



# Prebiotics, Probiotics & Postbiotics

Support Gut Health and  
Enhance Your Overall Well-Being with  
These Beneficial Foods



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MEDICAL ALLIANCE

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# Prebiotics vs. Probiotics vs. Postbiotics: Key Differences & Examples

Category	Prebiotics 🌱 (Non-Digestible Fibers)	Probiotics 🦠 (Living Organisms)	Postbiotics 🧫 (Non-Living Metabolites)
Definition	Non-digestible fibers that feed beneficial gut bacteria and promote their growth.	Live bacteria or yeast that support gut health and microbiome balance.	Bioactive compounds produced by probiotics during fermentation or after microbial cell lysis.
State	Non-living, fiber-based compounds.	Living microorganisms (bacteria & yeast).	Non-living microbial metabolites & cellular components.
Examples	Inulin, PHGG, Fructooligosaccharides (FOS), Galactooligosaccharides (GOS), Pectin, Psyllium Husk, Beta-Glucans	<b>Bacteria:</b> Lactobacillus, Bifidobacterium, Streptococcus <b>Yeast:</b> Saccharomyces boulardii <b>Spore-forming probiotics</b> (Bacillus species)	<b>Fermentation Metabolites:</b> Short-chain fatty acids (SCFAs), peptides, urolithins, exopolysaccharides <b>Organic Acids:</b> Butyrate, propionate, acetate <b>Bacterial-derived</b> enzymes, peptides, and vitamins
Function	<ul style="list-style-type: none"> <li>Nourish &amp; stimulate growth of beneficial bacteria.</li> <li>Promote SCFA production indirectly.</li> </ul>	<ul style="list-style-type: none"> <li>Colonize the gut and balance microbiota.</li> <li>Enhance digestion, nutrient absorption, and immune function.</li> </ul>	<ul style="list-style-type: none"> <li>Strengthen gut lining, regulate immune response, and reduce inflammation.</li> <li>Support gut barrier integrity and modulate metabolic pathways.</li> </ul>
Found In	Chicory root, garlic, onions, leeks, asparagus, green bananas, resistant starch (cooled rice & potatoes), and prebiotic supplements.	Fermented foods: Yogurt, kefir, kimchi, sauerkraut, miso & probiotic supplements.	Fermented foods (indirectly), apple cider vinegar (ACV), dark chocolate, natto, pomegranates, postbiotic supplements.
Survivability	Not affected by digestion; reaches the gut intact.	Must survive stomach acid & bile to reach intestines.	Already bioactive—does not require survival.

# Prebiotics vs. Probiotics vs. Postbiotics: Key Differences & Examples

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Interaction with the Gut	Feeds gut microbes and increases their activity	Colonizes gut (temporarily or long-term) and interacts with host bacteria.	Works through immune modulation, anti-inflammatory effects, and gut barrier repair.
Dependence on Other Factors?	Needs probiotics to ferment and produce postbiotics	Needs prebiotics to thrive and function optimally	Works independently; does not require prebiotics or probiotics to exert effects

## Key Takeaways:

- ✓ **Prebiotics** = The food that fuels beneficial bacteria.
- ✓ **Probiotics** = The live bacteria or yeast that provide gut health benefits.
- ✓ **Postbiotics** = The beneficial compounds produced by probiotics that exert health effects even though they are non-living.

# Prebiotics

Prebiotics are non-digestible fibers and compounds that serve as fuel for beneficial gut bacteria, stimulating their growth and increasing the production of short-chain fatty acids (SCFAs).

## 1. Soluble Fibers (Fermentable & Gel-Forming)

These fibers dissolve in water, forming a gel that slows digestion and feeds gut bacteria.

- Partially Hydrolyzed Guar Gum (PHGG) – Gentle, well-tolerated, and beneficial for IBS and gut motility.
- Pectin – Found in apples, citrus fruits, and pears; promotes butyrate production.
- Beta-Glucans – Found in oats, barley, and mushrooms; supports immune health and gut flora.
- Acacia Fiber (Acacia Senegal Gum) – A mild prebiotic fiber good for gut health.
- Glucomannan (Konjac Root Fiber) – Highly fermentable, promotes appetite regulation and gut motility.
- Hemicellulose – Found in whole grains, nuts, and legumes; supports Bifidobacteria growth.

## 2. Resistant Starches (RS)

Resistant starches act as prebiotics by resisting digestion in the small intestine and fermenting in the colon.

- Green Bananas & Green Banana Flour – Rich in RS2, supports butyrate-producing bacteria.
- Cooled Potatoes & Rice (Retrograded Starch) – Cooking, cooling, and reheating increases resistant starch content.
- Legumes & Lentils – Rich in resistant starch and galactooligosaccharides (GOS).
- Tigernuts – High in resistant starch, good for feeding Bifidobacteria.

### 3. Non-Digestible Oligosaccharides (Fermentable Fibers)

These short-chain carbohydrates selectively feed gut bacteria.

- Fructooligosaccharides (FOS) – Found in onions, garlic, asparagus, and leeks.
- Galactooligosaccharides (GOS) – Found in legumes and breast milk; supports Bifidobacteria.
- Mannan Oligosaccharides (MOS) – Found in yeast and plant cell walls; supports immune function.

### 4. Polyphenols (Prebiotic-Like Effects)

Polyphenols are plant compounds that selectively promote beneficial gut bacteria while reducing pathogenic species.

- Cranberries & Blueberries – Rich in anthocyanins, promote *Akkermansia muciniphila*.
- Dark Chocolate & Cacao – Supports gut flora and SCFA production.
- Green Tea & Black Tea (Catechins) – Polyphenols that selectively feed beneficial bacteria.
- Red Wine (Resveratrol) – Ferments in the gut, promoting Bifidobacteria growth.

### 5. Miscellaneous Prebiotic Sources

- Psyllium Husk – Partially fermentable, beneficial for gut motility and microbiome balance.
- Larch Arabinogalactan – Found in larch trees; supports immune and gut health.
- Seaweed & Algae (Fucoidan, Alginate) – Supports diverse gut microbiota.
- Fenugreek Fiber – Mucilaginous fiber that feeds SCFA-producing bacteria.

## Key Takeaways:

- ✓ Soluble fibers (PHGG, pectin) help feed gut bacteria and regulate digestion.
- ✓ Resistant starches (green bananas, cooled rice) support butyrate production.
- ✓ Oligosaccharides (FOS, GOS) selectively feed beneficial bacteria like Bifidobacteria.
- ✓ Polyphenols (cacao, berries) act as prebiotic-like compounds with microbiome-enhancing effects.



### Jerusalem Artichokes

Jerusalem artichokes, also known as sunchokes, are part of the sunflower family. A 100 gram serving contains 2 grams of the prebiotic fiber inulin. They can be eaten cooked or raw.



### Onions

This versatile veggie is rich in the prebiotic fibers inulin and FOS, which promote healthy digestion.



### Asparagus

This popular green veggie is loaded with antioxidants and soluble fiber, supporting your immune and digestive health.

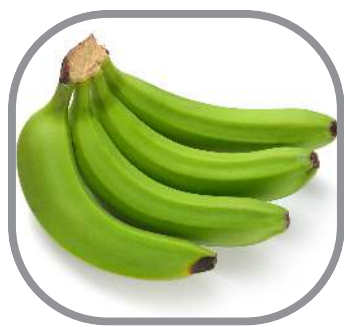


### Garlic

This flavorful herb is packed with immune-boosting benefits. But it's prebiotic fibers also promote the growth of bifidobacteria in the gut.

# PREBIOTIC-PACKED FOODS

Prebiotic foods are rich in dietary fiber, which nourishes your beneficial gut bacteria.  
Strive to include 1-2 prebiotic-rich foods in your diet each day.



### Bananas

Green, unripe bananas are rich in resistant starch, which serves as nourishment for your beneficial gut bacteria. Ripe yellow bananas also contain this fiber, although in lesser quantities.



### Dandelion Greens

These greens have a bitter, spicy kick similar to arugula and are packed with prebiotic fiber.



### Chicory Root

Part of the dandelion family, chicory is packed with the prebiotic fiber inulin. It's coffee-like taste makes it a great option for those looking to cut caffeine.



### Beans/Legumes

All beans and legumes are rich in prebiotic fibers. To enhance digestibility (and prevent gas), always soak dried beans overnight and cook them well.

# Probiotic Strains and Their Functions

## Lactobacillus Strains (Lactic Acid Bacteria)

💡 Key Benefits: Supports digestion, gut health, and immunity, reduces inflammation, and improves lactose tolerance.

📍 Found In: Yogurt, kefir, sauerkraut, kimchi, pickles, fermented dairy.

Strain	Benefit
Lactobacillus acidophilus	Enhances digestion, boosts immunity, supports vaginal health, improves lactose digestion.
Lactobacillus rhamnosus GG	Supports gut barrier integrity, reduces diarrhea risk (especially antibiotic-related), enhances skin health (eczema).
Lactobacillus casei	Helps regulate bowel movements, improves digestion, and supports immune function.
Lactobacillus reuteri	May reduce H. pylori infection risk, supports cardiovascular health, helps with colic in infants.

## Yeast-Based Probiotics

💡 Key Benefits: Yeast-based probiotics don't compete with bacteria, making them useful for gut infections & antibiotic recovery.

📍 Found In: Supplements (most common), kombucha, fermented foods.

Strain	Benefit
Saccharomyces boulardii	Supports gut healing, diarrhea prevention (C. difficile & antibiotic-related), and combats yeast overgrowth.
Saccharomyces cerevisiae	Enhances nutrient absorption and gut function, often used in functional yeast supplements.

# Probiotic Strains and Their Functions

## Bifidobacterium Strains (Key for Gut & Metabolism)

💡 Key Benefits: Reduces inflammation, enhances immune function, supports metabolic and cognitive health.

📍 Found In: Yogurt, kefir, tempeh, miso, aged cheese, supplements.

Strain	Benefit
Bifidobacterium bifidum	Supports digestion, immunity, and gut barrier function; helps reduce allergic reactions.
Bifidobacterium longum	Reduces inflammation, supports brain function, and may improve stress response (gut-brain connection).
Bifidobacterium breve	Helps with constipation, enhances gut microbiome diversity, and supports metabolic health.
Bifidobacterium lactis	Improves immune function, reduces bloating, and enhances calcium absorption.
Bifidobacterium adolescentis	Promotes hormone balance, reduces inflammation, and aids gut function.
Bifidobacterium animalis	Known for improving regularity and gut motility .

# Probiotic Strains and Their Functions

## Soil-Based Probiotics (Bacillus Strains)

💡 Key Benefits: Resilient, spore-forming bacteria that survive stomach acid better than traditional probiotics.

📍 Found In: Soil-based probiotics, fermented foods like natto, and certain gut-health supplements.

Strain	Benefit
Bacillus subtilis	Supports immune defense, digestion, and gut lining repair. Helps resist stomach acid better than Lactobacillus strains.
Bifidobacterium longum	Improves gut inflammation, reduces IBS symptoms, enhances protein digestion.
Bacillus clausii	Used for antibiotic-associated diarrhea prevention and gut microbiome restoration.
Bacillus indicus (HU36)	Antioxidant-producing strain that helps reduce oxidative stress and gut inflammation.

## Emerging & Specialized Probiotics

💡 Key Benefits: Targeted for hormonal balance, inflammation reduction, and metabolic health.

📍 Found In: Specialized probiotic supplements

Strain	Benefit
Akkermansia muciniphila	Supports gut barrier health, linked to weight management and metabolic function.
Faecalibacterium prausnitzii	A major butyrate-producing bacteria, essential for gut lining repair and anti-inflammatory benefits.
Clostridium butyricum	Produces butyrate, which supports colon health and reduces gut inflammation.

# How to Choose the Right Probiotic

Choosing the best probiotic depends on your health goals.

- For Digestion & IBS → *Lactobacillus plantarum*, *Bifidobacterium lactis*, *Bacillus coagulans*
- For Immune Support → *Lactobacillus rhamnosus*, *Bifidobacterium bifidum*, *Bacillus subtilis*
- For Gut Healing & Leaky Gut → *Saccharomyces boulardii*, *Akkermansia muciniphila*, *Clostridium butyricum*
- For Hormonal Balance & Metabolism → *Lactobacillus gasseri*, *Bifidobacterium adolescentis*, *Akkermansia muciniphila*
- For Antibiotic Recovery → *Saccharomyces boulardii*, *Bacillus clausii*, *Lactobacillus rhamnosus GG*

## Key Takeaways:

- *Lactobacillus* & *Bifidobacterium* → Common in fermented foods, beneficial for digestion & immunity.
- *Bacillus* (Soil-Based Probiotics) → Resilient strains that survive digestion better, great for gut restoration.
- *Saccharomyces boulardii* → Yeast probiotic for gut infections, antibiotic recovery.
- Emerging Probiotics like *Akkermansia muciniphila* → Support gut barrier & metabolism.
- Fiber that feeds SCFA-producing bacteria.

# FOODS HIGH IN PROBIOTICS

Probiotic foods help restore your healthy gut bacteria and enhance microbiome diversity.  
Strive for 1-2 servings of these probiotic-rich foods daily.



## Yogurt

Choose plain, full-fat, unsweetened varieties, and always check the label for 'contains live or active cultures.'



## Sauerkraut

This is shredded cabbage that's been fermented by lactic acid bacteria. Choose unpasteurized versions that have live, active cultures.



## Miso (soy)

Made from fermented soybeans, miso is rich in nutrients and has a salty flavor.



## Aged cheeses

Gouda, Parmesan, and Swiss are delicious and versatile, perfect as snacks or for enhancing Mediterranean dishes with depth and flavor.



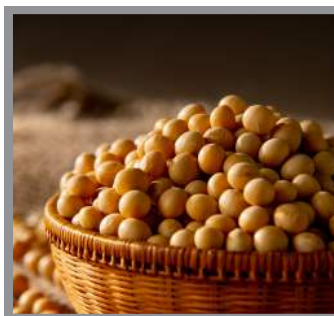
## Kimchi

A spicy, traditional Korean dish made with fermented veggies like cabbage, radish, or cucumber.



## Tempeh (soy & grain)

This high-protein food is made from fermented soybeans. Some tempeh brands contain gluten, so always check the label.



## Natto

A Japanese staple, natto is a fermented soybean product made with the *bacillus subtilis* bacteria.



## Kombucha

A sweet and fizzy fermented drink made with tea, sugar, bacteria, and yeast.

Brands: GT's enlightened, Health-ade, Brew Dr.

# Postbiotics: The Overlooked Key to Gut Health

Most people are familiar with probiotics (beneficial bacteria) and prebiotics (fiber that feeds probiotics), but fewer know about postbiotics—the bioactive compounds that probiotics produce. Postbiotics are the final product of microbial fermentation and play a crucial role in gut health, inflammation control, metabolism, and immune function.

## What Are Postbiotics?

Postbiotics are non-living bioactive compounds produced by probiotics when they ferment prebiotics in the gut. These compounds provide many of the same benefits as probiotics but don't require live bacteria to be effective, making them a powerful tool for gut and systemic health.

## Key Types of Postbiotics

1. Short-Chain Fatty Acids (SCFAs) – Acetate, butyrate, and propionate fuel gut cells, regulate inflammation, and enhance metabolism.
2. Microbial Peptides & Enzymes – Help with digestion, immunity, and gut barrier repair.
3. Polyphenol Metabolites – Antioxidants that support gut, heart, and brain health.
4. Exopolysaccharides – Strengthen the gut lining and aid in immune function.
5. Lactic Acid & Organic Acids – Lower gut pH, improving digestion and reducing harmful bacteria.

# How Do Postbiotics Work with Prebiotics & Probiotics?

**Postbiotics are the final step in the gut microbiome's functional cycle**

## 1. Prebiotics Feed Probiotics → Probiotics Produce Postbiotics

- Prebiotics (fiber & polyphenols) serve as food for probiotic bacteria.
- Probiotics (live bacteria) ferment prebiotics, producing health-enhancing postbiotic compounds.
- Postbiotics provide the actual biological benefits—regulating inflammation, gut integrity, and metabolism.

For example:

- Prebiotic Fiber (from onions, oats, or resistant starch) → Fermented by Bifidobacterium → Produces Butyrate (a postbiotic SCFA that fuels gut cells & reduces inflammation).

## Health Benefits of Postbiotics

### Gut Health & Digestive Function

- Postbiotics help strengthen the gut barrier, preventing leaky gut and reducing bloating, gas, and IBS symptoms. Butyrate, one of the most important postbiotics, is the primary fuel source for colonocytes (gut lining cells), promoting healing and reducing gut inflammation.

### Inflammation & Immune Modulation

- SCFAs like butyrate and propionate regulate inflammation by modulating immune system activity. Postbiotics also help train the immune system to tolerate beneficial bacteria while suppressing harmful microbes.

### Metabolic & Weight Regulation

- Postbiotics influence insulin sensitivity, fat metabolism, and appetite control. Studies show that higher SCFA production is linked to better weight management and metabolic flexibility.

### Brain & Mental Health (Gut-Brain Axis)

- Certain postbiotics can cross the blood-brain barrier and influence neurotransmitter production. Butyrate and other microbial metabolites help regulate mood, cognitive function, and stress response.

# Who Can Benefit from Postbiotics?

- ✓ People with Digestive Disorders – Postbiotics help restore gut balance, reduce bloating, and strengthen the gut lining.
- ✓ Those on Antibiotics – Unlike probiotics, postbiotics aren't destroyed by antibiotics, making them useful for gut recovery.
- ✓ Individuals with Autoimmune Conditions – SCFAs reduce inflammatory cytokines and gut permeability, supporting immune regulation.
- ✓ People Looking for Metabolic Support – Butyrate and propionate help regulate insulin, appetite, and fat metabolism.

## Postbiotics vs. Probiotics: Which One Should You Take?

Do you need postbiotics if you're already taking probiotics? The answer depends on your gut health goals:

- If you struggle with probiotic tolerance (bloating, gas, SIBO), postbiotics may be a better option because they provide benefits without requiring live bacteria.
- If you're taking probiotics, pairing them with prebiotics enhances postbiotic production naturally in the gut.
- If you have gut inflammation or metabolic issues, postbiotics like butyrate can be a more direct solution than probiotics alone.

## How to Optimize Postbiotic Production Naturally

- 1** Eat more prebiotic fibers & resistant starch – Onions, oats, garlic, green bananas, and cooled potatoes promote SCFA production.
- 2** Consume fermented foods – Kimchi, sauerkraut, aged cheese, kefir, and kombucha contain direct postbiotics.
- 3** Consider targeted postbiotic supplements – Butyrate, Urolithin A, and propionate supplements can bypass gut imbalances and provide immediate benefits.



# FOODS RICH IN POSTBIOTICS

Postbiotic-rich foods contain bioactive compounds produced by beneficial gut bacteria, supporting digestion, immunity, and overall health. Aim to include 1-2 postbiotic-rich foods daily for optimal gut and metabolic benefits.



## Pomegranates

- Postbiotic: Urolithin A (Produced when gut bacteria metabolize ellagitannins)
- Why It's Important: Urolithin A enhances mitochondrial function, promotes anti-aging effects, and supports muscle endurance and cellular repair.



## Fermented Dairy (Yogurt, Kefir, Aged Cheese)

- Postbiotics: SCFAs, lactate, peptides
- Importance: SCFAs like butyrate strengthen gut lining, reduce inflammation, and support immunity. Choose unsweetened, full-fat yogurt or kefir with live cultures for optimal benefits.



## Kimchi & Sauerkraut

- As postbiotics: Exopolysaccharides, SCFAs (Acetate, Propionate, Butyrate), Lactate
- Support gut barrier integrity, aid digestion, and boost immunity. Add raw and unpasteurized to meals to retain beneficial postbiotics.



## Miso & Natto

- As postbiotics: Vitamin K2, Peptides, SCFAs
- Natto is the top source of Vitamin K2, essential for bone and cardiovascular health, and fermentation generates beneficial peptides for gut health. Add miso to soups or enjoy with mustard or tamari for a probiotic boost.



## Apple Cider Vinegar (ACV):

- Postbiotics: Acetic Acid, Bioactive Peptides
- Importance: Acetic acid helps regulate blood sugar, improves digestion, antimicrobial properties that support the gut microbiome. Mix 1 tablespoon in 8 oz. water before meals to aid digestion, or add into salad dressings.



## Dark Chocolate & Cacao

- Postbiotics: Polyphenol Metabolites
- Importance: Cacao polyphenols feed gut bacteria, leading to the production of SCFAs and anti-inflammatory metabolites that support brain, heart, and gut health. Choose 85%+ dark chocolate or raw cacao powder.



## Green Tea & Black Tea



- Postbiotics: Catechin Metabolites, SCFA Precursors
- Importance: Gut microbiome ferments tea catechins, aiding metabolic health, cardiovascular function, and reducing inflammation. Choose unsweetened green or black tea, or matcha for added antioxidants.



## Oats & Barley

- Postbiotics: Beta-Glucans → Butyrate & Propionate
- Importance: Beta-glucans are prebiotic fibers that promote gut bacteria, producing SCFAs like butyrate, which support insulin sensitivity, cholesterol balance, and gut lining integrity.

# Creative Meal Ideas Incorporating Prebiotics, Probiotics, and Postbiotics

Breakfast	Lunch	Dinner	Snacks
 <p><b>Greek Yogurt &amp; Berry Power Bowl</b></p> <ul style="list-style-type: none"><li>✓ Prebiotics: Chia seeds, flaxseeds, oats</li><li>✓ Probiotics: Greek yogurt (with live cultures)</li><li>✓ Postbiotics: Blueberries (polyphenol metabolites), dark chocolate, cacao (postbiotics)</li></ul>	<p><b>Mediterranean Tempeh &amp; Fermented Cheese Salad</b></p> <ul style="list-style-type: none"><li>✓ Prebiotics: Leafy greens, artichokes, onions</li><li>✓ Probiotics: Tempeh, fermented cheese (e.g., aged cheddar, Gouda)</li><li>✓ Postbiotics: Olives (rich in polyphenols)</li></ul>	 <p><b>Wild Salmon with Roasted Garlic &amp; Sauerkraut</b></p> <ul style="list-style-type: none"><li>✓ Prebiotics: Roasted garlic, asparagus</li><li>✓ Probiotics: Sauerkraut (fermented cabbage)</li><li>✓ Postbiotics: Wild-caught salmon (rich in omega-3s that support postbiotic production)</li></ul>	<p><b>Aged Cheese &amp; Green Banana Slices with Dark Chocolate</b></p> <ul style="list-style-type: none"><li>✓ Prebiotics: Green banana slices (resistant starch)</li><li>✓ Probiotics: Fermented cheese (e.g., Parmesan, aged cheddar)</li><li>✓ Postbiotics: Dark chocolate (rich in polyphenols, which convert to postbiotics)</li></ul>

# Kefir Matcha Latte



## Benefits:

- ✓ Prebiotics: Matcha (polyphenols)
- ✓ Probiotics: Kefir (fermented dairy or coconut kefir)
- ✓ Postbiotics: Organic acids & SCFAs from kefir fermentation

## How to Make it

1. ½ cup plain kefir (probiotics & postbiotics)
2. ½ cup hot water with 1 tsp matcha powder (prebiotic polyphenols)
3. Blend together with a dash of cinnamon for an extra gut-supportive boost





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