS:** Flies have been suggested as a possible vector.

## STABILITY AND VIABILITY

**DRUG SUSCEPTIBILITY/RESISTANCE:** Susceptible to macrolides, fluoroquinolones, aminoglycosides, chloramphenicol, nitrofurantoin, gentamicin, and tetracycline.

**DRUG RESISTANCE:** Antibiotic resistance strains are emerging particularly to fluoroquinolones, macrolides, trimethoprim, beta lactam antibiotics, including penicillin and most cephalosporins, as well as to tetracycline, quinolone and kanamycin.

**SUSCEPTIBILITY TO DISINFECTANTS:** *C. jejuni* is susceptible to 10 mg/L iodophor, 1:50 000 quaternary ammonium compound, 0.15% phenolic compound, 70% ethyl alcohol or 0.125% glutaraldehyde all with a contact time of 1 minute or 5mg/L of hypochlorite with a contact time of 5 minutes.

**PHYSICAL INACTIVATION:** Inactivated by heat (70°C for 1 min), hydrostatic pressure (450 MPa at 15°C for 30 s) and gamma irradiation.

**SURVIVAL OUTSIDE HOST:** *Campylobacter* cells can enter a viable but non-culturable state (VBNC) when subject to stress. This is thought to improve their survival in the environment, as it has been observed to survive freezing for several months in frozen poultry, minced meat, and other cold food products. *Campylobacter* can survive for many weeks in water at 4°C, but only a few days in water above 15°C.

## FIRST AID / MEDICAL

**SURVEILLANCE:** *Campylobacter* infection can be confirmed by culturing and identification of bacteria from stool. Recent *Campylobacter* infections can be identified using serologic tests.

**FIRST AID/TREATMENT:** Treatment is primarily supportive as most infections are self-limiting. However, antibiotic therapy may be required in more serious cases particularly in young, elderly or immunocompromised patients. Erythromycin is the drug of choice for treating *Campylobacter* gastroenteritis.

**IMMUNIZATION:** None.

**PROPHYLAXIS:** No drugs are available. Reducing fecal contamination of the carcass after slaughter can control the spread of the bacteria.

## LABORATORY HAZARDS

**LABORATORY-ACQUIRED INFECTIONS:** Yes, several cases have been reported for *Campylobacter* spp.

**SOURCES/SPECIMENS:** Fecal samples, blood and specimens from animals.

**PRIMARY HAZARDS:** Ingestion or parenteral inoculation of bacteria.

**SPECIAL HAZARDS:** May have adverse effects on the fetus if contracted during pregnancy.

## EXPOSURE CONTROLS / PERSONAL PROTECTION

**RISK GROUP CLASSIFICATION:** Risk Group 2.

**CONTAINMENT REQUIREMENTS:** Containment Level 2 facilities, equipment, and operational practices for work involving infectious or potentially infectious materials, animals, or cultures.

**PROTECTIVE CLOTHING:** Lab coat. Gloves when direct skin contact with infected materials or animals is unavoidable. Eye protection must be used where there is a known or potential risk of exposure to splashes.

**OTHER PRECAUTIONS:** All procedures that may produce aerosols, or involve high concentrations or large volumes should be conducted in a biological safety cabinet (BSC). The use of needles, syringes, and other sharp objects should be strictly limited. Additional precautions should be considered with work involving animals or large scale activities.

## **HANDLING AND STORAGE**

**SPILLS:** Allow aerosols to settle and, wearing protective clothing, gently cover spill with paper towels and apply an appropriate disinfectant, starting at the perimeter and working towards the centre. Allow sufficient contact time before clean up.

**DISPOSAL:** Decontaminate all wastes that contain or have come in contact with the infectious organism by autoclave, chemical disinfection, gamma irradiation, or incineration before disposing.

**STORAGE:** The infectious agent should be stored in leak-proof containers that are appropriately labeled.

## **REFERENCE**

Pathogen Safety Data Sheet (PSDS) for *Campylobacter jejuni* has been modified from the ones produced by the Public Health Agency of Canada as educational and informational resources for laboratory personnel working with infectious substances.

- 1) Picture from [fyeahmedlab.tumblr.com](http://fyeahmedlab.tumblr.com)
- 2) Picture from <http://www.microbelibrary.org>