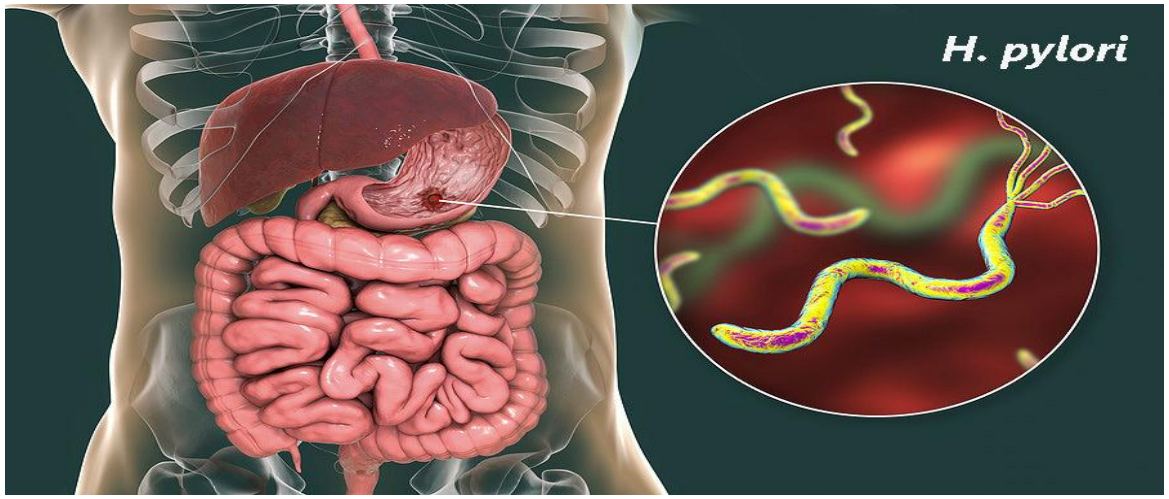

A brief explanation of the management of Helicobacter pylori

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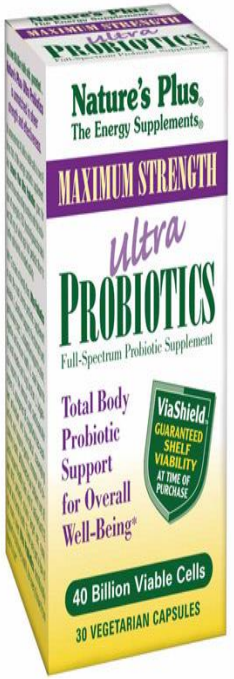
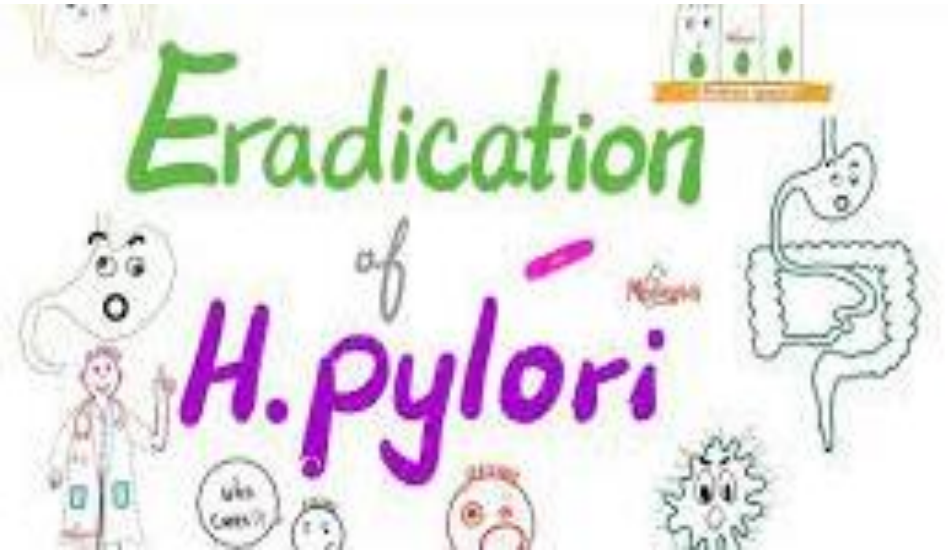
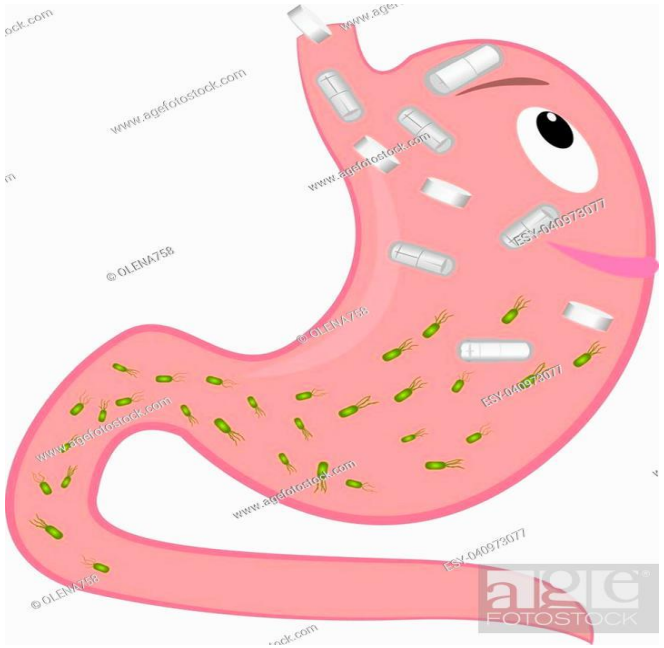


Overview

- Helicobacter pylori (H. pylori) is a Gram-negative anaerobic bacterium that
- colonizes the human stomach and is the leading cause of gastric diseases such as
- the chronic gastritis and peptic ulcers,
- as well as the most definite and controllable risk factor for the development of gastric cancer.

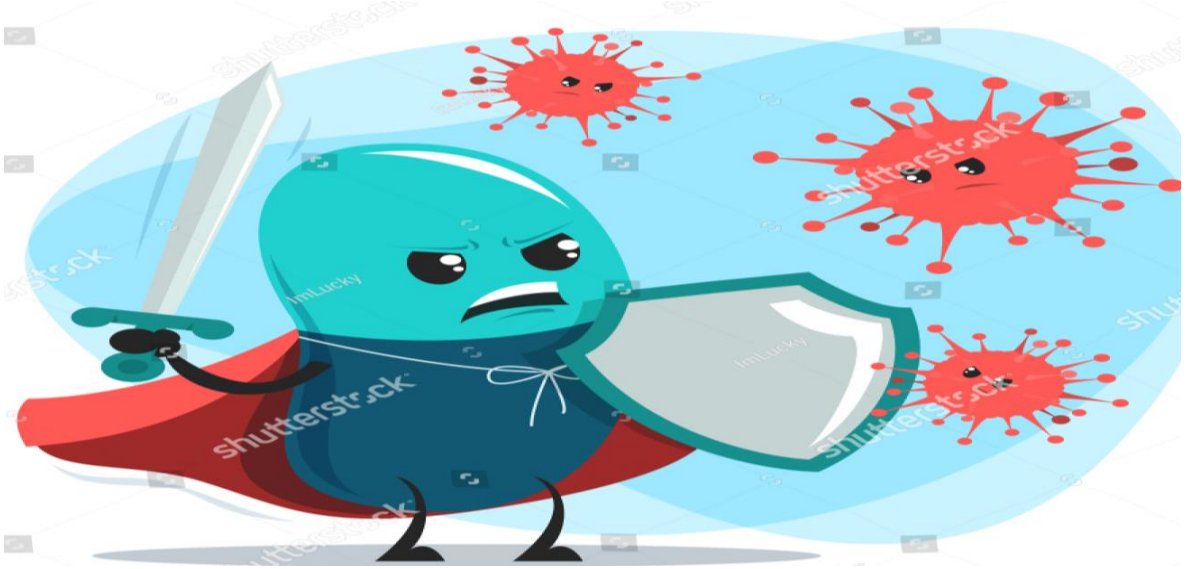
- Currently, the regimen for H. pylori eradication has changed from triple to quadruple, the course of treatment has been extended, and the type and dose of antibiotics have been adjusted
- but gradually increasing side effects and repeated treatment failures in an increasing number of patients.





Group of drugs are used in the treatment of H. pylori

- Drugs for the eradication of H. pylori include:
- Antibiotics and proton pump inhibitors (PPIs)



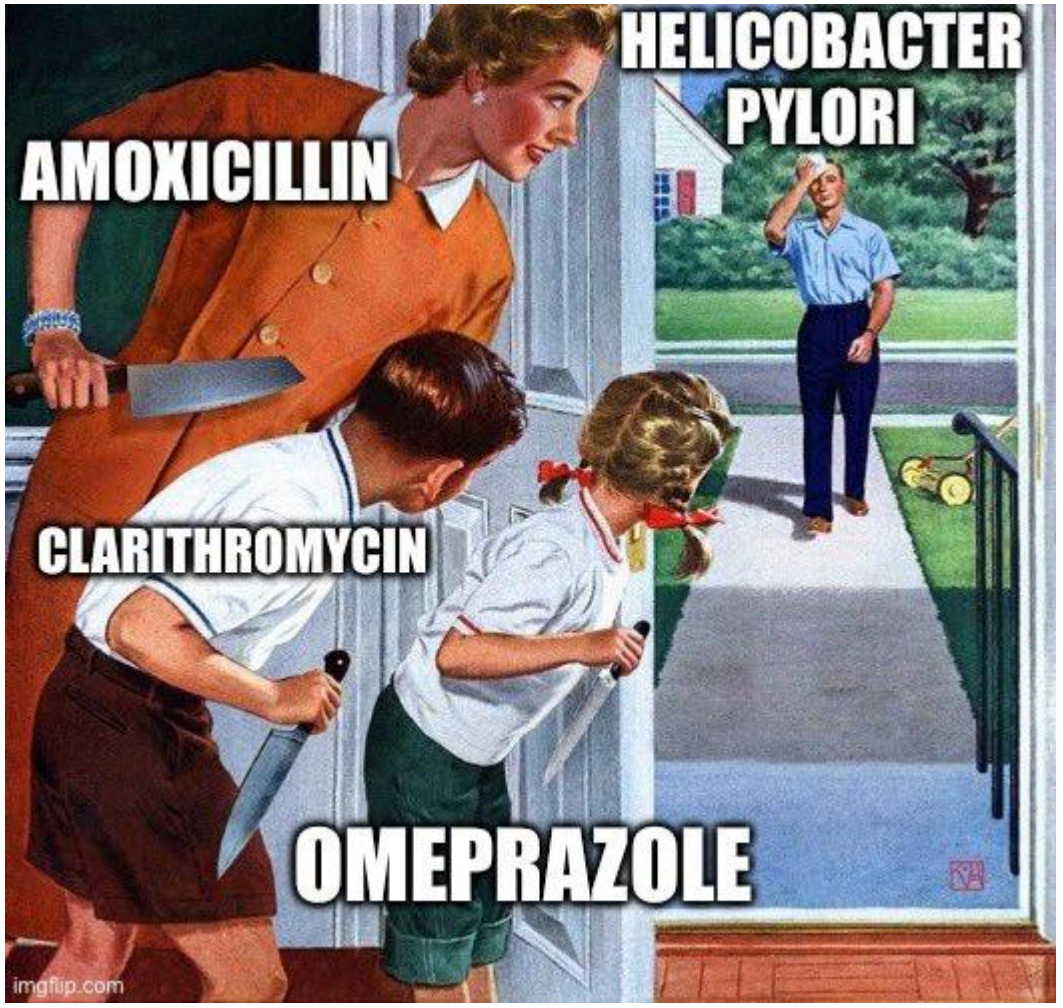
A single drug cannot eradicate H. pylori, and a combination treatment regimen must be used.

Main H.Pylori treatment protocols

- The main clinical protocols are:
- Triple therapy
- Non-bismuth quadruple therapy
- Bismuth-based quadruple therapy

Triple therapy

- A combination of one PPI with two antibiotics is a triple therapy.
- The standard triple regimen based on clarithromycin, which can be use for 7 days with omeprazole, amoxicillin, or omeprazole and metronidazole, with clarithromycin
- This regimen was the first-line regimen for H. pylori eradication at the time because of its low drug intake, short course of treatment, high efficacy, and low incidence of side effects.



- PPI (eg, omeprazole 20 mg BID, lansoprazole 30 mg BID, esomeprazole 40 mg QD, pantoprazole 40 mg QD, rabeprazole 20 mg BID) *plus*
- Clarithromycin 500 mg BID (first-line and continues to be recommended in areas where *H pylori* clarithromycin resistance is less than 15% and in patients without previous macrolide exposure) or metronidazole 500 mg BID (when clarithromycin resistance is increasing) *plus*
- Amoxicillin 1000 mg BID or metronidazole 500 mg BID (if not already selected

- Later, scholars expanded the triple regimen with levofloxacin or metronidazole, achieving high eradication rates.
- However, with the increasing rate of antibiotic resistance of H. pylori over the years, the eradication rate of these drug based triple regimens has been below 80%
- and the eradication rate is unsatisfactory even if the regimen is extended to 10 or even 14 days.

Quadruple therapy

Non-bismuth quadruple therapy

- May be given sequentially or concomitantly.
- *Sequential therapy*
- Sequential therapy (a suggested first-line option) and consists of the following:

1. PPI + amoxicillin for 5-7 days (eg, pantoprazole 40 mg BID and amoxicillin 1 g BID for 7 days), *then*
2. PPI plus 2 other antibiotics for the next 5-7 days; clarithromycin and metronidazole are the antibiotics usually chosen
3. Or we have levofloxacin-based regimens and tetracycline-based regimens (eg, pantoprazole 40 mg BID, tetracycline 500 mg QID, and metronidazole 500 mg BID)

- Eradication rates with different durations of sequential therapy are as follows:
- 14 days: 90.7-92.5% eradication rates
- 10 days: 87% eradication rate

- *Concomitant therapy*
- Concomitant therapy (an alternative first-line option) consists of the following :
- PPI *plus* Amoxicillin *plus* Clarithromycin *plus* Metronidazole (500 mg TID in one study)
- Duration of concomitant therapy is 10-14 days.
- Concomitant therapy is better for clarithromycin-resistant strains, and 14 days of concomitant therapy is superior to 14-day triple therapy, with cure rates of ≥90%.

Bismuth quadruple therapy

Bismuth quadruple therapy

- The classic bismuth quadruple regimen consists of PPI, bismuth, tetracycline, and metronidazole
- As the rate of H. pylori resistance to clarithromycin increased, the efficacy of the clarithromycin triplet regimen declined, and bismuth quadruple therapy was positioned to be a first-line treatment. Bismuth increases the eradication rate of H. pylori resistant strains by 30% to 40%.
- So, it was recommended to use bismuth quadruple therapy as the first-line treatment option due to the high eradication rate and the fact that bismuth is not easily developed drug resistance and has high safety in short term application.

- Bismuth is an antidiarrheal and anti-inflammatory agent used for symptomatic treatment of nausea, indigestion, upset stomach, diarrhea, and other temporary discomforts of the stomach and gastrointestinal tract.
- Bismuth is an antacid and anti-diarrheal agent.

Pharmacodynamic properties reported for bismuth subcitrate

- Bactericidal effect on *H. pylori*
- Binding to the ulcer base
- Inactivation of pepsin
- Stimulation of prostaglandin biosynthesis
- Suppression of leukotriene biosynthesis
- Inhibition of various enzymes
- Stimulation of epithelial

Bismuth-based therapy

- Bismuth-based therapy is an alternative first-line therapy (in areas with high clarithromycin and metronidazole resistance, and in patients with prior macrolide exposure or penicillin-allergic) or second-line therapy. It consists of the following:

1. PPI or H2 receptor antagonist (e.g, lansoprazole 30 mg BID or famotidine 20 mg BID) *plus*
2. Bismuth subsalicylate 525 mg QID (or bismuth tripotassium dicitrate 300 mg QID) *plus*
3. Metronidazole 250 mg QID or 500 mg TID (or levofloxacin 500 mg QD) *plus* Tetracycline 500 mg QID

- Duration is 10-14 days. The eradication rate was 90.4% for 10 days of bismuth quadruple therapy, while extending therapy to 14 days achieved an eradication rate of 97.1%

Probiotic intervention

- Due to the decreasing eradication rate of conventional therapies, some studies have begun to focus on the role of probiotics in H. pylori eradication. According to the standard definition of the Food and Agriculture Organization of the United Nations and the World Health Organization, probiotics are live microorganisms that, when ingested in sufficient quantities, are beneficial to host health.
- Numerous studies have shown that probiotics can benefit the human body in many ways, mainly in improving the health of the gastrointestinal tract.

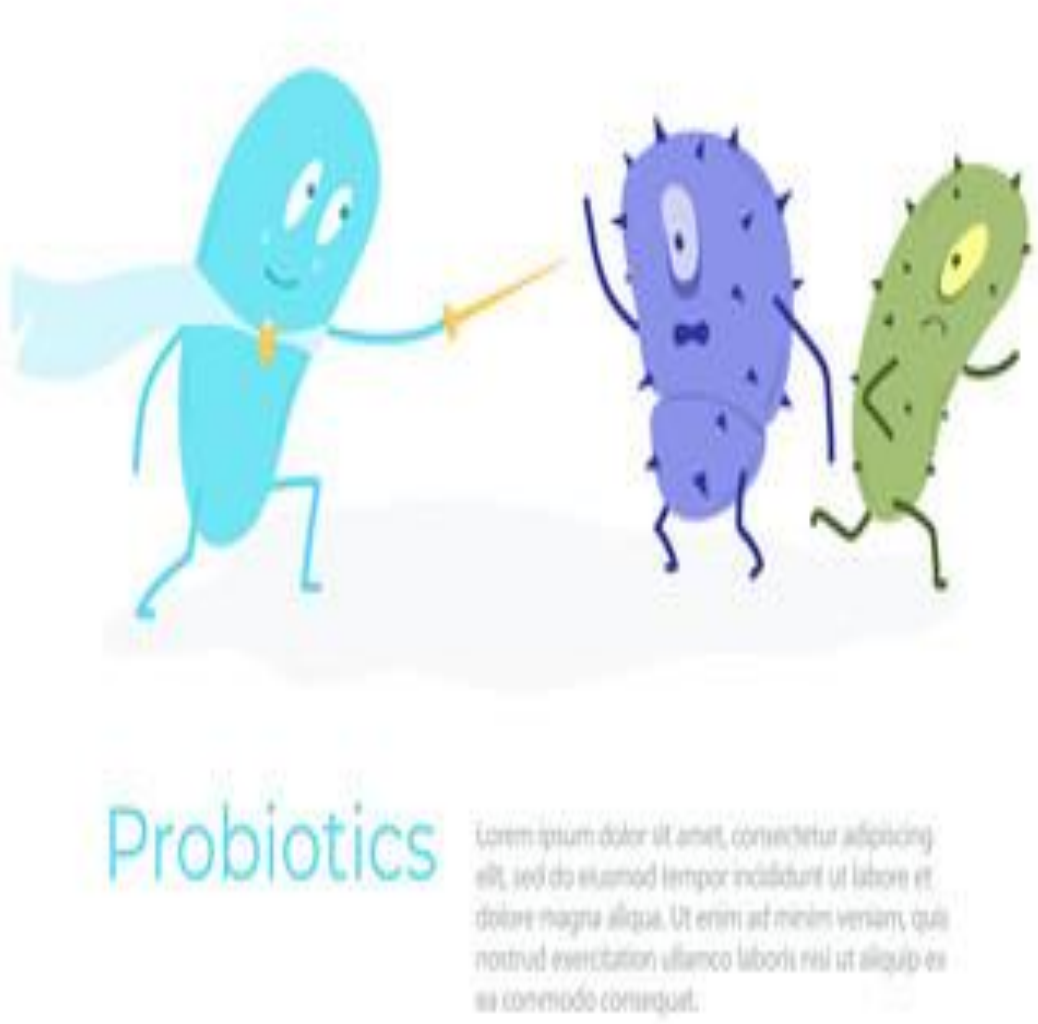
- Current research on probiotics in H. pylori eradication treatment focuses on whether :
- the addition of probiotics can improve the eradication rate of H. pylori;
- whether the addition of probiotics can reduce the incidence of side effects and alleviate symptoms in H. pylori eradication regimens
- and whether the addition of probiotics can promote the restoration of microecological imbalances caused by eradication drugs.

The potential mechanisms of action of probiotics

- The potential mechanisms of action of probiotics to improve H. pylori infection include the following aspects:
- First, probiotics may help to enhance the barrier effect
- The gastric acid and mucus barrier of the gastric mucosa are the first line of defense against pathogenic bacteria in the stomach.
- Some probiotics can promote mucin and mucus secretion and thus mucus secretion, and enhance the barrier effect of the gastric mucosa.

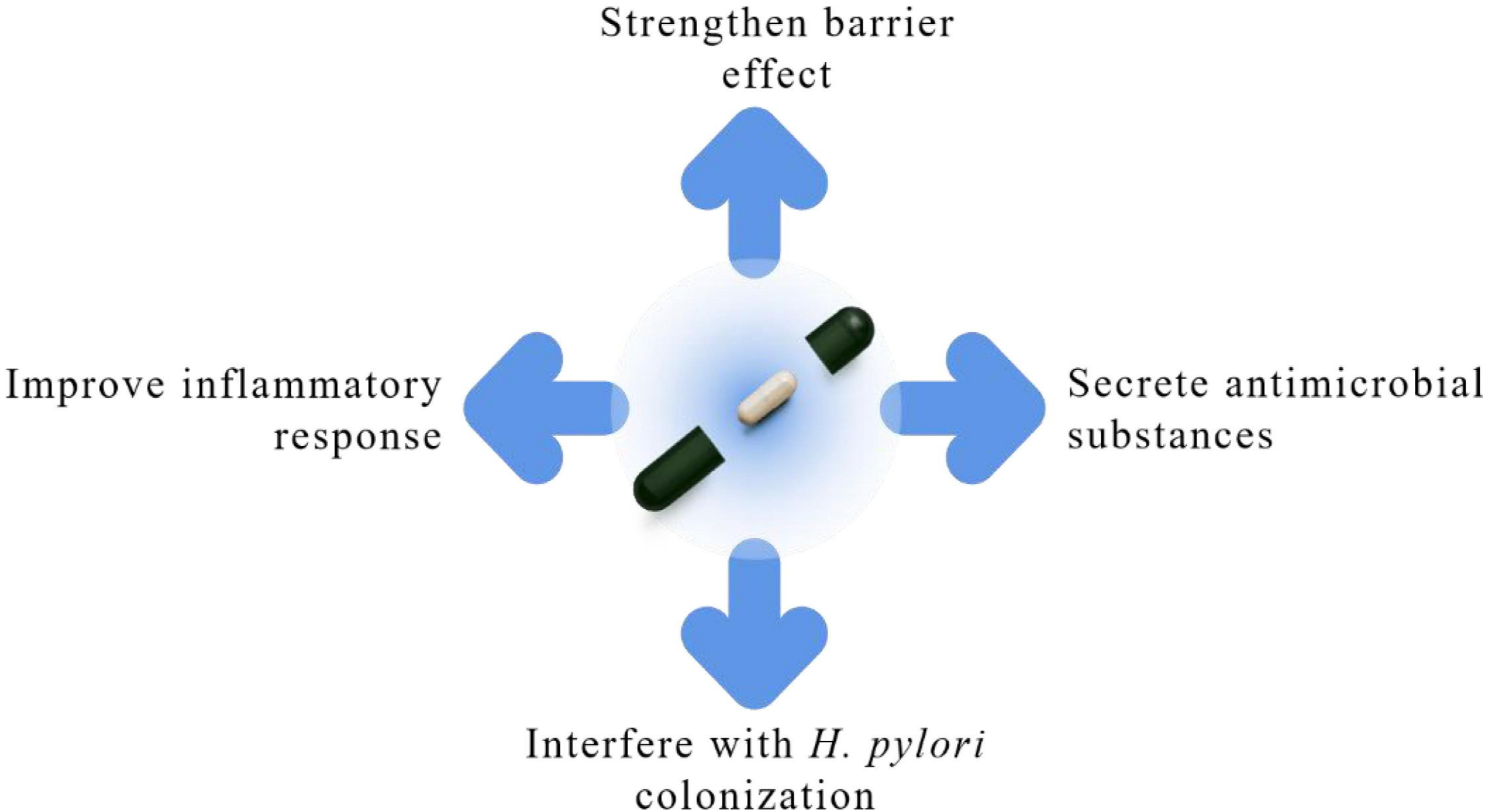
- Second, some probiotics can secrete antimicrobial substances, such as lactic acid, short-chain fatty acids (SCFAs), hydrogen peroxide, and bacteriocins.
- Lactic acid and SCFAs have incomplete dissociation properties, and the undissociated forms of these organic acids can cause damage to H. pylori.
- The anti-H. pylori effect of lactic acid and SCFAs is also related

to their inhibition of H. pylori urease activity. Some probiotics can synthesize hydrogen peroxide and bacteriocins, which also have direct antibacterial effects.



- Third, probiotics can interfere with H. pylori colonization. Some probiotics can interfere with the colonization of H. pylori in gastric mucosal epithelial cells by:
- Competing for adhesion sites, interfering with the adhesion process, and binding to H. pylori to form co-polymers to facilitate its excretion.

- In addition to these non-immune effects, Some probiotics may also reduce the host inflammatory response caused by H. pylori infection.
- The sustained expression of inflammatory factors caused by H. pylori infection can lead to a long-term chronic inflammatory response and is an important pathological basis for the pathogenesis of H. pylori infection.
- Probiotics can inhibit the expression of pro-inflammatory factors and improve the inflammatory response in the stomach.


Strengthen barrier effect
Improve inflammatory response
Secrete antimicrobial substances
Interfere with H. pylori colonization

How can Probiotic be used in treating H.Pylori?

- The optimal dose, the time of dosing, the duration of therapy, and the interaction mechanisms among the selected probiotics and antibiotics remain to be explored.

Conclusion

- Treating H.pylori is difficult due to the development of the bacterial resistance ;however
- There are suggestions to use probiotic supplementation as adjunctive therapy to improve eradication rates and reduce side effects in H. pylori eradication regimens

Thank You for Your Attention