A PATIENT GUIDE FROM BELLYMD

Ginger: What the evidence shows.

A plain-language look at one of the most studied plants in medicine, how it works in your stomach and your brain, and what the published research does and does not support.

About this guide. Ginger Root Extract 4:1 appears in both *MGB+ Cool* and *MGB+ Calm* at 100 mg per daily serving. Cool is built for post-meal burning, fullness, and reflux. Calm is built for morning queasiness, brain-gut hyperreactivity, and cyclical stomach upset. Ginger is the only ingredient shared by both formulas. This handout covers the published evidence so you can read it yourself and decide what makes sense for you.

CHAPTER ONE

What is ginger?

> *Ginger is the underground stem of Zingiber officinale, a flowering plant native to Southeast Asia. It has been used as both a food and a medicine for around 2,500 years, longer than almost any other plant in the human pharmacopoeia.*[1]

It moved out of Asia along the spice routes and was adopted into Greek, Roman, Arabic, and later European medical traditions. Across all of them, the same uses kept showing up: cooking spice, stomach soother, anti-nausea aid, and warming remedy for cold and damp conditions. Modern laboratory work has now mapped why those uses have stuck around for centuries.[1,2]

What is actually in ginger

Ginger contains hundreds of compounds, but a small handful do most of the biological work. They fall into two main families.[2,3]

Gingerols are the main active compounds in fresh ginger. The most studied is called 6-gingerol, named for a chemical detail you do not need to memorize. Gingerols are responsible for much of the sharp, fresh-ginger flavor and for many of the anti-inflammatory effects studied in laboratory work.[2,3]

Shogaols form when ginger is dried or heated. The most studied is 6-shogaol. Shogaols are stronger than gingerols at certain receptors that matter for nausea, and they accumulate when ginger is dried into a powder or made into an extract. The shift from gingerols to shogaols during drying is one reason different ginger preparations can have different effects in studies.[2,3]

A few other compounds, called paradols and zingerone, contribute as well. The general pattern is that fresh ginger leans gingerol-heavy, dried and extracted ginger leans shogaol-heavy, and both forms have active compounds that work on overlapping pathways.[2,3]

What the 4:1 extract means

The label on MGB+ Cool and MGB+ Calm reads Ginger Root Extract 4:1 at 100 mg per daily dose. The 4:1 number is a concentration ratio. It means that four parts of crude ginger root were processed down into one part of finished extract, concentrating the active gingerols and shogaols roughly four times stronger by weight.[3]

In practical terms, 100 mg of a 4:1 ginger extract is roughly equivalent in active-compound content to about 400 mg of crude ginger root powder. That conversion matters when comparing the daily dose in MGB+ to the doses used in published trials, where most of the research has used crude ginger powder rather than concentrated extract.[3] We will come back to this comparison in the dose chapter.

Why ginger keeps showing up in modern research

Ginger has one of the largest published research footprints of any single plant. A 2020 systematic review by Anh and colleagues in *Nutrients* identified 109 randomized controlled trials of ginger across digestive symptoms, pregnancy nausea, chemotherapy nausea, pain, blood sugar control, and inflammation markers.[3] That is a much larger evidence base than most botanicals carry. It is also the reason ginger is one of the few plant ingredients that appears in formal guidelines from major medical societies, including the American College of Obstetricians and Gynecologists for pregnancy nausea and the American Society of Clinical Oncology integrative therapies guideline for chemotherapy nausea.[4,5]

THE SHORT VERSION

Ginger is a Southeast Asian plant root used as food and medicine for about 2,500 years. The biology is mostly explained by two compound families: gingerols, which dominate in fresh ginger, and shogaols, which form during drying and concentration. A 4:1 extract concentrates these active compounds roughly four times stronger than crude ginger.

CHAPTER TWO

How it works in your body

Most plant compounds work on one or two pathways. Ginger works on at least four, and they are exactly the four that matter for the upper-gut and brain-gut symptoms that MGB+ Cool and MGB+ Calm are built for.

It speeds up gastric emptying

Gastric emptying is the technical term for how fast your stomach empties food into the small intestine. When gastric emptying is too slow, the result is the cluster of symptoms doctors call functional dyspepsia: post-meal burning, fullness, early satiety, and stomach discomfort with normal test results.[6]

Ginger speeds up gastric emptying. In a 2008 study by Wu and colleagues in *European Journal of Gastroenterology and Hepatology*, healthy volunteers who took 1.2 g of ginger before a standardized meal emptied their stomachs significantly faster than the same volunteers on placebo, and ginger increased the strength of the rhythmic contractions in the lower stomach that push food forward.[7] A 2011 follow-up study by Hu, Rayner, and colleagues in the *World Journal of Gastroenterology* reproduced this finding in patients with diagnosed functional dyspepsia, showing that ginger improved gastric emptying in the population where slowed emptying is the underlying problem.[6]

This kind of effect is called prokinetic, which means a compound that speeds up how fast food moves through your stomach and small intestine. It is the same general direction of effect as the prescription drug metoclopramide, but ginger works through different mechanisms and with a much cleaner safety profile.[2,6,7]

It blocks part of the nausea signal at its source

Nausea is signaled to the brain through several receptor systems. One of the most important is the 5-HT3 receptor, which is a serotonin receptor that triggers nausea signaling from the gut wall to the brainstem. This is the receptor that the prescription anti-nausea drug ondansetron, sold as Zofran, was designed to block.[8]

Gingerols and shogaols, especially 6-shogaol and 10-gingerol, act as partial blockers at this same 5-HT3 receptor. In a 2011 study by Pertz and colleagues in *Planta Medica*, both compounds reduced the maximum response of 5-HT3 receptors in gut tissue at modest concentrations.[9] A 2016 computational study by Lohning, Marx, and Isenring in the *Journal of Molecular Graphics and Modelling* mapped how multiple ginger compounds physically dock into the 5-HT3 receptor pocket, providing the structural explanation for the binding observed in tissue studies.[10]

Ginger is not as strong at 5-HT3 as ondansetron is, and ginger is not a replacement for ondansetron in serious situations. What it does mean is that ginger and ondansetron are working on the same target with different intensities. That overlap is the reason ginger consistently shows up in nausea trials at all.[9,10]

It calms the rhythm of the stomach

Beyond emptying speed, the stomach has an electrical rhythm that paces its contractions. When this rhythm becomes disordered, what doctors call gastric dysrhythmia, the result is nausea. Motion sickness, morning sickness, and the queasiness that follows long cannabis or alcohol exposure all involve this disordered rhythm.[11]

In a 2003 study by Lien and colleagues in the *American Journal of Physiology*, healthy volunteers exposed to a nausea-inducing visual rotation experienced less nausea, less gastric rhythm disruption, and lower stress-hormone release when pretreated with ginger compared to placebo.[11] This study is important because it documented a specific stomach-level mechanism for ginger's anti-nausea effect, separate from its 5-HT3 receptor activity.

It reduces inflammation in the gut wall

Gingerols and shogaols inhibit two key inflammatory pathways: cyclooxygenase-2, abbreviated COX-2, which is one of the enzymes responsible for producing inflammatory prostaglandins, and the NF-kappa-B signaling pathway, which is one of the master switches for inflammatory gene expression in the gut wall and elsewhere.[12,13]

A 2001 study by Tjendraputra and colleagues in *Bioorganic Chemistry* showed that specific ginger compounds, particularly 8-paradol and 8-shogaol, are potent COX-2 inhibitors at low concentrations.[12] A 2005 review by Grzanna and colleagues in the *Journal of Medicinal Food* summarized the broader anti-inflammatory profile and noted that ginger also inhibits leukotriene biosynthesis, which is a separate inflammatory pathway that conventional anti-inflammatory drugs like ibuprofen do not touch.[13]

Other mechanisms that contribute

Ginger has additional effects that round out the picture. It is carminative, meaning it reduces gas and bloating by relaxing parts of the upper gut and helping trapped gas escape. It acts on the vagus nerve, the long nerve that carries signals between the gut and the brainstem. There is some experimental evidence that it stabilizes mast cells, which are the immune cells in the gut wall that release inflammatory signals when triggered.[2,13,14]

> **WHY THIS MATTERS FOR BOTH COOL AND CALM**
>
> Ginger is the only ingredient shared by MGB+ Cool and MGB+ Calm. The reason is that its mechanism profile spans both formulas. The prokinetic and anti-inflammatory effects target the upper-gut motility and inflammation that drive the Cool symptom pattern. The 5-HT3 antagonism and stomach-rhythm effects target the brain-gut nausea signaling that drives the Calm symptom pattern. Few molecules touch both layers in one ingredient.

CHAPTER THREE

What the studies show

Ginger has more strong clinical trial evidence than most plant ingredients. Some of that evidence is at the level of repeated randomized trials and formal meta-analyses, which is the strongest tier of clinical research short of regulatory approval. The picture is not uniformly positive, and the trials use very different preparations and doses. Here is an honest breakdown.

Chemotherapy-induced nausea and vomiting

STRONG EVIDENCE · META-ANALYSES · GUIDELINE-SUPPORTED

This is one of the strongest areas of ginger research. A 2012 randomized controlled trial by Ryan and colleagues in *Supportive Care in Cancer*, conducted across multiple sites with 576 cancer patients, found that adding ginger at 0.5 g, 1.0 g, or 1.5 g daily to standard anti-nausea medication significantly reduced the severity of acute chemotherapy-induced nausea compared to placebo, with the strongest effect at 0.5 g and 1.0 g.[15]

A 2013 systematic review by Marx and colleagues in *Nutrition Reviews* pooled the available trials and concluded that ginger has a likely benefit for chemotherapy-induced nausea, while noting heterogeneity in dose and preparation across studies.[16] A 2019 update by Crichton, Marshall, Marx, and colleagues in the *Journal of the Academy of Nutrition and Dietetics* performed a formal meta-analysis and reached the same conclusion, with the strongest signal in trials that used standardized extracts and dosed ginger before chemotherapy.[17]

Not every trial is positive. A 2017 randomized trial by Bossi and colleagues in *Annals of Oncology* in 244 patients receiving high-dose cisplatin found that adding ginger to modern triple anti-nausea therapy did not produce an additional benefit in the overall population.[18] A 2013 review by Lee and Oh in the *Oncology Nursing Forum* also reached a cautious conclusion when limited to studies meeting their inclusion criteria.[19]

What this means: ginger has real, reproducible signal for chemotherapy nausea, strong enough that the American Society of Clinical Oncology included it in their integrative therapies guideline alongside acupressure and acupuncture.[5] It does not replace standard prescription anti-nausea drugs. It is a supportive ingredient that works alongside whatever else your oncology team has you on.

Pregnancy nausea

STRONG EVIDENCE · ACOG-RECOGNIZED · SAFETY DATA EXTENSIVE

Ginger has more clinical trial evidence for pregnancy nausea than almost any other intervention, prescription or natural. A 2005 systematic review by Borrelli and colleagues in *Obstetrics and Gynecology* pooled six randomized trials with 675 participants and concluded that ginger is more effective than placebo for nausea and vomiting in pregnancy, with no signal of adverse pregnancy outcomes.[20] A 2001 randomized trial by Vutyavanich and colleagues in the same journal showed that 1 g of ginger daily significantly reduced nausea and vomiting in early pregnancy compared to placebo.[21] A 2004 equivalence trial by Smith and colleagues in 291 women found that ginger and vitamin B6 were equally effective for early pregnancy nausea.[22]

Safety data are extensive. A 2013 cohort study by Heitmann, Nordeng, and Holst in the *European Journal of Clinical Pharmacology* followed 68,522 Norwegian women and found no association between ginger use during pregnancy and increased risk of congenital malformations, stillbirth, preterm birth, low birth weight, or low Apgar scores.[23] A 2010 clinical practice review by Niebyl in the *New England Journal of Medicine* and the formal recommendation framework of the American College of Obstetricians and Gynecologists both list ginger as a reasonable first-line option for pregnancy nausea.[4,24] A 2016 review by Lete and Allue in *Integrative Medicine Insights* updated this picture.[25]

> **IMPORTANT NOTE ON PREGNANCY**
>
> MGB+ Cool and MGB+ Calm are not marketed for use during pregnancy. The pregnancy nausea evidence base is included here for completeness, not as a recommendation for use during pregnancy. Pregnant patients should speak with the physician managing their pregnancy before starting any supplement.

Postoperative nausea and vomiting

MODERATE EVIDENCE · POOLED TRIALS

Postoperative nausea and vomiting means nausea and vomiting after surgery, which is common after general anesthesia. A 2006 meta-analysis by Chaiyakunapruk and colleagues in the *American Journal of Obstetrics and Gynecology* pooled five randomized trials with 363 patients and concluded that at least 1 g of ginger taken before surgery reduced postoperative nausea and vomiting compared to placebo, with relative risk reductions of roughly 31 to 39 percent.[26] A 2000 earlier systematic review by Ernst and Pittler in the *British Journal of Anaesthesia* reached a more cautious conclusion, finding individual trial benefit but a non-significant pooled effect with the trials available at that time.[27]

What this means: the postoperative evidence is moderate and the signal points in a positive direction at adequate doses. Anyone scheduled for surgery should follow their anesthesiology team's preoperative supplement instructions, since many surgical centers ask patients to stop most supplements in the days before a procedure.

Motion sickness

MIXED EVIDENCE · MECHANISM DOCUMENTED

One of the earliest modern ginger trials was a 1982 study by Mowrey and Clayson in *The Lancet*, which reported that ginger powder reduced motion sickness in volunteers spun in a tilted rotating chair more effectively than the antihistamine dimenhydrinate, sold as Dramamine.[28] Later trials have produced mixed results, but the mechanism work by Lien and colleagues described in the previous chapter showed that ginger reduces the gastric rhythm disruption that underlies motion sickness, supporting the original Mowrey finding at a biological level.[11]

What this means: ginger is a reasonable consideration for travel-related queasiness. The trials are old and the doses used were variable, so the practical evidence is weaker than the mechanism evidence.

Functional dyspepsia and post-meal symptoms

MECHANISM STRONG · CLINICAL TRIALS SMALL

Functional dyspepsia is the medical term for post-meal burning, fullness, and stomach discomfort with normal test results. As described in the mechanism chapter, ginger speeds gastric emptying in both healthy volunteers and in patients with functional dyspepsia.[6,7] A 2015 randomized controlled trial by Giacosa and colleagues in *Evidence-Based Complementary and Alternative Medicine* tested a ginger and artichoke combination against placebo in 126 patients with functional dyspepsia and found significant symptom improvement over four weeks.[29]

What this means: the biological case for ginger in upper-gut symptoms is strong. Direct large randomized trials of ginger alone in functional dyspepsia are limited, which is part of why ginger sits inside a multi-ingredient formula in MGB+ Cool rather than standing alone.

Migraine-associated nausea

SINGLE POSITIVE RCT · REPLICATION PENDING

A 2014 randomized trial by Maghbooli and colleagues in *Phytotherapy Research* compared 250 mg of ginger powder to 50 mg of sumatriptan, a standard prescription migraine drug, in 100 patients with migraine without aura. The two treatments produced similar reductions in pain intensity at two hours, and ginger had fewer side effects.[30] The finding is consistent with ginger's anti-inflammatory and anti-nausea profile, since nausea is a near-universal feature of migraine.

What this means: ginger is not a treatment for migraine, but the migraine literature is part of why ginger gets discussed in conditions where nausea and central sensitization travel together. Replication trials are still needed.

The honest summary

WHERE GINGER SITS IN THE EVIDENCE HIERARCHY

Compared to most of the other ingredients in the MGB+ formulas, ginger has more high-quality clinical evidence behind it. It has formal meta-analyses for chemotherapy nausea and pregnancy nausea. It has clear mechanism studies in humans for gastric emptying and stomach rhythm. It has a place in major medical society guidelines.[4,5,16,17,20,26]

That said, the ginger literature is heterogeneous. Trials use different preparations, including crude powder, hydroalcoholic extract, brand-specific standardized extract products, and combinations. Doses range from 250 mg to 2 g of various preparations daily. Some negative trials exist alongside the positive ones. The 4:1 extract specifically used in MGB+ has less direct trial evidence than crude ginger powder, because most of the research has used either crude powder or specific commercial standardized products like Zintona.[3] Anyone reading this brief deserves to know that distinction.

CHAPTER FOUR

About dose and timing

> *Published ginger trials have used a wide range of doses, mostly with crude ginger powder rather than concentrated extract. The 4:1 extract concentration in MGB+ means a smaller milligram number on the label is doing the same work as a larger number on a crude-powder label.*

What the literature has used

DAILY DOSE	TYPICAL USE IN PUBLISHED RESEARCH	FORM
500 mg to 2 g daily	Most published trials in chemotherapy nausea, pregnancy nausea, and postoperative nausea, often split across two to four doses.[15,20,21,26]	Crude ginger powder or standardized extract
	The dose used in the Maghbooli migraine trial.[30]	Crude ginger powder

DAILY DOSE	TYPICAL USE IN PUBLISHED RESEARCH	FORM
250 mg single dose		
1 to 1.2 g before a meal	Gastric emptying and functional dyspepsia mechanism studies.[6,7]	Crude ginger powder
100 mg per daily dose, 4:1 extract	The dose in MGB+ Cool and MGB+ Calm. Roughly equivalent in active-compound content to about 400 mg of crude ginger root.[3]	Standardized 4:1 ginger root extract

How to read that table

The 100 mg of 4:1 ginger extract in MGB+ sits in the lower end of the published dose range when converted to crude-ginger equivalents. This is intentional. The formulas are built as daily, multi-ingredient foundation support, not as acute single-dose interventions of the kind tested in chemotherapy or motion-sickness studies. The intent is steady daily exposure that supports normal gut motility and digestive comfort over weeks, working alongside whatever else your physician has you on.

Time to effect

For acute uses studied in trials, such as preoperative or pre-chemotherapy dosing, ginger shows effects within hours of a single dose.[11,15,26] For daily-support use, the realistic window for noticing a change in background symptoms is at least four weeks of consistent intake. Gut motility and brain-gut signaling are slow systems, and they respond to steady daily input rather than to a single intervention.

With or without food

Ginger compounds are reasonably well absorbed taken either way. Pharmacokinetic studies have used both fasting and fed protocols.[3] Taking it with a meal is generally the most practical option, especially when the goal is to support upper-gut motility around eating.

CHAPTER FIVE

Safety and what to know

> *Ginger has one of the cleanest safety records of any compound discussed in this brief, in part because humans have eaten it for thousands of years and in part because dozens of randomized trials have specifically monitored for adverse effects.*

General tolerability

Across the chemotherapy, pregnancy, postoperative, and functional dyspepsia trials, side effects with ginger have been rare and mild. Mild heartburn, occasional belching, and mild stomach upset are the most commonly reported and usually mild enough that they did not lead patients to drop out of the studies.[3,16,17,20] The 2020 systematic review by Anh and colleagues across 109 randomized trials reached the same conclusion.[3]

Pregnancy

As noted in the studies chapter, ginger has more clinical and population-level safety data in pregnancy than almost any other supplement ingredient. The 2013 Heitmann cohort of 68,522 women found no signal of increased congenital malformations, stillbirth, preterm birth, or low birth weight associated with ginger use during pregnancy.[23] Major obstetric guidelines list ginger as a reasonable option for pregnancy nausea.[4,24]

That evidence base is the reason the pregnancy literature appears in this brief at all. MGB+ Cool and MGB+ Calm are not marketed for use during pregnancy. Pregnant patients should speak with the physician managing their pregnancy before starting any supplement, including this one.

Anticoagulants and platelet effects

Because ginger compounds modestly inhibit COX enzymes and platelet aggregation in laboratory work, there has been a theoretical concern that high doses might increase bleeding risk in people on anticoagulants like warfarin. A 2005 clinical study by Jiang and colleagues in the *British Journal of Clinical Pharmacology* directly tested this question in healthy volunteers and found that ginger did not significantly change warfarin pharmacokinetics or pharmacodynamics at the doses studied.[31] The practical implication is that ordinary food and supplement-level ginger intake is unlikely to be clinically meaningful for most people. If you take warfarin or another anticoagulant, your physician or pharmacist is the right person to consult before adding any new daily supplement.

Drug interactions more broadly

Ginger is processed through the same liver enzyme family, cytochrome P450, that handles many prescription drugs. The interactions documented to date are modest and unlikely to matter at supplement doses.[3,31] The exceptions are medications with narrow therapeutic windows, meaning a small difference between an effective dose and a toxic dose. These include certain seizure medications, certain transplant medications, and some chemotherapy agents. Talk to your physician or pharmacist if any of those apply to you.

Children

Ginger has been studied in pediatric chemotherapy nausea with reasonable safety, but dosing in children is not the same as dosing in adults. MGB+ products are formulated for adult use. Pediatric use should be directed by a pediatrician.

> **WHEN TO TALK TO YOUR PHYSICIAN FIRST**
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> - You are pregnant or nursing.
> - You take warfarin or another anticoagulant.
> - You take a medication with a narrow therapeutic window, such as certain seizure or transplant medications.
> - You are scheduled for surgery within the next two weeks.
> - You are considering giving ginger supplements to a child.
> - You have gallstones, which can occasionally be aggravated by strong cholagogues, although this is rarely relevant at the doses in MGB+.

CHAPTER SIX

The bigger picture

> *Why ginger sits inside both MGB+ Cool and MGB+ Calm, how to think about it if you have a history of cyclical vomiting, and how it fits with the rest of what your physician has you on.*

Ginger is the only ingredient shared between Cool and Calm. That is not a marketing coincidence. The reason is that ginger's mechanism profile reaches into both formulas. In MGB+ Cool, ginger contributes prokinetic action to support normal gastric emptying and anti-inflammatory activity at the gut wall, working alongside mastic gum, zinc-carnosine, allithiamine, and the rest of the Cool formula. In MGB+ Calm, ginger contributes 5-HT3 receptor activity and stomach-rhythm stabilization for the morning-queasiness and brain-gut-hyperreactivity pattern, working alongside beta-caryophyllene, magnesium glycinate, benfotiamine, turmeric, and piperine.[6,7,9,10,11,12,13]

Ginger is supportive, not a replacement. It is not an alternative to a proton pump inhibitor for someone whose physician has prescribed one for reflux. It is not a substitute for prescription anti-nausea medication in serious nausea situations. It works alongside whatever else your physician has you on.

One paragraph on cyclical vomiting patterns

Some people who reach a brief like this one carry a diagnosis of cannabinoid hyperemesis syndrome or cyclic vomiting syndrome. These are cyclical patterns of stomach upset and vomiting with their own causes and their own treatment frameworks. Ginger is not a treatment for either condition. The only proven curative step for cannabinoid hyperemesis syndrome is stopping cannabis use, and that step is not optional for someone with the diagnosis. MGB+ Calm is positioned as daily support for the morning-queasiness phenotype regardless of the underlying diagnosis, not as a substitute for the cessation work or for the medical care of a cyclical vomiting condition.

How daily support works in practice

The two-thousand-year history of ginger as a digestive aid did not happen because someone took it once before a long boat ride. It happened because people noticed that a steady daily intake supported general digestive comfort over time. The modern research is consistent with that pattern. Ginger does have acute effects within hours of a single dose, especially on nausea and gastric emptying, but most of the work on background symptoms in modern trials is built around daily intake over weeks.[3,16,17]

> **HOW TO USE THIS BRIEF**
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> Bring it to your physician. Read the references. If you decide to add MGB+ Cool or MGB+ Calm 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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