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# How to Optimize Your Gut's Internal Butyrate Factory

Analysis by Dr. Joseph Mercola | November 23, 2026

## STORY AT-A-GLANCE

- Researchers found two ways to raise butyrate levels: supplying butyrate directly through supplementation or increasing the bacteria that naturally produce it, with both approaches linked to meaningful health benefits
- Children with irritable bowel syndrome who received a butyrate containing combination formula experienced meaningfully greater reductions in abdominal pain and digestive symptoms than those receiving a placebo, with benefits that persisted after treatment ended
- In a six-month study of 72 people with Parkinson's disease, a supplement combining butyric acid with other gut derived compounds was associated with improved motor scores, shifts in immune cytokine activity, stronger gut barrier function in laboratory models, and better energy production in immune cells
- A single butyrate-producing bacterium was linked to improved blood sugar stability, lower HbA1c, and reduced blood pressure in adults with prediabetes, suggesting that strengthening specific gut microbes may influence metabolic health
- A broad-spectrum synbiotic was associated with increased populations of beneficial bacteria, a 66% increase in butyrate production in people with low baseline levels, full conversion of participants into urolithin A producers, and lower levels of systemic inflammation

Butyrate has become one of the most closely studied compounds in microbiome science, but the most interesting finding isn't what it does — it's how you get it. Researchers have identified two different ways to increase butyrate levels. One approach supplies butyrate directly. The other strengthens the bacteria that manufacture it inside your gut. Different strategies. Similar results.

Low butyrate production has been linked to a wide range of health problems. Irritable bowel syndrome (IBS), a digestive disorder marked by recurring abdominal pain and disruptions in normal bowel function, is frequently associated with an imbalanced gut microbiome and reduced production of beneficial microbial compounds.

Researchers have also connected low butyrate levels to increased inflammation, weakened gut barrier function, impaired metabolic health, and disruptions in the normal communication network between your gut, immune system, and brain. Part of the reason comes down to fuel: butyrate is the preferred energy source for the cells lining your colon, so when it runs low, that lining is effectively underfed and less able to maintain a strong protective barrier.

Recent studies approached this problem from both directions. Some investigators supplied butyrate itself and reported improvements in digestive symptoms, immune regulation, and gut barrier function.

Others focused on increasing populations of butyrate-producing bacteria and found improvements in blood sugar control, inflammatory markers, and the production of other beneficial compounds generated by the microbiome. Although the interventions differed, the outcome was remarkably consistent: higher butyrate availability was associated with better health.

Taken together, these findings point to a larger lesson. Whether you raise butyrate directly through supplementation or indirectly by cultivating the microbes that produce it, the result is likely a similar shift — a healthier gut environment that supports processes throughout your body, far beyond digestion alone.

## Children Saw Relief in Digestive Symptoms

A study published in the Journal of Pediatric Gastroenterology and Nutrition followed 51 children ages 4 to 17 who had **irritable bowel syndrome** (IBS) and continued to experience symptoms during a preliminary observation period before treatment began.[1] The researchers randomly assigned participants to receive either a tablet containing calcium **butyrate** (500 milligrams), zinc (5 mg), and **vitamin D** (500 IU) or a placebo for eight weeks, followed by a four-week washout period.*

Because the active tablet combined three ingredients, the trial can't isolate how much of the benefit came from butyrate specifically versus the zinc and vitamin D, a limitation worth keeping in mind as you read the results. Their goal was to determine whether this intervention could possibly reduce abdominal pain and improve overall digestive comfort.

- **The results strongly favored the active treatment —** Children receiving the combination formula achieved a treatment success rate of 73%, compared to just 3.8% in the placebo group. Researchers defined success as at least a 50% reduction in abdominal pain.

  Nearly three out of four children improved in the treatment group, while improvement was rare among those receiving placebo. The researchers also calculated a number needed to treat of just two, meaning that for every two children treated, one achieved a meaningful clinical benefit that would not have occurred otherwise.

- **Symptom relief lasted beyond the treatment period —** At the end of the eight-week intervention, abdominal pain scores had fallen by more than 66% in the treatment group, while the placebo group showed little change. Four weeks after supplementation ended, pain scores remained about 78% below baseline.

  Digestive symptom scores followed a similar pattern, improving by more than 51% at the end of treatment and more than 60% at follow-up. These findings suggest that the benefits persisted for at least a month after the intervention stopped.

- **Children experienced improvements that reached beyond pain alone —** Researchers tracked a wide range of digestive complaints, including bloating, gas, bowel irregularity, urgency, nausea, and feelings of incomplete evacuation. Improvements appeared across multiple symptom categories rather than a single complaint. For children who struggle with daily digestive discomfort, that translates into fewer interruptions during school, less anxiety around meals, and greater confidence in everyday activities.

- **The intervention was well tolerated throughout the trial —** No significant adverse events or side effects were reported in either study group. Safety is particularly important when evaluating therapies for children because digestive disorders often require long-term management. The researchers found that participants tolerated the treatment well during the entire study period.

- **A subset of stool samples revealed important biological changes —** In a smaller group of participants who provided stool samples for microbiome analysis, researchers found increases in bacterial groups associated with short-chain fatty acid (SCFA) production, including members of the Lachnospiraceae family and the Ruminococcus gauvreauii group.

  At the same time, levels of Ruminococcus gnavus, a bacterial group frequently linked to gut inflammation and dysbiosis, declined. These findings suggest the intervention influenced the gut environment in ways that support intestinal health. However, the researchers also reported that some of the microbial changes began moving back toward baseline after supplementation stopped, even though symptom improvements remained in place during the washout period.

## Butyrate Reached Beyond the Gut

A study published in Scientific Reports followed 72 people with **Parkinson's disease** for six months.[2] Parkinson's disease is a progressive neurological disorder characterized by tremors, stiffness, slowed movement, and balance problems. Participants received

supplements containing butyric acid — a direct source of butyrate — and propionic acid, another beneficial SCFA produced by gut bacteria.*

As with the IBS trial, the supplement delivered more than one active compound, so the results reflect the combined formula rather than butyrate on its own. Some participants also received 2'-fucosyllactose, a prebiotic that serves as food for beneficial microbes and helps support the production of SCFAs within the gut, while continuing their standard medical treatment. The researchers wanted to see whether improving gut-derived metabolites could influence symptoms far beyond the digestive tract.

- **Motor scores improved alongside lower levodopa use —** The researchers reported clinically meaningful improvements in motor scores across all intervention groups, accompanied by reductions in levodopa use, the primary medication prescribed for Parkinson's disease.

  Because this is a single, small study, the findings are preliminary and point to a possible link between gut-derived compounds and nervous system function rather than an established treatment. If you have Parkinson's, don't change or reduce levodopa or any other medication except under the direct supervision of your neurologist, as abrupt dose changes can be dangerous.

- **The biggest changes occurred in the immune system —** Researchers found that supplementation altered peripheral immune responses, meaning immune cells circulating throughout the body behaved differently after treatment. One group of immune cells that received particular attention was regulatory T cells, often called "peacekeeper" cells because they help prevent excessive inflammation.

  After supplementation, researchers observed shifts in immune cytokine profiles, though regulatory T cell proportions themselves were not significantly changed. This matters because chronic inflammation has emerged as an important contributor to many age-related and neurological disorders.

- **Cellular energy production improved inside immune cells —** One of the most unique findings involved mitochondria, the structures that generate energy inside cells. Researchers reported enhanced mitochondrial respiration in immune cells following supplementation, based on a smaller validation subgroup of four participants followed for two weeks rather than the full 72-person, six-month cohort; the cells became better at producing energy.

  If you think of mitochondria as tiny power plants, the intervention may have helped those power plants operate more efficiently. This finding suggests that the influence of SCFAs may extend beyond digestion and reach the fundamental energy systems that keep cells functioning properly.

- **The intestinal barrier became stronger —** Researchers also examined how participants' microbiomes affected laboratory-grown intestinal tissue. After supplementation, post-treatment microbiota remodeled genes involved in inflammation and barrier function while improving barrier integrity in experimental models.

  The intestinal barrier acts like a security checkpoint between the contents of your digestive tract and the rest of your body. When that barrier functions properly, fewer inflammatory compounds cross into circulation. The findings indicate that changes in gut bacteria influence how well that protective barrier performs.

- **People responded differently based on their gut ecosystems —** The types of microbes already living in a person's gut helped determine how much benefit they received. Researchers identified distinct immune signatures and gut-related patterns associated with stronger responses. This reinforces an important concept in microbiome science: your gut ecosystem is not simply a passenger. It may shape how your body responds to dietary compounds, supplements, and even disease processes.

## A Single Microbe May Improve Blood Sugar Control

In another study, researchers tested whether adding one beneficial gut bacterium could slow the march toward Type 2 diabetes.[3] Published in Gut Microbes, researchers enrolled 98 adults from the U.S. and Europe who had prediabetes and insulin resistance, meaning their blood sugar regulation was already beginning to deteriorate.*

Participants took either a daily capsule containing Anaerobutyricum soehngenii — a butyrate-producing bacterium naturally found in healthy guts — or a placebo for 12 weeks, followed by a four-week washout period. The researchers wanted to determine whether restoring this missing microbe could improve markers of metabolic health before full-blown diabetes developed.

- **Blood sugar became more stable throughout the day —** One of the most important findings involved glycemic variability, which refers to how much blood sugar swings up and down over time. Frequent spikes and crashes place stress on your body even before diabetes develops. Participants receiving A. soehngenii experienced a significant reduction in glucose variability; their blood sugar became steadier and more predictable.

- **Long-term blood sugar control may have improved as well —** Researchers also measured HbA1c, often called your three-month blood sugar report card because it reflects average glucose levels over several months. Compared with placebo, the treatment group achieved a significant reduction in HbA1c after the intervention and washout period.

  The change was small, about 1 mmol/mol, roughly a 0.1% drop on the more familiar HbA1c percentage scale. They were otherwise healthy adults at risk of progressing toward Type 2 diabetes. The findings suggest that early microbiome intervention may help support metabolic health in the right direction before serious disease develops.

- **The strongest benefits appeared in participants with worse metabolic health —** The largest improvements occurred among U.S. participants, who entered the study with higher body weight, greater insulin resistance, and poorer blood sugar control than

the European participants. In this subgroup, glucose handling during an oral glucose tolerance test improved by approximately 15%, while measures of glucose variability improved by 3% to 4%.

- **Blood pressure may have improved alongside blood sugar —** Participants receiving the bacterial supplement experienced significant reductions in diastolic blood pressure, the bottom number in a blood pressure reading. European participants showed the greatest response, with reductions approaching 3.8 mm Hg after 12 weeks.

  Researchers noted that the blood pressure effect faded after supplementation stopped, suggesting the improvement was linked to the presence of the bacterium and its metabolic activity.

- **The mechanism appears to involve butyrate, GLP-1, and microbial teamwork —** Unlike many probiotic studies, this intervention did not dramatically change the overall microbiome. Instead, the supplemented bacterium successfully established itself while leaving the broader ecosystem largely unchanged.

  Earlier research cited by the investigators found that A. soehngenii increases production of GLP-1, a hormone that helps regulate appetite and blood sugar, while converting lactate into butyrate and producing beneficial secondary bile acids, compounds that help regulate metabolism and inflammation.

  The researchers also discovered that participants with higher levels of Bifidobacterium and Coprococcus bacteria responded best, suggesting that beneficial microbes often work together as a team rather than acting alone.

## A Synbiotic May Help the Gut Produce More of Its Own Butyrate

Separate research tested whether a broad-spectrum synbiotic — a supplement that combines beneficial bacteria with the nutrients they need to grow and thrive — could strengthen the microbiome in ways that ordinary probiotics often fail to achieve.[4]

Published in Nutrients, the study followed 32 healthy adults for 91 days. Participants received either a synbiotic containing 24 probiotic strains plus a polyphenol-rich pomegranate extract or a placebo.*

Rather than focusing on symptoms alone, the researchers measured key biological markers linked to long-term health, including microbial diversity, butyrate production, urolithin A production, and inflammation. Their goal was to determine whether a carefully designed microbial ecosystem could produce measurable changes in healthy adults.

- **The supplement rapidly increased beneficial bacterial diversity —** Within just seven days, participants taking the synbiotic experienced more than a twofold increase in the diversity of Bifidobacterium and Lactobacillus species compared to placebo.

  Those improvements were largely maintained throughout the 91-day study, though the magnitude fluctuated, dipping below the twofold mark around day 49 before rising again.

  Diversity matters because a richer microbial ecosystem is generally more resilient and better able to perform important jobs inside your gut. The intervention also increased native beneficial bacteria, including Roseburia, Butyribacter, and Blautia, groups known for producing health-supporting compounds.

- **Nearly everyone became a urolithin A producer —** Urolithin A is a compound produced when gut microbes convert polyphenols from foods such as pomegranates into biologically active metabolites. At the beginning of the study, only about half of participants in the synbiotic group produced detectable urolithin A.

  By Day 91, 100% of participants were producing it, compared with just 44.4% in the placebo group. Urolithin A levels increased dramatically, reaching 49-fold higher levels than placebo at the end of the study. Researchers noted that this was the first synbiotic intervention shown to reliably convert an entire study population into urolithin A producers.

- **Butyrate increased substantially in people who needed it most —** The researchers specifically examined participants who started the trial with lower-than-average butyrate levels. In this group, fecal butyrate increased by 66% during the study, while no meaningful change occurred in the placebo group. At the same time, the abundance of native butyrate-producing bacteria increased.

  This is important because people who already have adequate butyrate production are unlikely to push levels much higher due to normal biological regulation. The largest gains occurred in participants whose microbiomes had the greatest room for improvement.

- **Inflammation moved in the right direction —** Researchers measured C-reactive protein (CRP), a widely used marker of systemic inflammation. As beneficial bacterial populations increased, CRP levels declined. Participants with the largest increases in Bifidobacterium species tended to experience the greatest reductions in inflammatory markers.

  The researchers calculated that individuals with a tenfold increase in synbiotic-associated bacteria experienced an average CRP reduction of 0.44 mg/L. Even though participants were healthy at baseline, the findings suggest that strengthening the microbiome may help maintain a less inflammatory internal environment.

- **The biological effects appear to come from microbial teamwork —** Unlike studies that focus on a single bacterial strain, this intervention was designed to create cooperation among multiple microbes. Certain Lactobacillus strains helped break down pomegranate polyphenols into intermediate compounds, while Gordonibacter species converted those intermediates into urolithin A.

  Other bacteria produced lactate and acetate that fed native butyrate producers through a process known as cross-feeding. The microbes worked together like members of a relay team, each passing nutrients and metabolites to the next

organism. That cooperative network appears to explain why the synbiotic was able to increase both urolithin A and butyrate simultaneously, something previous interventions had not achieved.

## How to Support Your Butyrate Production

The studies highlighted an important takeaway: there's more than one way to raise butyrate levels. Some researchers achieved benefits by providing butyrate directly through supplementation, while others increased populations of beneficial bacteria that produce butyrate naturally inside the gut. Both approaches were associated with improvements in important measures of health.

Instead of focusing only on symptom relief, focus on rebuilding the gut ecosystem that supports long-term butyrate production while also considering direct supplementation when appropriate.

1. **Feed and grow your butyrate-producing bacteria —** Your body doesn't make butyrate on its own. Beneficial gut microbes produce it when they ferment carbohydrates that reach your colon. The studies on A. soehngenii and the multi-species synbiotic found that supporting the right microbes was associated with increased butyrate production and improvements in metabolic and inflammatory markers.

   If your digestion is relatively healthy, gradually increase your intake of whole fruits, cooked root vegetables, and other well-tolerated carbohydrate foods. The goal is to create an environment where butyrate-producing bacteria can thrive and continue generating butyrate for you every day.

2. **Direct butyrate supplementation was studied as an option for significant symptoms —** The pediatric IBS study and the Parkinson's disease study both used butyrate-containing formulas and were associated with meaningful benefits, though neither was designed to isolate butyrate's effect from the other ingredients. In the

IBS trial, symptom improvement was dramatic, while the Parkinson's study found improvements in immune regulation, gut barrier function, and cellular energy production.

For people dealing with ongoing digestive symptoms, the cited research suggests direct supplementation may increase butyrate exposure more quickly than waiting for microbial populations to expand. In many cases, supporting your microbiome and using butyrate directly appear to be complementary strategies rather than competing ones.

Research in this area has focused on formulations designed to deliver butyrate throughout the colon, since many products release too early in the digestive tract.

3. **Strengthen your intestinal barrier —** Multiple studies pointed to improvements in barrier integrity as butyrate levels increased. Think of your intestinal lining as a security system that decides what enters your bloodstream and what stays inside the digestive tract. When that barrier becomes compromised, inflammatory compounds gain easier access to the rest of your body.

   Prioritize adequate protein intake — about 0.8 grams per pound (or 1.76 grams per kilogram) of lean body mass — with roughly one-third coming from collagen-rich sources. Those amino acids help support tissue repair and maintenance throughout your digestive tract.

4. **Support the microbes that work together as a team —** The synbiotic study found evidence that beneficial bacteria often cooperate rather than act independently. Some microbes help break down plant compounds, others generate compounds that feed butyrate producers, and still others convert those compounds into metabolites such as urolithin A.

   This means microbial diversity matters. Eating a wide variety of whole foods helps support a broader ecosystem that performs more biological functions than any single bacterial strain could accomplish alone.

5. **Track your response and build momentum —** One of the most useful tools is a simple daily log. Record abdominal discomfort, bloating, bowel habits, energy levels, and overall well-being. Small improvements often appear before major changes become obvious. As symptoms improve, you gain valuable feedback about which habits are helping your gut ecosystem recover.

   That creates confidence, reinforces consistency, and makes it easier to stay on track long enough for beneficial microbes and butyrate production to become established.

**These findings are from research conducted in clinical settings. Results may not apply to all individuals.*

*This article is for informational purposes only and does not constitute medical advice. Consult a qualified healthcare provider before making changes to your health regimen.*

## FAQs About Butyrate

**Q: What is butyrate, and why is it important?**

**A:** Butyrate is an SCFA produced when beneficial gut bacteria ferment certain carbohydrates. It serves as a primary fuel source for the cells lining your colon and helps support gut barrier integrity, immune function, metabolic health, and communication between your gut and the rest of your body.

**Q: Is it better to take butyrate supplements or increase butyrate-producing bacteria?**

**A:** The research suggests that both approaches work. Some studies found benefits when participants received butyrate directly through supplementation, while others found benefits by increasing populations of butyrate-producing bacteria. Both

strategies were associated with improvements in important measures of digestive, metabolic, and immune health.

**Q: What health problems are associated with low butyrate levels?**

**A:** Low butyrate production has been linked to digestive disorders, increased inflammation, weakened gut barrier function, impaired blood sugar regulation, and disruptions in gut-brain communication. Researchers are increasingly finding that butyrate influences systems throughout the body, not just the digestive tract.

**Q: How can I naturally increase butyrate production?**

**A:** One of the most effective ways is to support the bacteria that make butyrate. Whole fruits, cooked root vegetables, and other well-tolerated carbohydrate foods provide fuel that beneficial microbes convert into SCFAs. Increasing microbial diversity through a varied whole-food diet also helps support a healthier butyrate-producing ecosystem.

**Q: What is a synbiotic, and how is it different from a probiotic?**

**A:** A probiotic contains beneficial bacteria. A synbiotic combines beneficial bacteria with prebiotics, which are compounds that help feed and support those bacteria. In the study reviewed here, a multi-species synbiotic was associated with increases in populations of beneficial microbes, higher butyrate production, increased urolithin A production, and lower levels of systemic inflammation.

## Sources and References


- [1] Journal of Pediatric Gastroenterology and Nutrition July 9, 2025
- [2] Scientific Reports December 5, 2025

- [3] Gut Microbes May 15, 2025
- [4] Nutrients August 23, 2025