




H. Pylori Review Based on GI Map

12.17.21




Knowing facts that are logical and have both studied back ups and anecdotal worth are critical to understanding the HP process and truth about its lifestyle and ability to function in different environments.





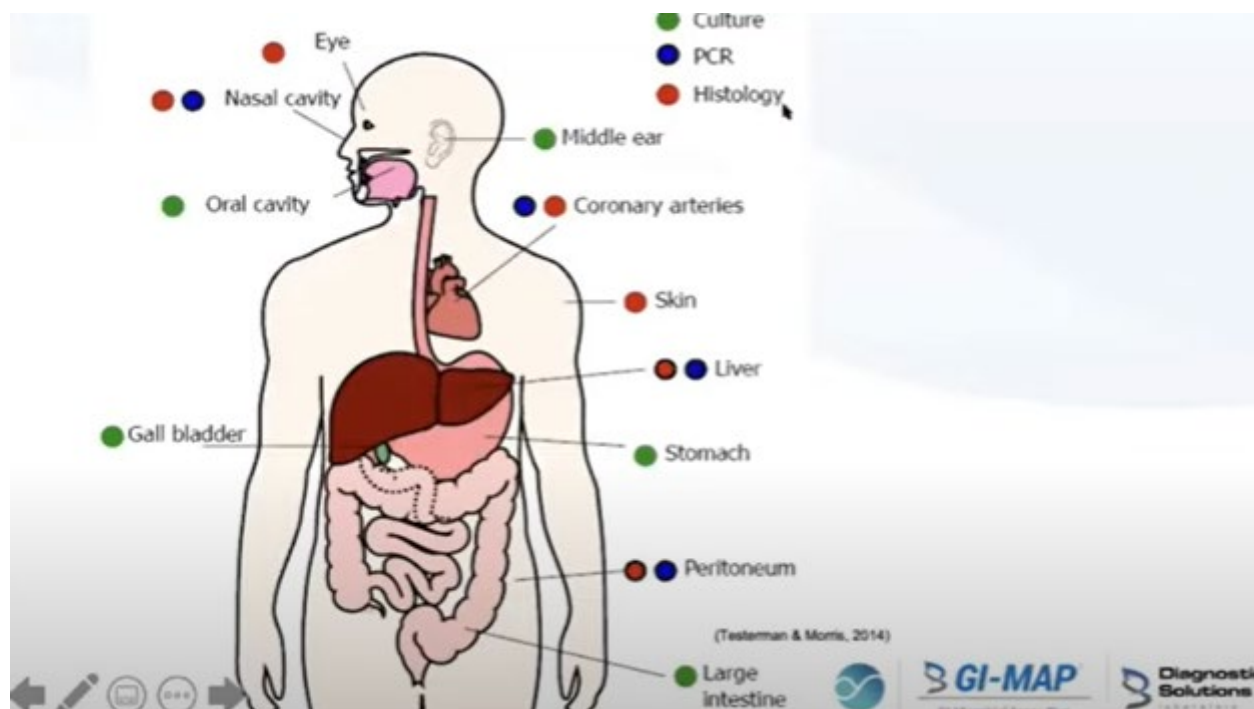
We are doing a review of the information presented in the Diagnostic Solutions webinar as it relates to facts and truth and based on what we know from both practice and white papers/studies.



Statements and Information

The webinar starts by indicating that HP is very hard to treat and has a high recurrence rate.

Where else are we seeing HP?



Symptoms

Non-Classic GI Manifestations

- Gas & bloating
- Histamine symptoms
- Diarrhea
- Constipation
- Halitosis
- Persistent dysbiosis
- Hyperemesis gravidarum



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All Molecular Gastroenterology



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Symptoms

Extraintestinal Manifestation

- Fatigue
- Depression and Anxiety
- **Nutrient deficiency, especially iron deficiency**
- **Insomnia**
- **Skin conditions, including chronic urticaria**
- Idiopathic thrombocytopenic purpura
- Insulin & blood sugar dysregulation
- **Sinus/ENT issues**
- Autoimmunity
- **Neurodegenerative conditions**
- Infertility
- Much more!



Franceschi et al. 2015, Nakagawa et al. 2018, Figura et al. 2002



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Basics of *H. pylori*

H. Pylori Basics

- Co-evolving for 58,000+ years
- Gram negative – double cell membrane
- Helical rod w/ sheathed flagellae
- Huge amount of genetic variation
- Very resistant to treatment
- High recurrence rate – 50-80%



Momeni et al, 2014, Krzyzek & Grande, 2020



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Basics of *H. pylori*

“Although further research may show that human beings are better off without their long-time companions *H. pylori*, I maintain that **we are at present too ignorant** of the diversity of *H. pylori* strains and their interactions with human beings **to advocate their total elimination**”

Dr. Martin Blaser



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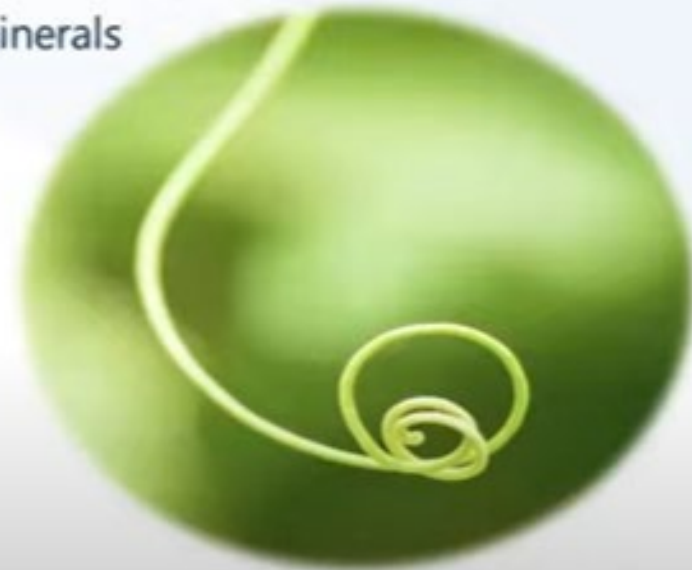


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Growth of *H. pylori*

What promotes *H. pylori* growth?

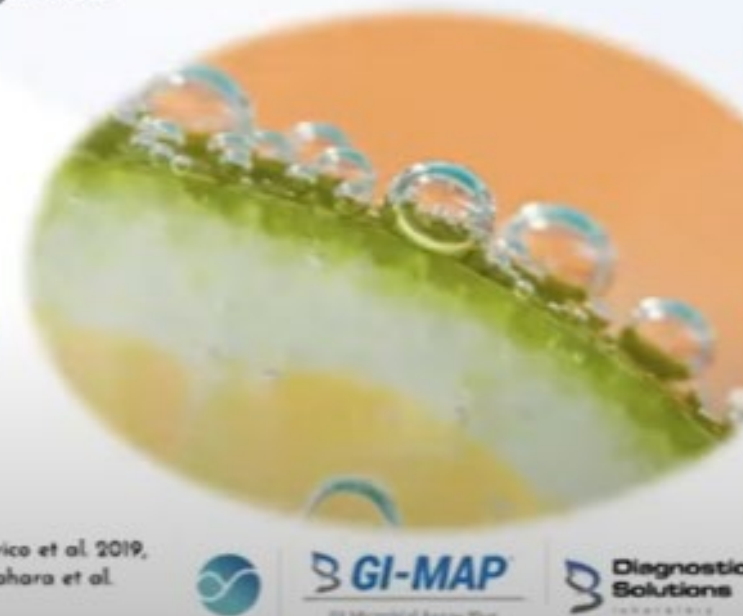
- Iron, nickel, copper, cobalt & other minerals
- Glucose
- **Hydrogen**
- Cholesterol
- Ammonia & amino acids
- **Catecholamines**
- High pH
- **Biofilm**



Growth of *H. pylori*

What does *H. pylori* produce?

- Enzymes: **urease**, catalase, oxidase, hydrogenase
- **Lipopolysaccharide** – low inflammatory
- Peptidoglycans
- Virulence factors
- Hydrogen sulfide
- **Biofilm**
- **Gamma Glutamyl Transpeptidase (GGT)**
- Outer membrane vesicles
- Outer membrane proteins



Backert & Clyne, 2011, Salama et al, 2013 Testerman & Morris, 2014, Di Lodovico et al. 2019, Hathroubi et al. 2018, Kidd et al. 1997, Stark et al. 2002, Lee et al. 2006, Kawahara et al. 2020



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Immune System and H. pylori

Immune changes with HP

- Promotes Th1 polarization
- IL-1 β - promotes inflammation
- Activates inflammasomes
- IL-18, IL-10 – promotes immune tolerance --> persistent infxn
- GGT – inhibits T cell proliferation --> persistent infxn
- Blocks IL-2 – downregulate NK & B cells
- PAMPs – evade detection by pro-inflammatory TLRs
- Inhibition of phagocytosis by macrophages
- Stimulates histamine release
- HP can reduce diversity of normal flora



Backert & Clyne, 2011; Salama et al, 2013; Kusters et al. 2020, Kidd et al. 1998, Tsai et al. 2015, Masini et al, 1994, Chen et al. 2021



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Forms of *H. pylori*

Cocoid *H. pylori*

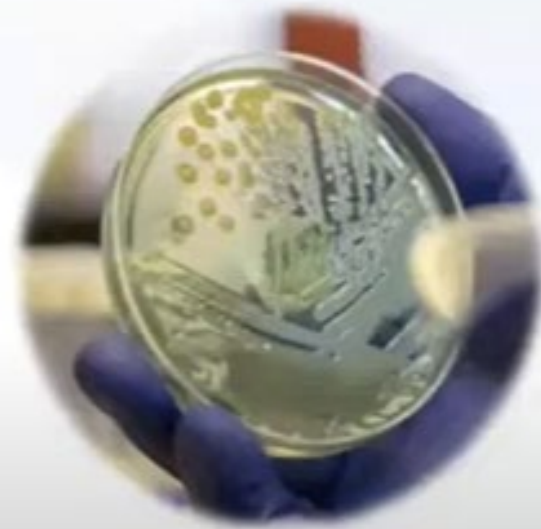
- Morphological variation
- VBNC State, ABX resistant
- Driven by antibiotics, botanicals, PPIs,
- Low urease production, VFs still produced
- Potential solutions:
 - More acid inhibition
 - Linolenic acid
 - NAC



Co-infections of *H. pylori*

Common Co-Infections

- Yeast
- *E. coli*
- Hydrogen-producing bacteria
- *Blastocystis hominis* & other protozoa



Karczewska et al. 2009, Benoit et al. 2020, Palencia et al. 2016, Sánchez-Alonzo et al. 2021
Sánchez-Alonzo et al. 2020, Siavoshi & Sanjeev, 2014



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All Molecular Gastric Map

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H. pylori is a Pathogen

- Invades tissue & disrupts cell membrane
- Gastric & duodenal ulcer
- Group 1 carcinogen
- Gastric carcinoma
- Increased risk of:
 - CRC, esophageal/pharyngeal CA, MALT lymphoma

Backert & Clyne, 2011; Waskito et al, 2007; Testerman & Morris, 2014; De Falco et al, 2015



H. pylori is Beneficial/Commensal

- Populates majority of humans
- Protective against allergies
- May be protective against IBD
- More likely to be beneficial in childhood
- May be protective against celiac disease



Testerman & Morris, 2014

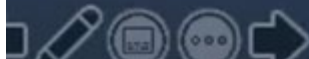


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H. pylori

	Result		Normal
<i>Helicobacter pylori</i>	1.3e3	High	<1.0e3
Virulence Factor, babA	Negative		Negative
Virulence Factor, cagA	Negative		Negative
Virulence Factor, dupA	Positive		Negative
Virulence Factor, iceA	Negative		Negative
Virulence Factor, oipA	Positive		Negative
Virulence Factor, vacA	Negative		Negative
Virulence Factor, virB	Positive		Negative
Virulence Factor, virD	Positive		Negative



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Isothiocyanates/Sulforaphane

- High urine levels had lowest occurrence of gastric cancer (n=18000)
- In vitro:
 - Bactericidal against *H. pylori*
- In vivo:
 - Decreases *H. pylori* colonization
 - Mitigates mucosal inflammation
 - Reverses NSAID-induced gastritis
 - Decreases nitric oxide levels



Holubiuk & Imiela, 2016, Yanaka et al., 2017, Mirmiran et al., 2017



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