Research Article **ISSN 2835-6276**

American Journal of Medical and Clinical Research & Reviews

AUTISM/PICA and H. PYLORI: CLUES AND CURES(?)

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Received: 10 Nov 2025; Accepted: 15 Nov 2025; Published: 25 Nov 2025

Citation: Dean Alexander. AUTISM/PICA and H. PYLORI: CLUES AND CURES(?). AJMCRR. 2025; 4(11): 1-6.

Cigar-smoking detective Lt. Frank Columbo, played brilliantly by Peter Falk, solves each challenging case in the closing moments of the suspenseful drama. We watch as clues are uncovered – awaiting Columbo to put the final puzzle pieces together. Researchers may not be quite ready for a "Eureka" moment for autism/pica, but we believe we're getting closer. H. Pylori is a prime suspect in this story, and pica is often found at the scene of the crime. Let's examine the clues after defining terms.

Columbo: Excuse me, Sir – can I borrow that pencil? I need to make a few notes. Thank you very much.

H. Pylori is a bacterial infection that affects almost 50% of the worldwide population, and is a major cause of stomach and upper intestinal disorders, including ulcers of the stomach and duodenum (the beginning of the small intestine), gastritis, and stomach cancer. H. Pylori is correlated with chronic inflammation, causing structural changes in gastric mucosa. Compromise of the GI mucosa is a major health setback (Holmgren & Czerkinsky, 2005) (in Nabavi-Rad, A., Azizi, M., Jamshidizadeah, S. et al., 2022). Standard treatment includes multiple antibiotics and powerful stomach-acid suppressor drugs.

Pica is the compulsive, recurrent consumption of nonnutritive items, often benign, but sometimes lethal. Ingested items include beads, buttons, rubber gloves, socks, strings, cigarette butts, paper, plastics, pop tops, trash, small rocks, bark, dirt/soil, feces, plants, grass, leaves, mushrooms, and twigs (Alexander, Lunde & Berger, 2020). Other reports include sharp objects such as nails, pins, and broken glass as well as poisonous substances such as paint chips and swimming pool chlorine tablets (Trajkovski, 2018). In persons with developmental disabilities, estimates range from 15.5% (Lofts, Schroeder & Maier, 1990) to 23.2% (Fields, Soke, Reynalds, et al., 2019) and higher. Behavioral approaches to reducing pica have enjoyed some short-term successes, but maintenance over time, generalization across different settings, costly staff training, and setting restrictions for the pica client and peers all remain challenging issues (Alexander, 2024). These limitations have widened the doorway for biological interventions such as nutrition, biotics, and focus on healthful and harmful bacteria in the gut/microbiome. Micronutrients such as iron (Alexander, 2024; Johnson, Roesser, Hyman, et al., 2010; Swift, Paquette, Davidson 1999) and zinc (Lofts, et al., 1990) have a demonstrated role. A

meta-analysis of pica and micronutrient status showed that zinc plasma concentrations were significantly lower in clients with pica compared to controls (Miao, Young & Golden, 2015). It follows that zinc supplementation would reduce pica by addressing zinc deficiency. This was confirmed by Lofts and his colleagues. (For other metrics see Alexander, 2024.)

Columbo: A lot of "doc talk." Please bear with me.

CLUES(!):

A common denominator for H. Pylori and pica hypothesized here is microbiome-mediated gastrointestinal inflammation (dysbiosis). Clues may be found in patterns of overlapping symptoms and diseases for the two disorders. Table 1 shows the association between pica and GI symptoms such as abdominal pain, diarrhea, and vomiting for clients with Autism Syndrome Disorder (ASD) and nonautistic developmental disability.

TABLE 1: Percent occurrence for GI symptoms for ASD and nonautistic developmentally disabled clients with and without Pica

	ASD Pica (a)	ASD No Pica (a)	ASD Pica (b)	ASD No Pica (b)	ASD Pica (c)	ASD No Pica (c)	Dev.Dis. Pica (c)	Dev.Dis. No Pica (c)
Number of clients	1011	1280	17	15	282	962	132	1461
Age range	3-62	3-62	24-58	24-58	2-5	2-5	2-5	2-5
Percent Occurrence								
Abdominal Pain	41	30	29	0				
Alternating constipation/diarrhea			29	7				
Constipation			94	80	30.8	28.5	27.3	18.8
Diarrhea	39	27			17.4	11.9	15.2	5.5
GERD	24	15	35	7				
Irritable Bowel Syndrome	12	7						
Stooling, pain on					18.8	16.2	19.7	11.1
Stools, loose	37	25			22	16.2	22.7	7.7
Stools, smelly	44	29						
Vomiting			41	27	7.8	3.8	11.4	2.9
Range	12-44	7-30	29-94	0-80	7.8-30.8	3.8-28.5	11.4-27.3	2.9-18.8
Median (middle value)	38	26	35	7	18.8	16.2	19.7	7.7

a) Edelson (2020)
b) Alexander, Lunde, Berger (2020
c) Fields, Soke, Reynolds (2020)

Similarly, such symptoms are reported for H. Pylori. In extensive reports from both the Autism Research Institute, 2020 and the Fields study, 2020, every one of the 16 GI symptoms that they studied was more frequent for those with pica than for those without pica: Clinically significant and statistically significant. (Flip a coin repeatedly 16 times and see how often they all come up heads!)

This pattern of overlap for pica and H. Pylori is also suggested for GI diseases in Table 2 (Alexander, et al., 2020).

TABLE 2: Association between pica and gastrointestinal diseases in clients with ASD

	Pica	No Pica	Pica/No Pica Ratio
Number of clients	33	31	
Age range	24-58		
Percent Occurrence			
Aerophagia	12	0	100
Colitis	15	6	2.5
Duodenitis	27	13	2
Esophagitis	39	13	3
Gastritis	58	26	2.2
GERD	30	23	1.3
H. Pylori	15	0	100
Hiatal Hernia	15	6	2.5
Intestinal Blockage	9	3	3
Ulcer	15	3	5
Range	9-58	0-26	
Median (middle value)	15	6	3.5

Alexander, Lunde, Berger (2020)

Diseases are, of course, even more clinically significant than symptoms, but here highly statistically significant as well. The percentages for all ten of the most frequently occurring GI diseases were higher for clients with pica disorder. This included H. Pylori itself – occurring in 15% in the combined pica group versus *none* of the clients without pica; ulcer occurring five times more often in the combined pica groups; and gastritis, by far the most frequently occurring disease at 58% compared to 26% of those without pica. These are signposts for H. Pylori infection.

Columbo: Folks, like this pencil, I'm not as sharp as I used to be. But I still have a nose for these things. To be on the safe side, I commissioned two kids [UCLA pre-doctoral psych interns] to gather the evidence and eliminate any ~~al pastori~~ apriori bias. 16 out of 16 symptoms! Ten out of ten diseases! Holy s…moke. If I start believing in coincidences like that, I'll have to find another line of work.

CURES(?)

Historically, three studies demonstrated experimentally a relationship between pica and nutrition: Lofts, et al., 1990, noted above, using zinc chelated for improved absorption; Bugle & Rubin 1993, employing a supplemental liquid diet containing all essential nutrients; and Pace & Toyer, 2013, employing a common multivitamin. Fast forward to 2015. Ozturk, Kurt, Ozgeris, et al., demonstrated that serum zinc levels were significantly higher and serum magnesium levels significantly lower in H. Pylori positive children than those of controls. If H. Pylori is in play, chelated magnesium could then be expected to correct the serum deficiency. However, magnesium is not reported to suppress pica. Ordinarily, zinc in any of eight current forms would be

contraindicated for managing H. Pylori since H. Pylori is already associated with significantly high zinc levels. In fact, adding zinc to reduce pica is likely to worsen H. Pylori: H. Pylori requires zinc to induce inflammatory activity and has evolved three zinc transport systems to survive high levels of zinc (Haley & Gaddy, 2015) (in Nabavi-Rad, et al.) Hence, the dilemna of addressing one problem at the expense of the other.

We would surely applaud a "Columbo moment" about now. And perhaps we have one. Japanese researchers, e.g. Ueda, Ueyama, Oka, et al., 2009, have developed a combination of zinc and carnosine that removes H. Pylori while healing the damage it has caused, as written up by Michael Downey in Life Extension Magazine, 2024 (physician reviewed, 53 references). Zinc-carnosine protects the stomach wall from corrosive contents, "sticks" to ulcers to quickly promote healing, inhibits dangerous H. Pylori, and treats gut permeability, i.e. leaky gut, by strengthening the intestinal barrier. A specific probiotic strain, lactobacillus reuteri DSMZ 17648 has also been shown to reduce H. Pylori bacteria (Mehling & Busjahn, 2013). Lactobacillus reuteri binds to H. Pylori, carrying them out of the body, which reduces the load of infection and helps prevent stomach cancer. Together this non-drug treatment package safely inhibits H. Pylori, lowers inflammation and heals the stomach lining, relieves stomach pain related to gastritis and peptic ulcer disease, and prevents gastric cancers related to H. Pylori.

Columbo: Yowzers!

Alternatively, zinc has also been reported to be DEFICIENT – as opposed to ELEVATED – in the presence of P. Pylori. (see Sempertegui, Diaz, Mejia, et al. 2007; Elsaghier, Aal, Faddan, et al. 2020; Zhang, Han, Gu, et al 2023; Ozturk, Kurt, Ozgeris, et al. 2015)

Columbo: Uh-oh- Catch 22…

Zinc deficiency makes the host more vulnerable to the inflammation associated with H. Pylori infection. Higher dietary zinc is associated with a lower likelihood of infection and a reduced risk of H. Pylori seropositivity.

Columbo: Seropositivity?? Why didn't you say so in the first place?

The integrity of the intestinal barrier is tied to consuming the right amount of zinc. An over- or underabundance of zinc can adversely impact the gut microbiome and cause diarrhea and inflammation.

Columbo: Time to call in the lab guys and stat gurus! So to wrap it up for now, this whole kerfuffle may boil down to (1) the benefit of Zinc Carnosine and Lactobacillus Reuteri versus adjusting the level of dietary zinc or zinc supplement, and (2) will that same zinc conjointly reduce pica and its correlates?

That's it for now…

Columbo: Just one more thing. Shoulda been a gastroenterologist and made my mother happy!

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