Assist. Prof. Dr. Ameer Mezher Hadi
Dr.Zaid Abdel Hadi Abd
Lecture. 8
Second Stage

College of Health & Medical Techniques
Department of Medical Laboratories Techniques

CAMPYLOBACTER JEJUNI

Introduction:

Campylobacters cause both diarrheal and systemic diseases, and are among the most widespread causes of **infection, worldwide**. *Campylobacter* infections of wild and domesticated animals, which are also the **natural reservoirs for these organisms**, are also widespread. ***C. jejuni* is the prototype organism in the group and is a very common cause of diarrhea in humans**. Other campylobacters, less commonly isolated from humans, include *C. fetus*, *C. coli*, and *C. upsaliensis.*

Morphology and Identification

A. Typical Organisms

C. jejuni and other campylobacters **are curved, comma-, or S-shaped, Gram-negative, non-spore-forming rods;** they have also been described as having **"sea gull wing" shapes.** Campylobacters **are motile, with a single polar flagellum at one or both ends**, but some organisms may lack flagella all together.

B. Culture

Campylobacter species, including *C. jejuni*, multiply at a slower rate when compared to other Gram-negative, enteric bacteria; therefore, selective media, containing various antibiotics **(eg, Campy-Blood agar and Skirrow's media)** are needed for isolation of campylobacters from stool specimens. ***Campylobacter* species require a microaerobic atmosphere, containing reduced O2 (5–7%) and increased 10% CO2 for incubation and** optimal growth. A relatively simple way to produce the incubation atmosphere is to place the plates in an anaerobe incubation jar without the catalyst and to produce the gas with a commercially available gas-generating pack or by gas exchange. Furthermore, most campylobacters grow best at 42°C, although growth can be seen on agar media with

incubation between 36°C and 42°C. Incubation of primary plates for isolation of *C. jejuni* should always be at 42°C. Several selective agar media are in widespread use for isolation of campylobacters; Skirrow's **medium contains vancomycin, polymyxin B**, and **trimethoprim to inhibit growth of other bacteria, but this medium may be less sensitive than other commercial products that contain charcoal**, other inhibitory compounds, as well as cephalosporin antibiotics. These selective media are suitable for isolation of *C. jejuni* and *C. coli* at 42°C. However, *C. upsaliensis*, while growing at 42°C, is not recovered on selective media, and *C. fetus* shows variable growth at 42°C, and may not be recovered at that temperature. The

colonies of *Campylobacter* species may have different appearances; generally, the colonies tend to be colorless or gray. They may be watery and spreading or round and convex, and both colony types may appear on one agar plate. Hemolysis on blood-containing agar media is not observed.

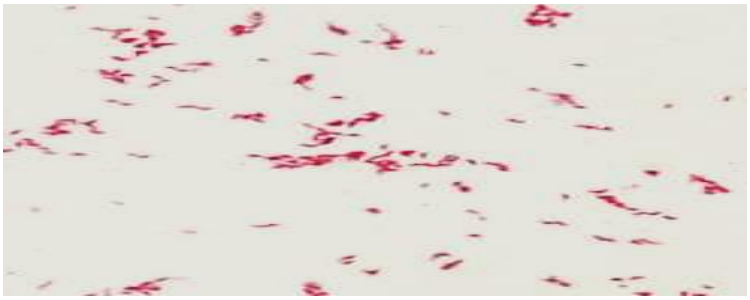

Figure-1: Gram-stain of *C. jejuni* showing "comma"- or "gull wing"-shaped Gram-negative bacilli (*arrows*). Campylobacters stain faintly and can be difficult to visualize. .

C. Growth Characteristics

Because of the selective media and incubation conditions for growth, an abbreviated set of tests is usually all that is necessary for further identification of campylobacters**.** ***C.***

CAMPYLOBACTER JEJUNI

***jejuni* as well as *C. coli* are positive for both oxidase and catalase**. Campylobacters do not oxidize or ferment carbohydrates. Gram stained smears show typical morphology. Nitrate reduction, hydrogen sulfide production, **hippurate hydrolysis tests**, and antimicrobial susceptibilities can be used for further identification of species. A positive hippurate hydrolysis test distinguishes *C. jejuni* from the other *Campylobacter* species.

Antigenic Structure and Toxins

The campylobacters **have lipopolysaccharides with endotoxic activity**. Cytopathic **extracellular toxins and enterotoxins have been found**, but the significance of the toxins in human disease is not well defined.

Diagnostic Laboratory Tests

A. Specimens

Diarrheal stool is the preferred specimen when attempting to isolate campylobacters in patients with gastrointestinal illness. Rectal swabs may also be acceptable specimens. *C. jejuni* and *C. fetus* may occasionally be recovered from blood cultures usually from immunocompromised or elderly patients.

B. Smears

Gram-stained smears of stool may show the typical "gull wing"–shaped rods. Dark-field or phase-contrast microscopy may show the typical darting motility of the organisms.

C. Culture

Culture on the selective media as described earlier is the definitive test to diagnose *C. jejuni* enteritis. If *C. fetus* or another species of *Campylobacter* is suspected, an agar medium without cephalosporins should be used and incubation at 36–37°C is necessary.