

Helicobacter Pylori Gram-negative Bacteria

An Ever Increasing Problem

Looking to the Past for a Solution for the Future

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History of Mastic

There has been a remedy that has been used for many centuries and for which modern science has provided solid evidence of safety and efficacy is mastic. Mastic is the gum resin of the mastic tree. The mastic tree is an evergreen tree that grows primarily of Chios, a Greek Island in the Aegean Sea. It has been noted that the mastic tree is one of the most deeply rooted trees on Earth. The mastic derived from the mastic sap is highly ionically and phonically charged.

Mastic has a rich history from ancient times, to medieval times, to the time of Columbus, to modern day. There has always been a mystique around mastic. It was considered to encompass the mysteries of the Holy Grail to the medical community. Columbus believed it to be so powerful that many of his time thought it could cure the plague. Egyptians use mastic over the ages for gastrointestinal ulcers, diarrhea, and a wide variety of medical problems. On the lighter end, it was used during the Ottoman Empire, sultans' harems for fresh breath and white teeth.

Modern day medicine seemed to scoff at such ideas of natural medicines. What modern medicine misses is the point that all medicines today are attempting to mimic the natural healing properties of plant medicines. The problem they run into is the tremendous listing of side effects from the processed medicines of the current time. Plant medicines have been studied and found to have been scientifically proven as powerful remedies while encompassing little or no side effects. The myth of modern medicine is that the medicine cures the disease when the fact is that the medicine allows your body to more readily heal itself. The same applies to natural medicines. They are not the cure-all, however, they have been shown to be more naturally integrated into the system, lowering any side effects and allowing for a more efficient and effective recovery.

Traditional applications of mastic have been shown to be safe and effective in many different ways. Its antibacterial nature shows great promise in helping the body with many gastrointestinal tract problems. Also, its ability to scavenge and convert ammonia to urea has helped individuals remove the acid levels and relieve discomfort. Through the conversion to urea, individuals are able to jettison the ammonia effectively through their body systems. This has been a great boon for sufferers of *Helicobacter pylori*. (The typical anti-ulcer treatment of today's mainstream medicine is a triple therapy regimen including two antibiotics combines with an acid secretion inhibitor or designed to protect the gastric mucosa from chemical attack.) In recent years, laboratory experiments and clinical trials have shown conclusively that mastic kills *H. pylori*, 2, 4, 5 as well as many other harmful bacterial and fungus. Mastic, therefore, may be effective in helping combat stomach maladies such as gastritis and peptic ulcers.

Scope of Infection

Helicobacter pylori is one of the most common chronic bacterial infections in humans and affects most populations throughout the world. Over 75% of cases of gastric ulcers and over 95% of duodenal ulcers are infected with *H. pylori*. It is also blamed for other gastrointestinal problems such as dyspepsia and heartburn. A number of investigators have shown that *H. pylori*-infected individuals with duodenal ulcer and *H. pylori*-positive healthy volunteers have higher basal serum gastrin levels compared with uninfected controls, indicating increased potential for hydrochloric acid production. Although it is a major pathogenic factor in gastroduodenal disease, including chronic type B gastritis, duodenal ulcers, and gastric adenocarcinoma, *H. pylori* has shown increasing resistance to standard treatment with antibiotics. The World Health Organization confirms that *H. pylori* is a major cause of stomach cancer.

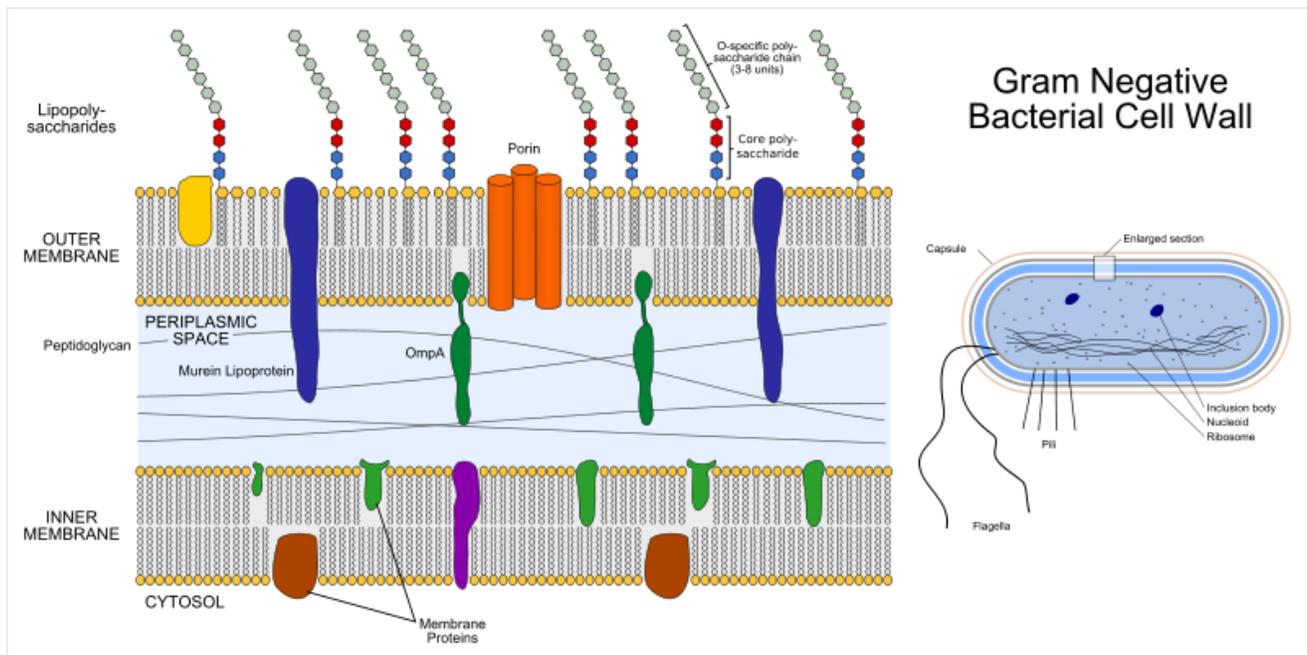
Infection Steadily Increasing

Infections caused by *Helicobacter pylori* are common bacterial infections seen in humans, worldwide. This infection is usually acquired in childhood and may persist for the whole life of the patient. The prevalence of the disease is 30–40% in the developed countries and 80–90% in the underdeveloped countries. Although *H. pylori* infection is this common, the exact mode of transmission has not yet been fully understood. Oral–oral, fecal–oral and gastrointestinal–oral routes are the possible modes of transmission. The typical course of the disease begins with chronic superficial gastritis, eventually progressing to atrophic gastritis, which starts a cascade that results in the development of gastric carcinoma. However, about 80% of the infected humans are asymptomatic. Nowadays, it is not only accepted as an agent responsible for gastritis but also a microorganism responsible for systemic infections.

The Human stomach was considered to be the only reservoir of *H. pylori* until bacteria were discovered in human dental plaque, in oral lesions, in saliva, and in tonsil and adenoid tissue. It is suggested that *H. pylori* enters the nasopharyngeal cavity by gastro esophageal reflux and colonize in the dental plaques, adenoid tissues and tonsils. From these localizations, the bacteria ascend to the middle ear and to the paranasal sinuses directly or by the reflux again and may trigger some diseases, including otitis, sinusitis, pharyngitis, laryngitis and glossitis. Although the *H. pylori* infection has been intensively studied in, especially, gastrointestinal disorders and most chronic diseases and tumors, the role of *H. pylori* in pathogenesis of upper respiratory system diseases has not been explored in depth.

What Is Gram-Negative Bacteria?

Gram-negative bacteria's structure has some unique characteristics of its outer membrane. Its outer leaflet of the membrane is made up of a complex lipopolysaccharide whose lipid portion acts as an endotoxin. If endotoxin enters the circulatory system, it causes a toxic reaction, with the sufferer developing a high temperature, high respiration rate, and low blood pressure. This may lead to endotoxic shock, which may be fatal. This outer membrane protects the bacteria from several antibiotics, dyes, and detergents that would normally damage the inner membrane or cell wall (peptidoglycan). The outer membrane provides these bacteria with resistance to lysozyme and penicillin. However, alternative medicinal treatments such as lysozyme with EDTA and the antibiotic ampicillin have been developed to combat the protective outer membrane of some pathogenic Gram-negative organisms. Helicobacter bacteria is gram-negative bacteria which is medically relevant to primarily gastrointestinal problems namely peptic ulcers.



Gram-Negative Bacteria Root Cause

Gram-negative bacteria are at the root of about 30% of the hospital-acquired infections in the U.S.

Although they don't account for the majority of these types of infections, they have "features that are of particular concern," including highly efficient ways of gearing up for drug resistance and a host of resistance mechanisms, according to Anton Peleg, MD, and David Hooper, MD, both of Massachusetts General Hospital in Boston.

Health authorities do not have good figures on how many infections and deaths in the United States are caused by Gram-negative bacteria. The Centers for Disease Control and Prevention estimates that roughly 1.7 million hospital-associated infections, from all types of bacteria combined, cause or contribute to 99,000 deaths each year.

But in Europe, where hospital surveys have been conducted, Gram-negative infections are estimated to account for two-thirds of the 25,000 deaths each year caused by some of the most troublesome hospital-acquired infections, according to a report released in September 2010 by health authorities there.

Perfect Storm for Disease Increase with No Current Solution

Those elements, combined with the absence of new drug development, have created a "perfect storm" around the Gram-negative pathogens. This was said in a review article in the May 13 issue of the *New England Journal of Medicine*.

The costs of gram negative bacteria project to be astronomical in mortality and healthcare costs. Many of the newer protocols are being reported that the organisms are resistant to all available antibiotics. Patients who contract healthcare-associated pneumonia, namely pneumonia from healthcare facilities, have a greater risk of death as opposed to community acquired pneumonia due to the lack of sufficient and effective protocol.

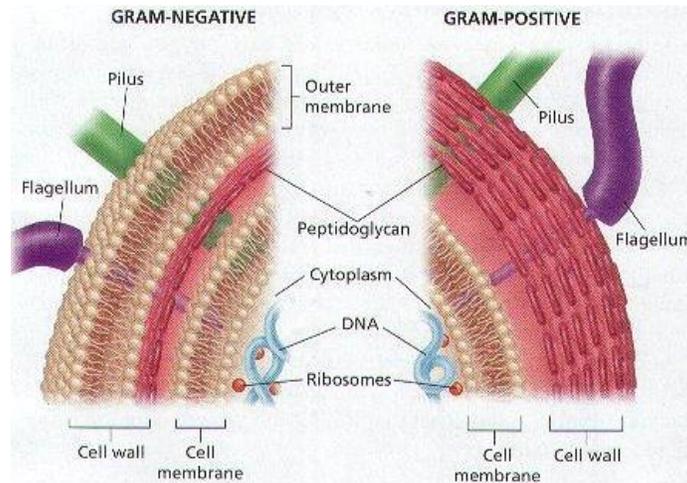
Many hospitals have become a breeding ground for several drug-resistant Gram-negative germs. According to researchers at SUNY Downstate Medical Center, more than 20 percent of the *Klebsiella* infections in Brooklyn hospitals are now resistant to virtually all modern antibiotics. Those supergerms are now spreading worldwide.

"For Gram-negatives we need any drugs," said Dr. Brad Spellberg, an infectious-disease specialist at Harbor-U.C.L.A. Medical Center in Torrance, Calif., and the author of "Rising Plague," a book about drug-resistant pathogens. He states this because there is no current protocol to solve this situation.

Doctors treating resistant strains of Gram-negative bacteria are often forced to rely on two similar antibiotics developed in the 1940s — colistin and polymyxin B. These drugs were largely abandoned decades ago because they can cause kidney and nerve damage, but because they have not been used much, bacteria have not had much chance to evolve resistance to them yet.

Drug-resistant Gram-negative germs for the most part threaten only hospitalized patients whose immune systems are weak. The germs can survive for a long time on surfaces in the hospital and enter the body through wounds, catheters and ventilators.

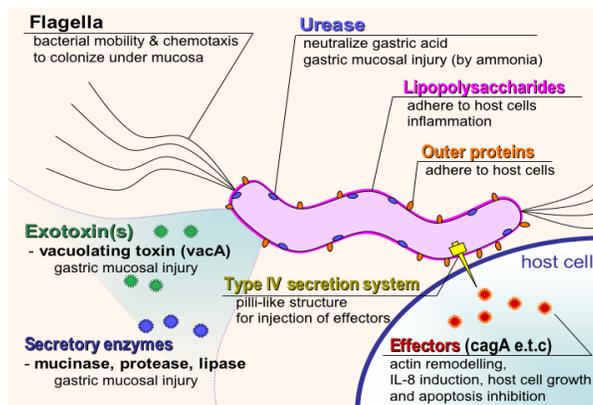
What is most worrisome about the Gram-negatives is not their frequency but their drug resistance.

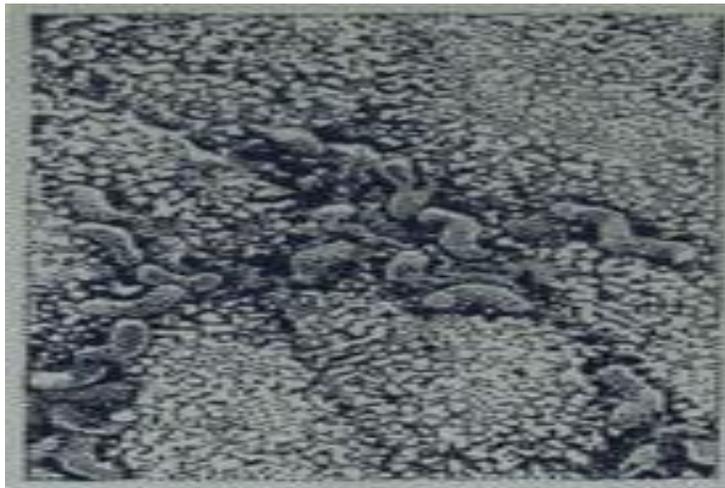


What Is H. Pylori?

Helicobacter pylori is now well known as a Gram-negative bacteria that plays a role in the pathogenesis of peptic ulcers, gastritis, primary B cell gastric lymphoma and adenocarcinoma of the stomach. Eradication is difficult and generally requires a triple drug regime to achieve. This is related to a number of side effects and there is the concern of the development of bacterial resistance. More than 50% of the world's population harbor *H. pylori* in their gastrointestinal tract. Infection is more prevalent in developing countries. *H. pylori*'s helix shape is thought to have evolved to penetrate the mucoid lining of the stomach.

H. pylori is a fragile bacteria that has found an ideal home in the protective mucous layer of the stomach. These bacteria have long threads protruding from them that attach to the underlying stomach cells. The mucous layer that protects the stomach cells from acid also protects *H. pylori*. These bacteria do not actually invade the stomach cells as certain other bacteria can. The infection, however, is very real and it does cause the body to react. Infection-fighting white blood cells move into the area, and the body even develops *H. pylori* antibodies in the blood.





Scanning electron mirograph of H.Pylorie

What are the symptoms of H. Pylori?

Oral and gastrointestinal symptoms:

- Malabsorption of proteins
- Metallic taste in mouth
- Metallic taste worsens 2-3 hours after eating and happens in the middle of the night
- Sharp, persistent stomach pain, chronic hoarseness, chronic laryngitis, middle-ear effusion
- Complaints such as chronic cough, sore throat or hoarseness
- H. pylori is seen in patients with chronic sinusitis
- Have a gastro esophageal-related underlying cause
- Low sugar (Hypoglycemia)
- Increases toxic ammonia (Urease Enzyme) in the body
- Allergies to shell and cod fish

How Does One Get H. Pylori?

Helicobacter pylori (H. pylori) is one of the frequently encountered microorganisms in the aero digestive tract. Although infections caused by H. pylori are this common, the exact mode of transmission has not been fully understood yet. Oral–oral, fecal–oral and gastrointestinal–oral routes are the possible modes of transmission.

H. pylori infection probably occurs when an individual swallows the bacteria in food, fluid, or perhaps from contaminated utensils. The infection is likely one of the most common worldwide. The rate of infection increases with age, so it occurs more often in older people. It also occurs frequently in young people in the developing countries of the world, since the infection tends to be more

common where sanitation is poor or living quarters are cramped. In many cases it does not produce symptoms. In other words, the infection can occur without the person knowing it. The infection remains localized to the gastric area, and probably persists unless specific treatment is given.

Helicobacter Pylori Tests

Four tests are used to detect H. pylori:

- Blood antibody test. A blood test checks to see whether your body has made antibodies to H. pylori bacteria. If you have antibodies to H. pylori in your blood, it means you either are currently infected or have been infected in the past.
- Urea breath test. A urea breath test checks to see if you have H. pylori bacteria in your stomach. This test can show if you have an H. pylori infection. It can also be used to see if treatment has worked to get rid of H. pylori. The breath test is not always available.
- Stool antigen test. A stool antigen test checks to see if substances that trigger the immune system to fight an H. pylori infection (H. pylori antigens) are present in your feces (stool). Stool antigen testing may be done to help support a diagnosis of H. pylori infection or to determine whether treatment for an H. pylori infection has been successful.
- Stomach biopsy. A small sample (biopsy) is taken from the lining of your stomach and small intestine during an endoscopy. Several different tests may be done on the biopsy sample. For more information, see the medical test Upper Gastrointestinal Endoscopy.

A Helicobacter pylori (H. pylori) test is done to:

- Determine whether an infection with H. pylori bacteria may be causing an ulcer or irritation of the stomach lining (gastritis).
- Determine whether treatment for an H. pylori infection has been successful.

Mastic Offers a Solution from the Past

Mastic gum has been shown in a more recent study to inhibit the growth of H. pylori as well as act as an antibiotic against the bacterium. Mastic gum appears to be able to be absorbed through the Gram-negative bacteria's protective protein cover, thus destroying the bacteria with its natural antibacterial properties.

Mastic gum has been tested against ulcer formation and healing in various models. One study involved experimentally-induced gastric and duodenal ulcers in rats. At a dose of 500 mg/kg, it reduced gastric secretions, protected cells, and demonstrated a significant reduction in the intensity of gastric mucosal damage,

confirming a low toxicity potential. In another study, human patients with endoscopy-proven duodenal ulcers were given either one gram of mastic or placebo daily for two weeks. Eighty percent of the patients taking mastic gum reported improvements in their symptoms of stomach pain and seventy percent had healing changes in the gastric mucosa as observed by endoscope. Mastic gum has been shown to work against many strains of *H. pylori*.

Researchers at the University of Nottingham used mastic gum in clinical trials on patients with peptic ulcers. Mastic relieved the pain and seemed to clear the stomach and duodenal ulceration within 2 weeks. They later confirmed that mastic gum kills *Helicobacter pylori*, at concentrations as low as 0.06 mg/ml. [Results published in the NEJM.]

Researchers at Aristotle University in Greece found that topical mastic gum reduced bacterial plaque by 41.5%. Mastic gum drew leukocytes into the liquid found in the gingival, which also reduced the toxins in the bacterial plaque. Other European researchers confirm that mastic can help preserve and strengthen gums and teeth. Recent research at the University of Athens Department of Pharmacy has shown that mastic and mastic oil have significant antibacterial and fungicidal properties.

Mastic gum is well tolerated and has no serious side effects when consumed at the recommended dietary supplement dose of 1-2 grams per day. As with any dietary supplement, please see your physician before use.

Traditionally, mastic has been used as a food preservative, for dyspepsia and other disorders of the digestive tract, to prevent dental cavities and other gum and mouth problems, and to help control diabetes. In Europe mastic gum has been used to help normalize cholesterol, triglyceride and blood pressure levels, as well as in the preparation of ointments for skin problems, including burns, eczema and frostbite. Because mastic gum is valuable for oral hygiene, it is used in toothpaste, mouthwash, and as a component in dental fillings.

Pharmaceutical companies use it in the production of pills and capsules, in self-absorbing surgical threads, and doctors use it for sticking a septic bandage on a surgical wound. The Kurds add mastic to their drink *arac*, similar to the Greeks' *ouzo*, to prevent damage to the stomach. This wide range of applications points to mastic gum's toxicological safety.

Many modern researchers have confirmed some of the traditional uses of mastic gum, including its roles in oral health and healthy digestive functioning.

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