

Epsilonproteobacteria

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ϵ -proteobacteria

- The ϵ -proteobacteria are the smallest of the five proteobacterial classes.
- They all are slender gram-negative rods, which can be straight, curved, or helical.
- The ϵ -proteobacteria have one order, Campylobacterales, and two families, Campylobacteraceae and Helicobacteraceae.
- The two most important genera, *Campylobacter* and *Helicobacter*, are microaerophilic, motile, helical or vibrioid, gram-negative rods.
- The genomes of *Campylobacter jejuni* and *Helicobacter pylori* (both about 1.6 million base pairs in size) have been sequenced.
- They are now being studied and compared in order to understand the life styles and pathogenicity of these bacteria.

Table 1. summarizes some of the characteristics of these two genera.

Table 22.8 Characteristics of Selected ϵ -Proteobacteria

Genus	Dimensions (μm) and Morphology	G + C Content (mol%)	Oxygen Requirement	Other Distinctive Characteristics
ϵ-Proteobacteria				
<i>Campylobacter</i>	0.2–0.5 \times 0.5–5; vibrioid cells with a single polar flagellum at one or both ends	30–38	Microaerophilic	Carbohydrates not fermented or oxidized; oxidase positive and urease negative; found in intestinal tract, reproductive organs, and oral cavity of animals
<i>Helicobacter</i>	0.5–1.0 \times 2.5–5.0; helical, curved, or straight cells with rounded ends; multiple, sheathed flagella	33–42.5	Microaerophilic	Catalase and oxidase positive; urea rapidly hydrolyzed; found in the gastric mucosa of humans and other animals

Campylobacter

- The genus *Campylobacter* contains both nonpathogens and species pathogenic for humans and other animals.
- *C. fetus* causes reproductive disease and abortions in cattle and sheep.
- It is associated with a variety of conditions in humans ranging from:
 - **septicemia** (pathogens or their toxins in the blood), to
 - **enteritis (inflammation)** of the intestinal tract)
- *C. jejuni* causes abortion in sheep and enteritis diarrhea in humans.

Helicobacter

- There are at least 14 species of *Helicobacter*, all isolated from the stomachs and upper intestines of humans, dogs, cats, and other mammals.
- In developing countries 70 to 90% of the population is infected; developed countries range from 25 to 50%.
- Most infections are probably acquired during childhood, but the precise mode of transmission is unclear.
- The major human pathogen is *Helicobacter pylori*, which is the cause of gastritis and peptic ulcer disease.
- *H. Pylori* produces large quantities of urease, and urea hydrolysis appears to be associated with its virulence.