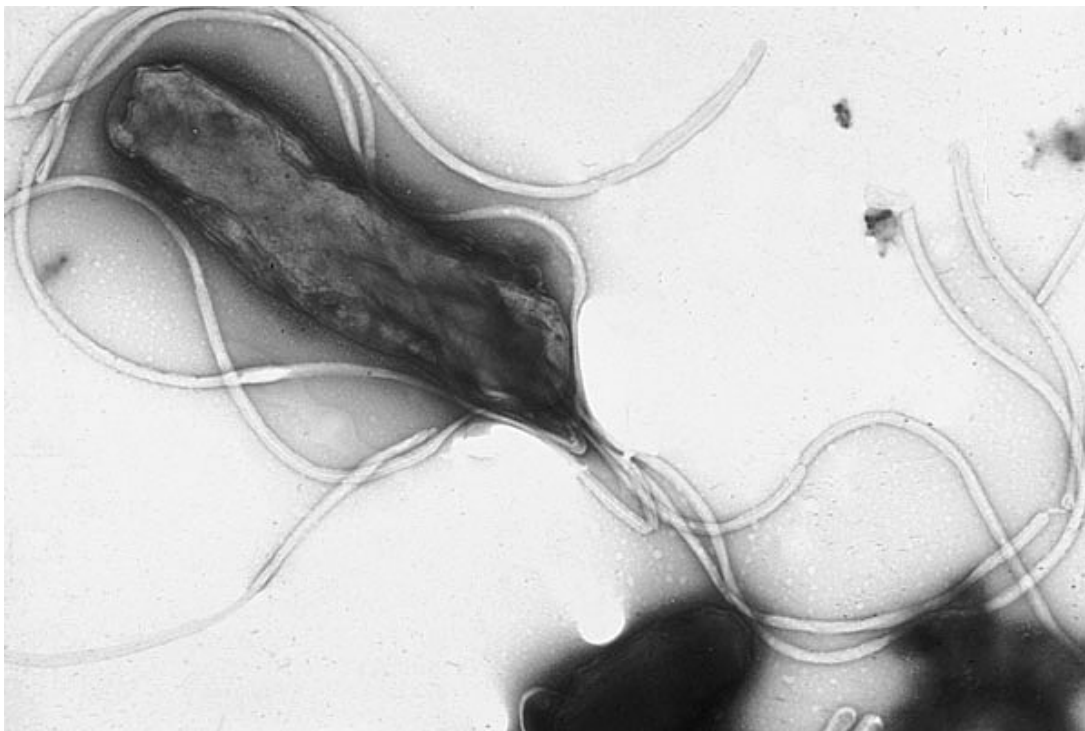


## Helicobacter Pylori Infections — Differential Diagnosis and Medical Treatment

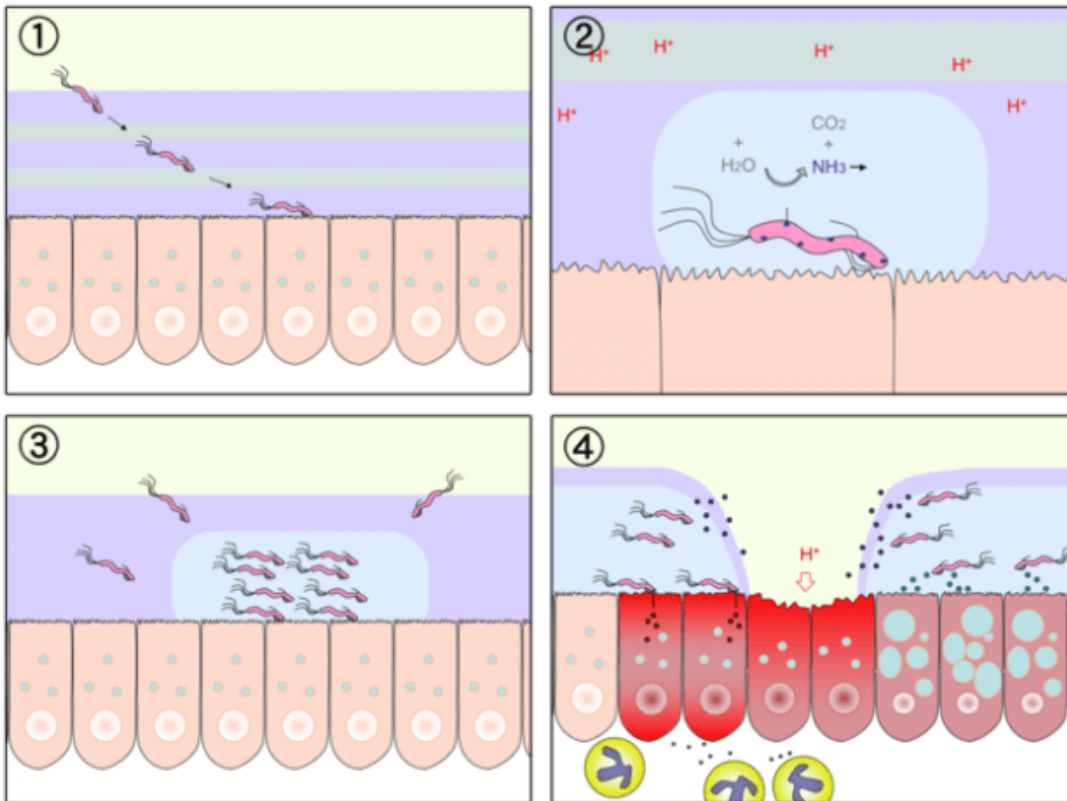
[See online here](#)

**Helicobacter pylori is a type of bacteria, which results in gastric infection. It is estimated to be found in more than 50% of the international population. It is not sure how exactly the bacteria can be spread; however, unclean food or water may aid in the spreading of the infection and result in different gastric diseases or conditions, including peptic ulcer disease or gastric cancer in severe complications.**



### Definition and Background of Helicobacter Pylori Infections

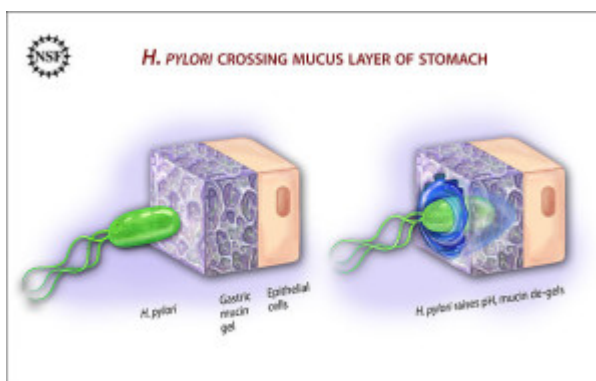
**Helicobacter pylori (H. pylori)** bacterium is involved in many diseases other than **peptic ulcer disease**, such as **coronary artery inflammation**, **gastroesophageal reflux disease**, **skin disease**, **iron deficiency anemia**, **rheumatologic issues** and **lymphoid tissue lymphomas** associated with mucosa. It has also been reported that there is a strong association between **gastric adenocarcinoma** and **lymphoma** and H. pylori bacterium.



**Image:** "Diagram of gastric ulceration by *H. pylori*, with minimal annotation. 1. *H. pylori* penetrate the mucus layer of the host stomach and adhere to the surface of gastric mucosal epithelial cells. 2. Produce ammonia from urea by the urease, and the ammonia neutralize the gastric acid to escape from elimination. 3. Proliferate, migrate, and finally form the infectious focus and 4. The gastric ulcerization is developed by the destruction of mucosa, inflammation and mucosal cell death." by Y\_tambe. License: [CC BY-Sa 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

## Etiology of Helicobacter Pylori Infections

### Causes of Helicobacter pylori



**Image:** "H. Pylori Crossing Mucus Layer of Stomach" by NSF Flickr photostream. License: Public Domain

The main changes caused by *H. pylori* bacteria are **gastric metaplastic** and **atrophic** changes. There is a direct **decrease** in the mucosal levels of **glutathione** as a result of the **adhesion** of *H. pylori* bacteria to the cells of the stomach. Some studies and reports show that there is a correlation between **low-grade MALTomas** of the stomach and *H. pylori* infection. **Tyrosine phosphorylation** of the gastric cells may be caused by the *H. pylori* bacteria adhesions as well.

# Epidemiology of Helicobacter Pylori Infections

## Spread of Helicobacter pylori in the United States

It appears that **race** plays an important role in the epidemiology of H. pylori infections in the United States, as **60%** of the cases are patients from **Hispanic** origins. **White** patients account for approximately **29%** of cases.

## International spread of Helicobacter pylori

**90%** of people affected with peptic ulcer disease appear to be positive for H. pylori infection. There are not enough international data about the bacterium, but it appears that about **50%** of people are infected with H. pylori bacteria.

## Presentation of Helicobacter Pylori Infections

### History of Helicobacter pylori

Generally, **30%** to **35%** of patients infected with H. pylori bacteria may be **asymptomatic**. However, when symptoms appear they include:

- Vomiting
- Abdominal pain
- Nausea
- Heartburn
- Morning hunger
- Halitosis
- [Diarrhea](#)

There is no difference in the presence or the frequency of symptoms between gastritis patients who are infected with H. pylori and the ones who are not infected.

### Physical examination of Helicobacter pylori

Patients infected with H. pylori appear to **not have specific or different signs** than other gastritis patients who are not infected with the bacteria. The main signs that may be present in these patients include **dyspepsia** and **abdominal discomfort**.

## Differential Diagnosis of Helicobacter Pylori Infections

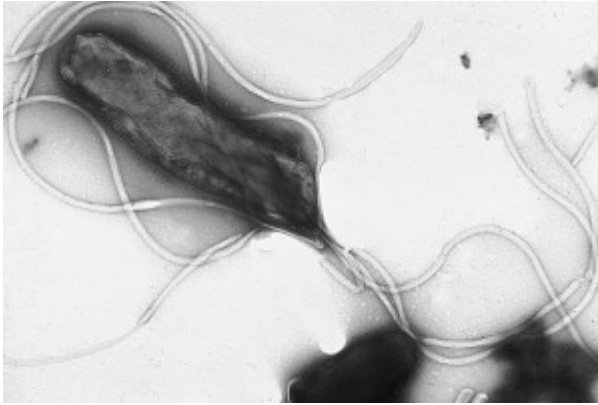
### Clinical pictures similar to Helicobacter pylori

- Atrophic [gastritis](#)
- [Acute gastritis](#)
- Chronic gastritis
- Gastrinoma
- [Gastric cancer](#)
- Non-Hodgkin lymphoma
- [Peptic ulcer disease](#)

- [Gastroesophageal reflux disease](#)
- Stress-induced gastritis

## Diagnosis of Helicobacter Pylori Infections

### Laboratory studies

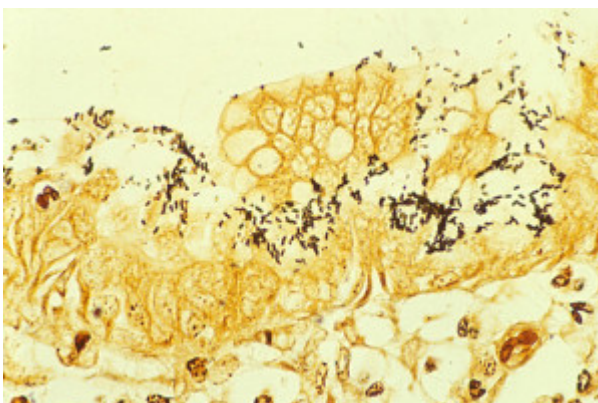


**Image:** "Electron micrograph of H. pylori possessing multiple flagella" by Yutaka Tsutsumi, M.D. License: Public Domain

Several laboratory studies may aid in the diagnosis of patients with suspected H. pylori infection. These tests include:

- **H. pylori serology:** serology testing is useful to detect the infection in **new patients**; however, it is not as useful in the follow up of already diagnosed patients. It has high **sensitivity and specificity of over 90%**.
- **Fecal antigen test of H. pylori:** it is useful in detecting the infection in the **initial stages**, as well as to **detect eradication after treatment**. It has a very high **sensitivity of 94%** and **specificity of 98%**.
- **Carbon-13 urea breath test:** urease is present in the [stomach](#) during H. pylori infections, which increases the concentration of the labeled carbon.
- **Antibiogram:** clarithromycin and metronidazole are not recommended as first-line medications in areas of high resistance for these antibiotics. Antibiogram testing is useful in these areas.

### Imaging studies



**Image:** "H. pylori colonized on the surface of regenerative epithelium" by Yutaka Tsutsumi, M.D. License: Public Domain

Patients with H. pylori infections **may not require imaging studies**, and they may not be useful in them. However, these studies may be useful in patients with **more complicated diseases** such as gastric cancer, MALToma or ulcer disease.

## Procedures

- **Esophagogastroduodenoscopy (EGD):** patients who present with symptoms of **peptic ulcer disease** usually require this procedure in order to view the mucosal lining condition of the duodenum and the stomach.
- **Esophagogastroduodenoscopy (EGD) plus biopsy:** this procedure is used to obtain **gastric antrum biopsy** specimens for histological examination.
- **Esophagogastroduodenoscopy (EGD) plus echography:** it is mandatory to perform this procedure in patients who have positive biopsy results of MALTomas in order to allow a **better staging** of the condition.

## Staging

H. pylori infections do not have a staging system. However, the process of the disease may be described in the following steps:

1. Chronic gastritis
2. Atrophic gastritis
3. Metaplasia of the intestine, which may evolve into dysplasia
4. Adenocarcinoma of the stomach

## Treatment of Helicobacter Pylori Infections

Only patients who show **positive results** of H. pylori infection should be treated. When choosing the treatment regimen, it is important to consider **antibiotic resistance**.

### Pharmacotherapy of Helicobacter pylori

Several **triple therapy** regimens have been approved for the treatment of duodenal and gastric ulcer disease in patients with positive H. pylori infection test results, these regimens include:

Medications	Duration
<ul style="list-style-type: none"><li>• Amoxicillin</li><li>• Omeprazole</li><li>• Clarithromycin</li></ul>	10 days
<ul style="list-style-type: none"><li>• Metronidazole</li><li>• Tetracycline</li><li>• Bismuth subsalicylate</li></ul>	14 days
<ul style="list-style-type: none"><li>• Amoxicillin</li><li>• Lansoprazole</li><li>• Clarithromycin</li></ul>	10 or 14 days

All these treatments and medications have a high risk of developing certain **side effects**, including:

- Nausea
- Metallic taste
- Skin rash
- Vomiting
- [Diarrhea](#)

Treatment should be discontinued if any of the last three side effects appear. **H2-**

**receptor blockers**, such as **famotidine** and **ranitidine**, may also be involved in the treatment of H. pylori infections.

## Surgical intervention of Helicobacter pylori

Generally, patients who suffer from H. pylori infections **do not require** any surgical interventions. However, in severe complications, such as **cancer**, it may be required.

## References

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