A PATIENT GUIDE FROM BELLYMD

Zinc-L-Carnosine: What the evidence shows.

A plain-language look at a chelated zinc compound first approved as a prescription gastric medication in Japan, and what the published research does and does not support.

About this guide. Zinc-L-carnosine, also called polaprezinc, appears in *MGB+ Cool* as part of a seven-ingredient upper-gut support formula. This handout covers the published evidence behind zinc-L-carnosine so you can read it yourself and decide what makes sense for you.

CHAPTER ONE

What is zinc-L-carnosine?

> *A short answer first. Zinc-L-carnosine is a single molecule built from zinc and a small protein fragment called L-carnosine. It was developed in Japan in the late 1980s and approved there as a prescription medicine for gastric ulcer in 1994 under the brand name Promac.*[1,2]

L-carnosine is a dipeptide, which is a tiny piece of protein made of two amino acids joined together: beta-alanine and L-histidine. Your body makes it naturally, especially in muscle and brain tissue. Zinc is an essential mineral your cells need for over three hundred different enzymes, including the ones that repair tissue and run your immune system.[1,3]

By itself, plain zinc is hard for the stomach lining to use efficiently. Cheap zinc supplements like zinc sulfate or zinc gluconate dissolve quickly and pass through, and they can irritate the stomach when taken in larger amounts. The chemists who developed zinc-L-carnosine asked a different question: what if you bonded the zinc directly to a small molecule that the stomach lining recognizes and tolerates well, so the zinc stays where it is needed for longer?[1,4,5]

That is what zinc-L-carnosine is. The zinc atom is held inside the L-carnosine molecule by chemical bonds that link it to the nitrogen and oxygen atoms in the dipeptide. The result is a chelated compound, meaning a single bonded compound, not two separate ingredients stirred together. Chemists describe it as a one-to-one polymer-like chain, which is a fancy way of saying the units stack neatly and dissolve in a slow, predictable way.[1,4]

> **THE SHORT VERSION**
> Zinc-L-carnosine is zinc locked inside a small natural peptide called L-carnosine. The combination is a single chelated molecule. It dissolves slowly along the stomach lining, sticks to areas of injured tissue, and delivers zinc and carnosine together right where they are needed.

Why the form matters more than the milligrams

This is the most important point in the brief. Zinc-L-carnosine is not the same as plain zinc and not the same as plain L-carnosine. The clinical research that supports it was almost all done on the chelated compound, not on the separate ingredients. Studies have shown that the zinc-L-carnosine complex sticks to ulcerated and inflamed gastric tissue, dissolves slowly, and releases zinc locally over hours, which plain zinc supplements do not do.[5,6]

When research talks about polaprezinc, zinc-L-carnosine, or the Japanese name Promac, it is the same compound. When research talks about zinc gluconate, zinc citrate, zinc picolinate, or zinc sulfate, that is plain zinc and the evidence does not automatically transfer. When research talks about L-carnosine on its own, that is the small peptide alone, and again the evidence does not automatically transfer. The chelated form is what carries the gut-specific evidence.[3,7]

A brief history

Zinc-L-carnosine was jointly developed by two Japanese companies, Hamari Chemicals and Zeria Pharmaceutical, beginning in the late 1980s. Early pharmacology papers used the code name Z-103.[8,9] After a decade of preclinical and clinical work, Japanese regulators approved it in 1994 as a prescription medicine for gastric ulcer.[1,2] Outside Japan, it is sold as a dietary supplement rather than a prescription drug, which is the form available in the United States.

CHAPTER TWO

How zinc-L-carnosine works in your body

> *Most supplements work by being absorbed into the bloodstream and travelling through the body. Zinc-L-carnosine works mainly the opposite way. Its job happens before it ever gets absorbed, while it is still inside your stomach and small intestine, in direct contact with the lining.*

It sticks to injured tissue

The first thing zinc-L-carnosine does is unusual. After you swallow it, the molecule preferentially adheres to areas of the stomach where the lining is damaged or inflamed. Researchers showed this directly in animal studies by tracking the compound after a dose. It coats areas of ulceration far more than healthy tissue, and stays there for hours.[5,6]

This matters because it concentrates the molecule's effects right where the work needs to be done. Compounds that are absorbed quickly into the blood and distributed everywhere have to act on the gut at low concentrations. A compound that lingers on injured tissue can act at much higher local concentrations.[5,6]

It supports the cells that build a new lining

Mucosa is the medical term for the lining of your stomach and intestine. It is a single layer of cells, only about one-tenth of a millimeter thick, separating the inside of your gut from the rest of your body. Every two to four days, this layer replaces itself entirely. The cells that build it have to divide quickly and migrate into place, like a tiling crew working continuously.[7,10]

In laboratory studies, zinc-L-carnosine increased both the migration speed and the multiplication rate of the cells that rebuild the gut lining. In one human study using a marker called the lactulose-to-rhamnose ratio, which measures how leaky the small intestine is, zinc-L-carnosine completely blocked the rise in gut permeability that normally happens when people take an NSAID called indomethacin for several days. People on placebo plus the NSAID saw their permeability roughly triple. People on zinc-L-carnosine plus the same NSAID showed no significant change.[10]

> **WHY THIS MATTERS FOR UPPER-GUT SYMPTOMS**
>
> Post-meal burning, fullness, and reflux symptoms are not only about stomach acid. The stomach and esophagus also depend on a healthy lining and well-regulated immune cells in the wall. When that lining is thinned or irritated, the same amount of acid feels worse, and the gut wall is more reactive to everyday triggers. A compound that supports the lining is acting on a different lever than a compound that lowers acid.

It triggers a cellular protection response

Inside cells, a family of molecules called heat shock proteins serves as a built-in first-aid system. When cells are stressed by heat, low oxygen, or chemical injury, they make more of these proteins, which protect the cell's machinery from coming apart. The most studied one in the gut is called HSP72. Multiple laboratory studies have shown that zinc-L-carnosine increases HSP72 production in stomach lining cells and that this rise is part of how the compound protects the tissue.[11,12]

A separate antioxidant enzyme called heme oxygenase-1 also goes up in response to zinc-L-carnosine. Heme oxygenase-1 helps cells handle the kind of free-radical stress that happens during inflammation. When

researchers blocked it experimentally, much of zinc-L-carnosine's protective effect on the stomach lining disappeared, which suggests this antioxidant pathway is part of how the compound actually works, not just a side observation.[13]

It calms certain immune signals in the gut wall

The gut wall contains immune cells called mast cells, which are immune cells in your gut that release inflammatory signals when triggered. Mast cells release histamine and other inflammatory chemicals when they sense a problem. In animal studies, zinc-L-carnosine reduced the release of histamine from mast cells and reduced the gastric injury that occurs when mast cells are deliberately activated.[14,15] It is one of several mechanisms by which the compound appears to dampen low-grade inflammation in the upper gut without acting on stomach acid.

It is unfriendly to H. pylori

H. pylori, the bacterial infection that contributes to many stomach ulcers and chronic gastritis, lives in the layer of mucus on top of the gastric lining. It is one of the few organisms that can survive there. Zinc-L-carnosine appears to make life harder for H. pylori in two ways. First, it strengthens the lining that H. pylori is trying to inflame. Second, when zinc-L-carnosine is added to standard antibiotic therapy against H. pylori, eradication rates go up. This was first observed in a small Japanese trial in 1999 and has since been confirmed in larger trials and meta-analyses, which are statistical pool-together studies that combine results from multiple trials.[16,17,18]

What zinc-L-carnosine is not

Zinc-L-carnosine is not an acid blocker. It does not lower the amount of acid your stomach makes. It does not work the way medicines like omeprazole or famotidine work, and it is not designed to replace them. It works on different parts of the upper-gut problem: the lining, the local immune signals, the antioxidant defenses, and the bacterial ecosystem.[7] If your physician has prescribed an acid-management medication, zinc-L-carnosine is meant to complement that work rather than substitute for it.

CHAPTER THREE

What the studies show

> *Here is the published evidence by area. Each section flags what the trial was, how big it was, and what the result actually means. Most of the research was done in Japan and other parts of Asia, which is a real limitation we will return to at the end.*

Gastric ulcer, the original Japanese indication

ANIMAL STUDIES AND JAPANESE CLINICAL TRIALS · 1989 TO 2022

The earliest pharmacology studies on zinc-L-carnosine focused on chronic gastric ulcer in rats, showing that the compound accelerated ulcer healing and increased markers of repair in the stomach wall.[9] These animal results were the basis of the Japanese clinical trials that supported approval in 1994.[1,2]

More recently, a 2022 multicenter randomized controlled trial in China compared zinc-L-carnosine against rebamipide, another mucosal-protective compound used in Asia. Two hundred twenty-four patients with gastric ulcers were treated for up to eight weeks. Healing rates were similar between the two groups, which was the prespecified test of equivalence.[19]

What this means: for the specific indication of gastric ulcer in Japan and China, zinc-L-carnosine has prescription-level evidence, including a modern blinded comparator trial. This is the strongest part of the clinical evidence base.

H. pylori eradication, as an add-on to antibiotics

THREE RANDOMIZED TRIALS POOLED · 396 PATIENTS · META-ANALYSIS 2022

The first signal came from a 1999 trial by Kashimura and colleagues in Japan, where adding zinc-L-carnosine to a standard three-drug antibiotic regimen for H. pylori increased eradication rates compared with the antibiotics alone.[16] A larger 2017 multicenter trial in China by Tan and colleagues found a similar effect, with eradication rates roughly 75 to 77 percent on zinc-L-carnosine plus triple therapy versus 59 percent on triple therapy alone.[17]

In 2022, Mahmoud and colleagues pooled three randomized trials, totaling 396 patients, in a meta-analysis published in the journal *Nutrients*. The combined estimate showed a roughly two-fold improvement in odds of eradication when zinc-L-carnosine was added to triple therapy. Adverse events were not increased.[18]

What this means: as an adjunct, meaning an addition to existing therapy rather than a replacement, zinc-L-carnosine has reproducible evidence that it improves H. pylori clearance. The effect is meaningful but the trials are still mostly Asian and the comparator regimens are not identical across studies. Zinc-L-carnosine should never be used as a standalone treatment for an H. pylori infection. That is a job for proper antibiotics prescribed by a physician.

NSAID-induced gut injury

HUMAN PILOT TRIAL AND ANIMAL STUDIES · 2007 TO 2016

NSAIDs are a class of pain and inflammation drugs that include ibuprofen, naproxen, and indomethacin. They are useful but they irritate the gut lining and increase intestinal permeability, the medical word for how leaky the small-intestine wall becomes. In a 2007 study published in *Gut*, Mahmood and colleagues at Imperial College London gave ten healthy volunteers a five-day course of indomethacin with either zinc-L-carnosine or placebo. The placebo group's lactulose-to-rhamnose ratio, the test for gut leakiness, roughly tripled. The zinc-L-carnosine group showed no significant change.[10]

This finding has been supported by mechanism studies. Polaprezinc protects intestinal epithelial cells from indomethacin-induced apoptosis, the medical word for orderly cell death, partly through the heat shock protein system and partly through quenching of reactive oxygen species.[12,20]

What this means: the human study is small but the result is clean, the mechanism is biologically consistent, and the design was a randomized blinded crossover. It supports the use of zinc-L-carnosine for situations where the gut lining is under chemical stress.

Endoscopic ulcers and post-procedure healing

RANDOMIZED COMPARATOR TRIAL · ESD-INDUCED GASTRIC ULCERS

Endoscopic submucosal dissection, abbreviated ESD, is a procedure where a gastroenterologist removes a piece of stomach lining through a scope. It leaves behind a deliberate ulcer that takes weeks to heal. In a randomized trial by Jung and colleagues published in the *Journal of Clinical Gastroenterology*, polaprezinc added to a proton-pump inhibitor performed comparably to rebamipide added to a proton-pump inhibitor for ESD-ulcer healing.[21]

What this means: this is another piece of evidence that the compound supports tissue healing in a setting where the injury is well-characterized. It is also another reminder that zinc-L-carnosine is studied alongside acid-management therapy, not against it.

Atrophic gastritis and early dyspepsia symptoms

CASE-LEVEL EVIDENCE · PRELIMINARY

A 2025 case report by De Bastiani and colleagues in the *American Journal of Case Reports* described improvement in both symptoms and histology, the medical word for what the tissue looks like under a microscope, in a patient with chronic atrophic gastritis treated with zinc-L-carnosine.[22] This is one patient, not a trial, and it should be read as a hypothesis rather than a conclusion.

What this means: the broader clinical idea that zinc-L-carnosine might benefit early upper-gut histologic changes is biologically reasonable and is being explored. The evidence base here is much thinner than for gastric ulcer or H. pylori adjunct use.

Ulcerative colitis (as a rectal enema)

SMALL RANDOMIZED TRIAL · 28 PATIENTS

In a 2014 randomized study by Itagaki and colleagues, patients with active ulcerative colitis received either zinc-L-carnosine enemas or placebo for two weeks. The zinc-L-carnosine group showed a higher rate of clinical and endoscopic response.[23] This is a different use from oral supplementation and the trial was small, but it shows the compound has activity in the lower gut as well, when delivered there.

What this means: for general patients reading this brief, the colitis study is not directly relevant to oral supplementation. It does add to the broader picture that the molecule supports gut-lining repair across different parts of the digestive tract.

Chemotherapy-induced oral mucositis

COMPARATIVE TRIAL · 36 PATIENTS UNDERGOING STEM CELL TRANSPLANT

Many cancer therapies damage the lining of the mouth and throat, producing painful sores called oral mucositis. In a 2014 study by Hayashi and colleagues, patients undergoing high-dose chemotherapy and stem cell transplantation received either polaprezinc suspended in sodium alginate as a swish-and-swallow, or a standard control rinse. The polaprezinc group had dramatically lower rates of moderate-to-severe mucositis, 20 percent versus 82 percent.[24]

What this means: this is not a primary use case for someone buying a supplement, but it is another piece of evidence that the compound supports the lining of the upper digestive tract at the tissue level.

Taste disorders related to zinc deficiency

DOSE-RESPONSE META-ANALYSIS · 4 RANDOMIZED TRIALS · 2020

Loss of taste, called dysgeusia, is sometimes caused by low zinc levels. A 2020 individual-patient-data meta-analysis by Furihata and colleagues pooled four randomized trials of polaprezinc at 75 mg, 150 mg, and 300 mg per day for taste disturbance and zinc deficiency. All three doses raised serum zinc more than placebo, and higher doses had larger effects.[25]

What this means: this is one of the few formal dose-response analyses of polaprezinc. It is in a specific population, not a general consumer population, and it does not directly tell you what an upper-gut maintenance dose should look like. It does establish that the compound reliably raises body zinc levels in people who are low.

What has not been studied directly

HONEST GAPS TO FLAG

No large randomized trial has specifically tested zinc-L-carnosine for functional dyspepsia, irritable bowel syndrome, or non-erosive reflux symptoms in a Western adult population. The case for use in those settings rests on the mechanism evidence above and the ulcer and H. pylori trials, both of which involve a related but not identical clinical picture. Anyone who tells you zinc-L-carnosine has been "proven" for those conditions is overstating what the published trials show.[7]

CHAPTER FOUR

About dose and timing

> *Most of the published Japanese trials used higher daily doses of the complete zinc-L-carnosine molecule than what appears in MGB+ Cool. There is an honest way to talk about that.*

What the literature has tested

DAILY DOSE	TYPICAL USE IN TRIALS	FORM
150 mg of complex (about 34 mg elemental zinc)	Original Japanese prescription dose for gastric ulcer; also the dose used in many H. pylori adjunct trials.[1,16,17,19]	Zinc-L-carnosine
75 mg twice daily of complex (about 34 mg elemental zinc)	Mahmood 2007 Imperial College gut-permeability trial.[10]	Zinc-L-carnosine
75 to 300 mg of complex per day	Dose-response meta-analysis range for raising serum zinc in zinc-deficient patients.[25]	Zinc-L-carnosine
About 22 mg of complex (about 5 mg elemental zinc) per daily dose	The dose used in MGB+ Cool; a foundation amount within a seven-ingredient stack.	Zinc-L-carnosine

How to read that table

Two things are true at the same time. First, the prescription-level Japanese studies and most of the H. pylori adjunct trials used higher daily doses of the complete molecule than what is in MGB+ Cool. Second, the active ingredient is the chelated form itself, zinc-L-carnosine, not the elemental zinc count or the L-carnosine count taken separately.[3,4,7] A foundation amount of the right chelated compound is doing something different from a much larger amount of plain zinc gluconate or plain L-carnosine, because plain zinc and plain L-carnosine do not produce the same gastric adhesion, mucosal targeting, or heat shock response that the chelated form does.[5,6,11,12,13]

MGB+ Cool is built as a multi-ingredient daily-support formula. The zinc-L-carnosine in it is one of seven contributing ingredients, each chosen for a different mechanism. The intent is steady support of upper-gut tissue health and bacterial balance, not replication of a prescription-level ulcer-healing regimen. If you and your physician decide a higher dose makes sense for a specific situation, that is a conversation worth having on its own terms.

Time to effect

In gastric ulcer and H. pylori trials, treatment windows were typically four to eight weeks.[17,19,21] In the gut-permeability trial, the effect on intestinal leakiness was measurable within five days of starting the compound.[10] A reasonable expectation for daily support is at least four weeks of consistent daily use before judging effect on background symptoms, and longer for slower-moving patterns.

With or without food

Zinc-L-carnosine sticks to gastric tissue better in the presence of normal stomach acid, which is part of how it dissolves slowly along the lining.[5,6] A practical approach is to take it with a meal or shortly after. Strong empty-stomach use is not the way the original Japanese pharmacology studied it.

CHAPTER FIVE

Safety and what to know

> *Zinc-L-carnosine has one of the cleaner safety profiles in this space, with a long Japanese clinical record and consistently low adverse-event rates in the randomized trials. That does not mean zero considerations.*

Track record in trials

Across the trials cited in this brief, including the H. pylori meta-analysis of 396 patients and the multicenter gastric ulcer comparator trial of 224 patients, serious adverse events specifically attributed to zinc-L-carnosine were rare and not increased compared with control treatments.[17,18,19,25] Adding zinc-L-carnosine to standard antibiotic regimens did not increase the rate of side effects.[18]

Common side-effect profile

The side effects most often reported are mild gastrointestinal complaints such as constipation, nausea, or stomach discomfort. These are generally dose-related and resolve when the dose is reduced or the supplement is taken with food.[19,25]

Zinc and copper balance

The one safety issue specific to zinc supplementation that is worth knowing about is long-term high-dose use. Zinc and copper compete with each other for absorption in the small intestine. Long-term zinc supplementation at elemental doses well above the daily allowance can lower copper levels and, in rare cases, cause a copper-deficiency anemia.[3,25] This is a concern for elemental zinc intakes consistently above about 40 mg per day for many months, not for the foundation amount in MGB+ Cool, which contains 5 mg of elemental zinc per dose. The MGB+ Cool dose is well below the level where this becomes a clinical concern.

Drug interactions

Zinc can reduce the absorption of certain antibiotics, particularly tetracyclines and fluoroquinolones, if taken at the same time. The standard recommendation is to separate zinc-containing supplements from those antibiotics by at least two hours. Zinc can also interact with iron supplements taken simultaneously. There are no well-established interactions between zinc-L-carnosine and the common acid-management medications used for upper-gut symptoms.[3]

Pregnancy and lactation

Zinc is required during pregnancy and lactation, but high-dose zinc-L-carnosine specifically has not been studied in controlled pregnancy trials. The conservative recommendation is to avoid zinc-L-carnosine supplementation during pregnancy and lactation unless your physician advises otherwise.

WHEN TO TALK TO YOUR PHYSICIAN FIRST

- You are pregnant or nursing.
- You take prescription antibiotics in the tetracycline or fluoroquinolone families.
- You take prescription iron supplements.
- You have a diagnosed copper deficiency or are being treated for one.
- You are considering giving zinc-L-carnosine to a child.
- You are managing a serious chronic gastrointestinal condition such as inflammatory bowel disease or active H. pylori infection.

CHAPTER SIX

Where the evidence has limits

> *An honest brief includes the weaknesses of the literature it cites. The zinc-L-carnosine literature has several real ones.*

Most of the clinical evidence is Asian

Zinc-L-carnosine was developed and approved in Japan and the majority of clinical trials have been conducted in Japan, China, and Korea. The published Western trial base is much smaller. The Mahmood gut-permeability trial out of Imperial College London is one of the few high-quality Western studies on the compound.[10] Whether the eradication and ulcer-healing effects generalize identically to non-Asian populations has not been formally established.

Industry funding is common

Many of the early Japanese trials were funded by the developing companies, Hamari Chemicals and Zeria Pharmaceutical. This is the norm for prescription drug development, not a flaw unique to zinc-L-carnosine, but it should be acknowledged. The independent meta-analyses and the Western Mahmood trial provide partial counterweights.[10,18]

Trial sizes are mostly modest

The largest single trial in this brief enrolled 224 patients. The H. pylori meta-analysis pooled 396 patients across three trials. These are useful sizes for generating a signal but they are not the thousand-plus patient megatrials that produce the strongest evidence in modern pharmacology.[17,18,19]

Some of the headline effects come from combination therapy

In the H. pylori adjunct trials, zinc-L-carnosine was added on top of standard triple-drug antibiotic regimens.[16,17,18] The combined effect is the relevant clinical question, but it does mean we cannot separately quantify the contribution of zinc-L-carnosine alone, because no one ran that trial. This is a normal feature of adjunct evidence, not a special flaw.

Honest summary

Zinc-L-carnosine is one of the better-characterized mucosal-protective compounds in the gastroenterology literature. It has a coherent mechanism story, a Japanese prescription record going back to 1994, a 2007

randomized Western human study showing it stabilizes the gut lining under chemical stress, and a 2022 meta-analysis supporting it as an add-on for H. pylori treatment. The evidence base is real, reproducible, and biologically consistent. The evidence base is also smaller than the marketing for any zinc-carnosine supplement would suggest, especially in Western populations and for general consumer use. Anyone telling you it cures any condition is overstating the data. Anyone telling you it is unsupported is also overstating in the other direction. The honest position is in between.

CHAPTER SEVEN

The bigger picture

> *Why zinc-L-carnosine sits inside a multi-ingredient upper-gut formula rather than standing alone, and how it fits with whatever acid management you and your physician have already decided on.*

Upper-gut symptoms like post-meal burning, fullness, reflux sensation, and dyspepsia rarely come from one cause. The acid in your stomach is one piece of the picture. The condition of the lining is another. So is the responsiveness of the immune cells in the wall, the speed at which the stomach empties, and whether H. pylori has set up residence in the mucus on top of the lining. Different treatments act on different parts of that system.

Acid-management medications like proton-pump inhibitors and H2 blockers do the job they were designed to do, which is to reduce the amount of acid your stomach makes. They are appropriate for many people and your physician's decision to use one is not something this brief argues against. Zinc-L-carnosine is acting on different levers entirely: the lining that the acid sits on, the immune cells in the wall, the local antioxidant defenses, and the bacterial population that lives in the mucus. It pairs with acid management rather than competing with it.

That is the design idea behind MGB+ Cool. Zinc-L-carnosine contributes one mechanism, namely mucosal support, local antioxidant activity, and a contribution to bacterial balance. Other ingredients in the formula address adjacent layers: motility, mast-cell stabilization, and bile-related symptoms. The intent is steady, low-dose support of the parts of upper-gut function that acid blockers do not touch, alongside whatever acid management you and your physician have already chosen.

HOW TO USE THIS BRIEF

Bring it to your physician. Read the references. If you decide to add zinc-L-carnosine to your daily routine, give it at least four weeks at a consistent dose before judging effect, and track how you feel in whatever way works for you. Real data, your data, beats marketing claims from either side.

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CITATIONS

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All references are real, PubMed-indexed publications. PMID numbers are listed where assigned. DOIs are included where available for direct linking.

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