

*Helicobacter pylori*  
and  
Peptic Ulcer

# Objectives

- Definition of peptic ulcer
- Etiology
- Epidemiology
- *Helicobacter pylori*
- Pathogenesis
- Signs and Symptoms
- Diagnosis
- Complications
- Treatment

# Definition

- A peptic ulcer is a sore (ulceration) on the lining of the stomach or duodenum, occurring in areas exposed to acid and pepsin and most often caused by *Helicobacter pylori* infection.
- some ulcers are caused by long-term use of nonsteroidal anti-inflammatory agents (NSAIDs), like aspirin.
- In a few cases, cancerous tumors in the stomach or pancreas can cause ulcers.
- Peptic ulcers are not caused by stress or eating spicy food, but these can make ulcers worse.

# Peptic Ulcers: Gastric & Duodenal



# Other factors

- Steroid therapy
- Smoking
- Excess alcohol intake
- Genetic factors
- Hyperparathyroidism
- Severe physiologic stress (Burns, CNS trauma, Surgery, Severe medical illness)

# Epidemiology

*H. pylori* infection occurs worldwide

Prevalence varies greatly among countries and population groups

20 – 50% prevalence in middle age adults in industrialised countries

>80% prevalence in middle age adults in developing countries :may reflect poorer living conditions

# *Helicobacter pylori*

- Members of the genus *Helicobacter* are curved or spiral organisms .
- Gram-negative
- They have a rapid, motility resulting from multiple polar flagella.
- Microaerophilic,
- Produces urease.

# *Helicobacter pylori*



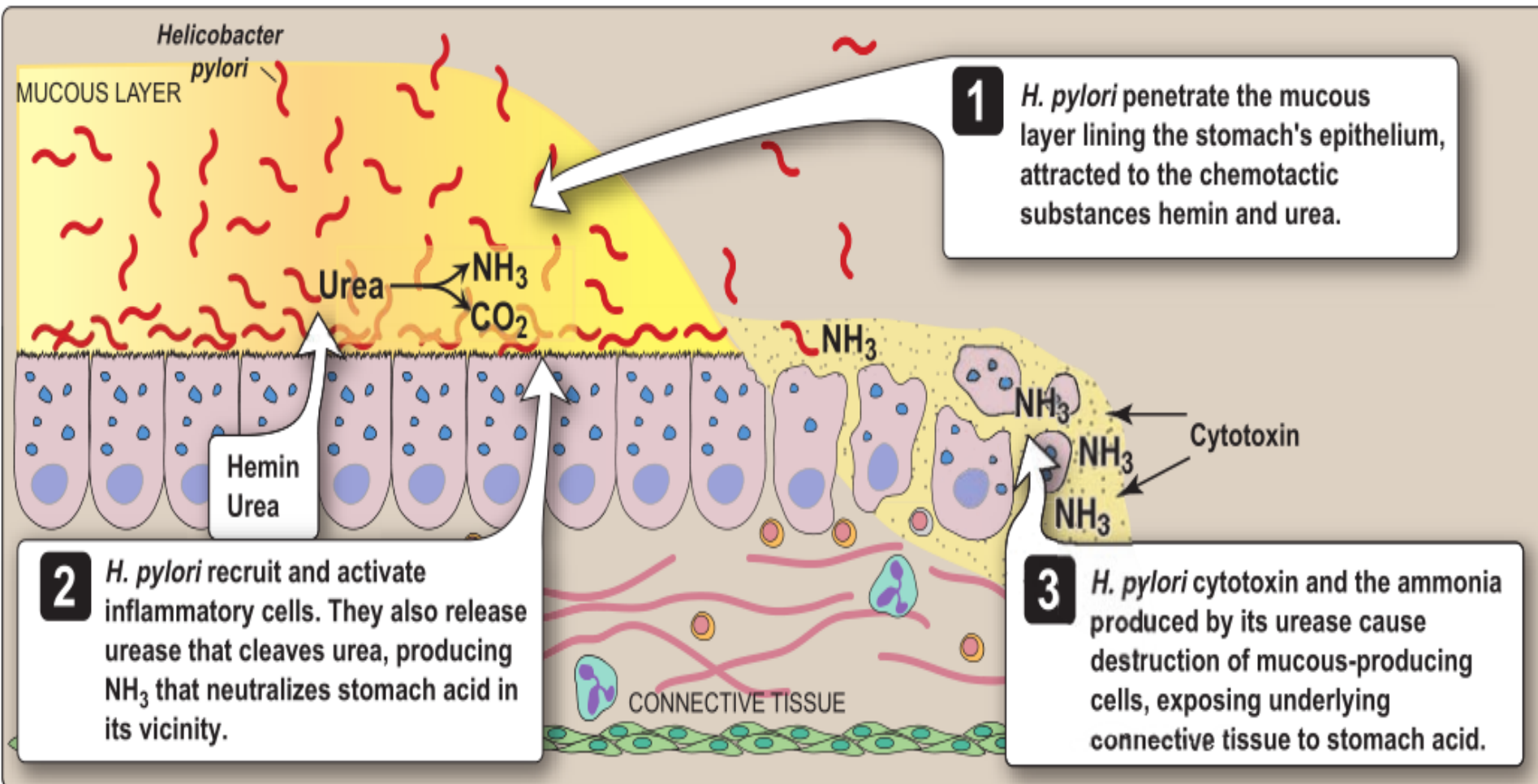


# Pathogenesis

- The organism survives in the mucus layer that coats the epithelium and causes chronic inflammation of the mucosa.
- Although the organism is noninvasive, it recruits and activates inflammatory cells.
- Urease released by *H. pylori* produces ammonia ions that neutralize stomach acid favoring bacterial multiplication.
- Ammonia may also both cause injury and potentiate the effects of a cytotoxin produced by *H. pylori*.

- Infects mucosa of stomach > inflammatory response > gastritis > increased gastrin secretion > gastric metaplasia > damage to mucosa > ulceration
- Increased risk of developing gastric adenocarcinoma, and gastric B-cell lymphoma (mucosa-associated lymphoid tumors).
- [Note: *H. pylori* infection is found in more than 95 percent of duodenal ulcer patients and in nearly all patients with gastric ulcers who do not use aspirin or other nonsteroidal anti-inflammatory drugs, both risk factors for gastric ulcers.]

# Pathogenesis of *H. pylori*



# Signs and Symptoms

- Abdominal discomfort is the most common symptom. This discomfort usually
  - *comes and goes for several days or weeks*
  - *occurs 2 to 3 hours after a meal*
  - *occurs in the middle of the night when the stomach is empty*
- weight loss
- poor appetite
- bloating
- Nausea and vomiting

# Diagnosis

- Invasive diagnosis:

involve gastric biopsy specimens obtained by endoscopy. *H. pylori* can be detected in such specimens histologically, by culture, or by a test for urease.

- Non-invasive diagnostic test:

- Urea Breath Test
- Culture (stool or biopsy)
- Serology (detecting antigen of bacteria in stool or blood)
- Occult blood

# Urea breath tests

Involve administering radioactively labeled urea by mouth. If *H. pylori* are present in the patient's stomach, the urease produced by the organism will split the urea (1–2 hours) to CO<sub>2</sub> (radioactively labeled and exhaled) and NH<sub>3</sub> .]

## Characteristic of *H. pylori*

*H. pylori* is oxidase positive and catalase positive, has a characteristic morphology, is motile, and is a strong producer of urease.

# Complications

- Perforation & Penetration—into pancreas, liver and peritoneal space
- Peritonitis
- Bowel obstruction, Gastric outflow obstruction.
- Bleeding--occurs in 25% to 33% of cases and accounts for 25% of ulcer deaths.
- Gastric CA

# Treatment

- *the recommended primary therapies for H. pylori infection include: clarithromycin, and amoxicillin, or metronidazole (clarithromycin-based triple therapy) for 14 days*
- Lansoprazole 30 mg + clarithromycin 500 mg + amoxicillin 1 g × 10 days.
- Omeprazole 20 mg + clarithromycin 500 mg + amoxicillin 1 g × 10 days.
- Esomeprazole 40 mg + clarithromycin 500 mg + amoxicillin 1 g × 10 days.





**Thanks for  
listening**