

# Diagnosis of Helicobacter Pylori Infection

 For more information see *Helicobacter pylori*.

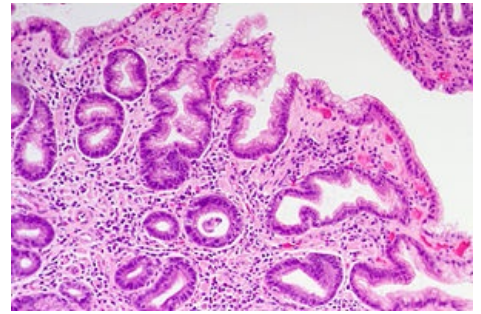
**Helicobacter pylori** is a Gram-negative, microaerobic human pathogen, and *H. pylori* infection is strongly **related to many gastroduodenal diseases** including *chronic active gastritis*, *peptic ulcer diseases*, *atrophic gastritis*, *mucosa-associated lymphoid tissue (MALT) lymphoma*, and *noncardia gastric cancer* (In 1994, *H. pylori* was recognized, as the only bacteria, as a **type I carcinogen**, and now it is considered the most common etiologic agent of infection-related cancers). *H. pylori* infection affects more than half of the adult population worldwide, but the prevalence of *H. pylori* infection varies widely by geographic area, age, race, and socioeconomic status.

Accurate diagnosis of *Helicobacter pylori* infection is a crucial part of the effective management of many gastroduodenal diseases. Several invasive and non-invasive diagnostic tests are available for the detection of *H. pylori* and each test has its usefulness and limitations in different clinical situations. Although none can be considered as a single gold standard in clinical practice, several techniques have been developed to give more reliable results.

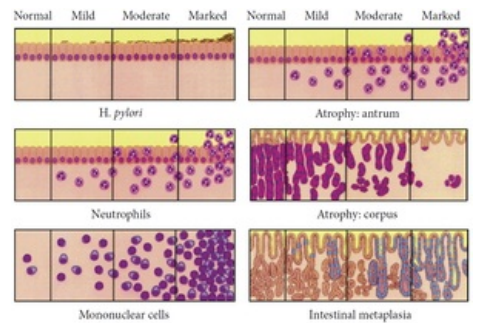
## Invasive testing

Invasive tests are performed via **endoscopic biopsy** specimens and these tests include **histology**, **culture**, **rapid urease test** as well as **molecular methods**. Developments of endoscopic equipment also contribute to the real-time diagnosis of *H. pylori* during endoscopy.

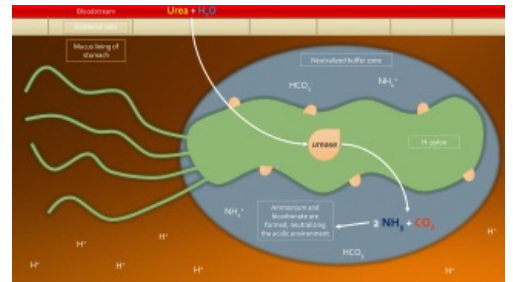
- **The culture** - the microbiological culture from endoscopy-based gastric biopsies, is considered a definite proof for *H. pylori* investigation. The culture of *H. pylori* from the gastric biopsy is characterized by a high specificity with low sensitivity. The culture has 100% specificity, but with significant variation regarding sensitivity ranging from 85% and 95%
- **Rapid urease test (RUT)** - The basis of the test is the ability of *H. pylori* to secrete the urease enzyme, which catalyzes the conversion of urea to ammonia and carbon dioxide → the change of color from the original yellowish color to a red through 24 hours is reflecting the positivity of the test.



Helicobacter gastritis



Visual classification of GASTRITIS



*Helicobacter pylori* urease enzyme - diagram



Rapid urease test

## Non-invasive testing

**Urea breathing test** and **stool antigen test** are the most widely used non-invasive tests, whereas **serology** is useful in screening and epidemiological studies. Molecular methods have been used in variable specimens other than gastric mucosa. More than detection of *H. pylori* infection, several tests are introduced into the evaluation of virulence factors and antibiotic sensitivity of *H. pylori*, as well as screening precancerous lesions and gastric cancer.

- **Urea Breath test (UBT)** - the patient drinks  $^{14}\text{C}$ - or  $^{13}\text{C}$ -labelled urea, which the bacterium metabolizes, producing labeled carbon dioxide that can be detected in the breath. It is the first-choice test because of its specificity and sensitivity.
- **Stool antigen test (SAT)** is the other noninvasive method with good sensitivity and specificity
- **Antibody-based test** - numerous serological tests based on the detection of anti-*H. pylori* IgG antibody in patient's saliva or urine samples are widely available for *H. pylori* diagnosis

- However, the serological test is not a reliable test to assess eradication therapy because antibody levels can persist in the blood for long periods of time even after successful eradication[

## GastroPanel

GastroPanel is a **first-line non-invasive diagnostic blood** test for dyspeptic patients. It gives information on the structure and function of the stomach mucosa, and of the risks caused by a possible abnormal inner lining. Based on the results, it is possible to get information to support the diagnosis of:

- Healthy stomach mucosa
- Functional and organic dyspepsia (when GastroPanel results indicate a healthy stomach mucosa, the cause of stomach problems is often functional dyspepsia or disease outside the stomach)
- Atrophic gastritis (damaged stomach mucosa that is severely dysfunctional) and likelihoods of the conditions specifically in the corpus and antrum areas of the stomach (normal, gastritis, or atrophic gastritis)
- ***Helicobacter pylori* infection**
- Achlorhydria of the stomach (anacidic stomach)

The test panel consists of four assays:

- **Pepsinogen I ELISA**
- **Pepsinogen II ELISA**
- **Gastrin-17 ELISA**
- ***Helicobacter pylori* IgG ELISA**

## Links

### Related articles

- Helicobacter pylori - antibodies detection
- 13C-labeled urea breath test
- Examination of Helicobacter pylori antigen in stool

### Reference

- with permission of the author

KOCNA, Petr. *GastroLab : MiniEncyklopedie laboratorních metod v gastroenterologii* [online]. ©2002. The last revision 2011-01-08, [cit. 2011-03-04]. <<http://www1.lf1.cuni.cz/~kocna/qlab/glency1.htm>>.

### Source

- BURES, J. , et al. Epidemiology of Helicobacter pylori infection in the Czech Republic. *Helicobacter*. 2006, vol. 11, no. 1, p. 56-65, ISSN 1523-5378 [online], 1083-4389 [print]. PMID: 16423091 (<http://www.ncbi.nlm.nih.gov/pubmed/16423091>).
- BONAMICO, M. , et al. Evaluation of stool antigen test, PCR on ORAL samples and serology for the noninvasive detection of Helicobacter pylori infection in children. *Helicobacter*. 2004, vol. 9, no. 1, p. 69-76, ISSN 1083-4389 [print], 1523-5378 [online]. PMID: 15156906 (<http://www.ncbi.nlm.nih.gov/pubmed/15156906>).
- SMITH, SI. , et al. Comparison of three PCR methods for detection of Helicobacter pylori DNA and detection of cagA gene in gastric biopsy specimens. *World J Gastroenterol*. 2004, vol. 10, no. 13, p. 1958-1960, ISSN 1007-9327. PMID: 15222045 (<http://www.ncbi.nlm.nih.gov/pubmed/15222045>).
- NAKATA, H. , et al. Immunological rapid urease test using monoclonal antibody for Helicobacter pylori. *Journal of Gastroenterology and Hepatology*. 2004, y. 19, vol. 9, p. 970-974, ISSN 08159319. PMID: 15304111 (<http://www.ncbi.nlm.nih.gov/pubmed/15304111>).
- HINO, B. , et al. Comparison of invasive and non-invasive tests diagnosis and monitoring of Helicobacter pylori infection in children. *Journal of pediatric gastroenterology and nutrition*. 2004, vol. 39, no. 5, p. 519-523, ISSN 0277-2116 [print], 1536-4801 [online]. PMID: 15572892 (<http://www.ncbi.nlm.nih.gov/pubmed/15572892>).