

A Deep Dive Into Butyrate — Your Gut's Powerhouse Molecule

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STORY AT-A-GLANCE

- › Butyrate is a short-chain fatty acid (SCFA) produced by gut bacteria that ferment dietary fiber. It serves as essential fuel for colon cells and maintaining overall systemic health
- › Adequate fiber intake — around 30 grams daily — is crucial for butyrate production. Without it, your body burns stored fat and protein, creating disease-causing byproducts
- › Butyrate strengthens your gut barrier, preventing intestinal permeability that allows harmful substances to enter the bloodstream and trigger autoimmune responses
- › Research shows butyrate improves insulin sensitivity, reduces diabetes risk, lowers bad cholesterol, prevents colorectal cancer, and supports brain health
- › Boost butyrate by eating fiber-rich foods, resistant starches, fermented foods and probiotics, while avoiding processed foods, managing stress, and limiting unnecessary antibiotics

Gut health is a cornerstone for optimal wellness, and one aspect of it that deserves more attention is butyrate. In a presentation titled "Butyrate: The Key to Optimal Health and Well-Being,"¹ Indiana-based dietitian Dawn Boxell takes a deep dive into the importance of this crucial molecule, which is a topic I'm also passionate about.

I encourage you to watch the entire video above. It covers crucial topics, such as butyrate's system-wide effect on your health and natural ways to boost its production.

The Lowdown on Butyrate

Essentially, butyrate is a short-chain fatty acid (SCFA) produced when beneficial bacteria in your gut ferment dietary fiber. This is what your colon uses to nourish itself, leading to better overall systemic health.

- **Dietary fiber is the key to producing butyrate** — According to Boxell, if you don't meet your regular fiber requirements, your body switches to burning stored fat and protein as fuel sources, which causes byproducts that cause disease (more on these diseases later).
- **Natural sources of butyrate** — While dietary fiber is the ideal way of increasing your butyrate production, Boxell notes that certain foods already contain butyrate, such as butter. She stresses that it needs to come from **grass fed cows**, as conventionally raised cows lack the appropriate environment to create butyrate in their milk:

"So, there are some natural sources of butyrate, and this comes in butter and ghee. Butyrate is abundant in just grass fed butter. It's not just from all butter, it is only going to come from grass fed cows. So, you would have to choose a butter that says from grass fed cows, and then ghee is just clarified butter."

- **Ghee also contains butyrate** — Ghee, especially from grass fed cows, is great for people with lactose intolerance, but you still need to check if you're affected. Boxell explains:

"It's kind of trial and error when it comes to utilizing ghee, if you do have some dairy intolerances, but they do remove a lot of the proteins that people will react to."

"So, that makes it a little bit more tolerable for some lactose-intolerant people. But this clarified butter has good ... butyrate concentration and again, it would need to be from grass fed cows"

How Butyrate Creates a Stronger Gut Barrier

The **colon** is one of the most important parts of your gut. It's home to the highest number of beneficial microbes such as *Akkermansia muciniphila*, *Faecalibacterium prausnitzii*, and *Roseburia intestinalis*. These strains, along with others, release SCFAs.

- **SCFAs energize your gut lining** — As these beneficial bacteria digest fiber, they release SCFAs that your colon uses as nourishment. Boxell explains:

"Your gut is an ecosystem of its own. And when these beneficial gut bacteria produce butyrate, this provides energy to your colonic cells. Those are the cells within your colon, and this energy supply helps nourish and support your gut cells and also really does help with your gut integrity or that lining those tight junctions."

- **The role of your gut barrier** — Your gut barrier protects you from disease-causing microbes while still allowing nutrient absorption. This natural permeability works properly only when a thick mucus layer filters and breaks down food into particles your body can use without triggering the immune system.
- **When the gut barrier weakens** — Without enough butyrate to maintain that protective mucus layer, permeability increases. Over time, this creates bigger gaps that allow poorly digested particles through, sparking immune reactions and health problems.

The Different Benefits of Butyrate on Your Overall Health

Now that you know what happens when your body doesn't have enough butyrate, what happens when you increase it? There's now a growing body of research showing that it helps manage chronic health issues, such as:

- **Insulin resistance and Type 2 diabetes** — According to Boxell, boosting butyrate production has immense benefits on your metabolic health. She highlights a study published in the *Frontiers in Nutrition*² that provides evidence on how butyrate

promotes better blood sugar control by improving insulin sensitivity and glucose homeostasis.

- **Blood sugar control and weight management** — Boxell noted that once your insulin resistance has improved and your risk for Type 2 diabetes goes down, you'll be able to manage your weight better. To do this, you need to consume fiber-rich carbohydrates. "There are more things that you can do, but really, that is the most impactful," she says.
- **Cancer** — As noted earlier, your colon cells rely on butyrate for energy. One positive outcome from this positive feedback loop is a lower risk of colorectal cancer. Boxell explains:

"Butyrate has been extensively studied for its role in maintaining colorectal health and preventing colorectal cancer, and it provides nourishment to the cells, lining the colon and promotes their proper functioning.

So again, it's putting yourself in a good place by consuming those fiber-filled carbohydrates. Butyrate also inhibits the growth of cancer cells and induces apoptosis, which is cell death of the cancer cells, and lowers the risk of colorectal cancers."

- **Heart disease** — Cholesterol is a fatty, waxy substance found in every cell in your body. As noted in [a previous article](#), having high levels of low-density lipoprotein (LDL), commonly known as the bad cholesterol, your risk for heart disease increases because of a specific protein called Apolipoprotein B (ApoB) within it. That said, butyrate helps lower LDL and promote high-density lipoprotein (HDL), the good cholesterol:

"Research suggests that butyrate decreases LDL cholesterol, which is your bad cholesterol, and increases your HDL cholesterol, which is considered your good cholesterol ... So that's a side benefit I think that all of us can

appreciate. Butyrate modulates the lipid metabolism and reduces inflammation, which may contribute to a healthier cardiovascular system," Boxell said.

Butyrate Impacts Your Overall Brain Health

Your gut and brain are inextricably linked via a complex system called the gut-brain axis. Butyrate is able to cross the blood-brain barrier and travel up your nervous system, influencing neurotransmitter communication in positive ways.

- **Butyrate helps lower the risk of neurodegenerative diseases** — Once butyrate production is optimized, your brain also benefits from it:

"[B]utyrate may protect against neurodegenerative diseases like Alzheimer's and Parkinson's. So, to me, that's pretty powerful.

So, one, if you focus on just optimizing your gut health, part of that piece is going to be butyrate production or, overall ... short-chain fatty acid production, because there's a benefit from other short-chain fatty acids as well. They ... play different roles, but butyrate has some significant roles."

- **An imbalanced gut microbiome affects your mental health** — When butyrate levels are low, you're opening the door for cognitive issues, as well as digestive problems:

"If you have gut dysbiosis, small intestinal bacterial overgrowth (SIBO), if you have H. pylori (that's in the stomach), if you have any other type of, even if you want to go as deep as celiac [disease], Crohn's colitis, irritable bowel syndrome, IBD [inflammatory bowel disease], all of these things, they all do impact your mood, your mental health, your depression, anxiety.

And when you go even further to dementia, Alzheimer's, Parkinson's, those brain diseases that they are just really saying that your brain is inflamed."

- **Restore your mental fortitude via your diet** — Boxell explains that your diet plays a large role in your overall mood. Specifically, unhealthy food makes you more susceptible to mental issues, and that supporting your gut with healthy food will bring back positive mood:

"Really, if you attack your health in a way of 'How can I stay more anti-inflammatory in my choices that I can benefit?' that comes with fiber. So, you can think of your plants as kind of like a fire extinguisher and that really dampens that heat or that flame, if you want to think of it that way ...

Again, there are ways that you can prevent the decline in your mental health and mood by making different choices with what you put on your fork."

- **Butyrate keeps your gut barrier durable** — When your gut barrier leaks, antibodies mistake your tissues as threats. This "mistaken identity" fuels autoimmune disease flareups. Now, the barrier is responsible for keeping pathogens from entering your bloodstream. How do you keep it strong and healthy? Butyrate. As noted by Boxell:

"Research does indicate that butyrate regulates immune responses, suppresses inflammation and restores immune balance. And these properties hold promise for conditions such as inflammatory bowel disease, multiple sclerosis, rheumatoid arthritis where immune dysregulation is a key factor."

8 Practical Strategies to Boost Your Butyrate Production

As hinted earlier, dietary fiber is one guaranteed way to boost butyrate production. However, it's not as simple as filling your stomach with leafy vegetables. You need to approach your optimization efforts in a holistic manner because fiber will only get you so far. Having said that, Boxell offers a plethora of strategies to get your gut back in top shape:

- **Eat 30 grams of dietary fiber every day** — Again, dietary fiber is important for boosting butyrate production because it's what your gut bacteria use as food. Boxell recommends an average of 30 grams per day for both men and women, but these figures will slightly vary:

"Your gut bacteria primarily produce butyrate by fermenting fibers. And so, [make] sure that you consume a fiber-rich diet. For females, it's supposed to be 28 grams of fiber per day, and for males it should be 34 grams of fiber per day. I kind of just base it in the middle and I just say at least try for 30 grams of fiber every day. And then we just build on that if needed."

While I agree that sufficient dietary fiber intake is important, don't dive into it right away if your gut health is currently poor. If you have an imbalanced microbiome, **bad bacteria will ferment the fiber you eat (instead of the good bacteria)**, causing them to produce endotoxins that affect your cellular function.

For your body to use dietary fiber properly, you need to heal your gut first. To do that, make sure you're supplying it with healthy saturated fats (and not linoleic acid-rich vegetable oils) and 200 to 250 grams of carbohydrates a day from healthy, unprocessed sources.

The best examples include whole fruits, such as apples, berries and bananas, well-cooked white rice, and sweet potatoes. For an in-depth understanding of this approach, read "**Butyrate — The Metabolic Powerhouse Fueling the Gut and Beyond.**"

- **Add resistant starch into your rotation** — Boxell recommends eating resistant starch to aid your gut bacteria. This is something I also recommend, as it's quite beneficial **but only if your gut is in an optimal state**. She provides food options below:

"[R]esistant starch acts as a fuel source for butyrate-producing bacteria because it resists digestion ... in your small intestines. Some of the foods that are rich in resistant starch are green bananas, cooked and cooled

potatoes and rice, beans and lentils."

- **Consume fermented foods** — These are rich in probiotics that repopulate your gut. Boxell recommends you eat them daily. Try making your own yogurt at home, as well as [fermenting your own vegetables](#). This gives you a steady supply of healthy food without needing to spend money at the grocery store regularly.
- **Take a probiotic supplement** — If you're pressed for time, consider taking a probiotic supplement. However, don't just take any product you see — check if your gut is compatible with the indicated strains. Boxell explains:

"It's important to work with someone like myself who can help choose the right type of probiotic supplement for your personal needs, because I utilize different strains for different things.

So, I may not want someone to utilize a Lactobacillus species because I might have this inclination that I think they might have small intestinal bacteria overgrowth or SIBO, and that those Lactobacillus species really aggravate and make the symptoms worse for the patient."

- **Consider prebiotics** — These are foods that contain unique carbohydrates that nourish your gut bacteria. However, supplements work as well. Boxell explains the available alternatives below:

"Again, picking the right prebiotic is good to work with someone on, because some products that are out there you may find work a little bit better for different conditions. But prebiotic in food, these are things like garlic, onion, leek, and asparagus. Even milk has prebiotic properties.

Basically, anything that is considered a fructooligosaccharide or a galactooligosaccharide. So those oligosaccharides are the ones that can help neurosis bacteria and support the growth."

- **Avoid ultraprocessed foods** — These products are filled with gut-damaging [linoleic acid](#), as well as other toxins that do not benefit your health:

"You want to avoid those refined carbohydrates, and you want foods that are going to be more in the whole grain and that are unrefined. [Eating] sugary drinks and foods, if you do it in excess, that can kind of create an increase in intestinal permeability and damage that intestinal barrier ... Truly evaluate what you are consuming because it will impact the health of your gut."

- **Control your stress levels** — When you're under stress, [your body produces cortisol](#), which affects your health in numerous ways over time. As such, you'll want to keep it down by getting enough sleep and regular exercise:

"If you want to have a healthy gut microbiome, then [incorporate] stress management techniques such as regular exercise or just moving your body, mindfulness practices, mindful eating, a mindful walk or more of like a meditative walk. Any of those things can be considered mindful practices. And then getting enough sleep and then also having fun."

- **Minimize your antibiotic use** — Antibiotic overuse is a persistent public health threat across the globe, causing thousands of deaths annually. Moreover, it has lasting effects on your gut health, [even when taken short-term](#). If you do need to take antibiotics for a medical emergency, take probiotics to counteract its effects:

"Avoid overuse of antibiotics and antibiotics can cause gut bacteria including butyrate producers to become unbalanced. Here's the thing: If you need antibiotics, you take the antibiotics. But when you take the antibiotics, I would encourage you to take a probiotic that is intended for the use with antibiotics."

Frequently Asked Questions (FAQs) About the Health Benefits of Butyrate

Q: What is butyrate and why is it important for gut health?

A: Butyrate is a short-chain fatty acid (SCFA) made when gut bacteria ferment dietary fiber. It fuels the cells lining your colon, helping to maintain a strong gut barrier, which is vital for preventing harmful substances from entering the bloodstream. Without enough butyrate, the gut lining weakens, increasing inflammation and disease risk.

Q: How can I naturally increase my butyrate levels?

A: To boost butyrate, eat about 30 grams of fiber daily from fruits and vegetables. Include resistant starches like cooked potatoes and bananas, as well fermented foods for probiotics. Grass fed butter and ghee also contain butyrate. Probiotic and prebiotic supplements can also help based on your gut needs.

Q: What are the health benefits of butyrate beyond gut health?

A: Butyrate improves insulin sensitivity, supports blood sugar control, and helps with weight management. It protects colon cells, reducing the risk of colorectal cancer. It also lowers bad cholesterol, raises good cholesterol, and reduces inflammation, benefiting heart health. In the brain, it protects against Alzheimer's and Parkinson's by reducing inflammation and supporting neurotransmitters.

Q: What factors can reduce butyrate production or damage gut health?

A: Low fiber intake, ultraprocessed foods, and excess sugar reduce butyrate production. Overusing antibiotics harms beneficial gut bacteria. Chronic stress, poor sleep, and lack of exercise also disrupt gut health and reduce butyrate levels.

Q: What is the gut-brain connection and how does butyrate play a role?

A: Butyrate supports brain health by crossing the blood-brain barrier, lowering inflammation, and helping regulate mood. Low butyrate levels are linked to depression, anxiety, and neurodegenerative diseases. Supporting gut health through diet and lifestyle can improve mental clarity and reduce the risk of cognitive decline.

Sources and References

- ¹ YouTube, Gastric Health, "Butyrate the key to optimal health & well being," June 5, 2023
- ² Front Nutr. 2022 Nov 24;9:1067647