KRESSER INSTITUTE FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

# Gut Treatment Probiotics & Prebiotics Review

Probiotics and prebiotics are both essential to healing the gut.

**Probiotics:**

- Primarily help to balance and regulate the immune system and reduce inflammation in the gut.
- However, most probiotics do not quantitatively change the composition of the gut microbiome over time (soil-based organisms may be an exception to this). That's because many species of probiotics that are taken do not colonize the gut and take up residence, so taking probiotics doesn't actually increase the numbers of beneficial bacteria.

**Prebiotics:**

- Prebiotics do increase the beneficial bacteria over time because they provide food for those beneficial species of bacteria.

All long-term gut healing protocols should include both probiotics and prebiotics for optimal results. However, it is sometimes necessary to avoid prebiotics early in the treatment process because in certain cases they can make conditions such as small intestinal bacterial overgrowth (SIBO), parasite infections, and fungal overgrowth worse.

**Fermentable fibers:**

- Prebiotics that selectively stimulate a limited number of favorable species, in particular, *Lactobacillus* and *Bifidobacterium.*
- Increase the production of short-chain fatty acids (SFCAs), increase the acidity of the colon, and make the gut less hospitable to pathogens and more hospitable to beneficial species of bacteria.

## SOURCES OF DIFFERENT TYPES OF FERMENTABLE FIBER IN THE DIET

| Fiber type | Where it's found in diet |
|---|---|
| **Inulin** | Garlic, onions, leeks, chicory root, jerusalem artichoke, dandelion root, burdock root, yacon |
| **Beta-glucans** | Mushrooms, dates, oat fiber |
| **Pectins** | Fruit *(esp. peaches, apples, oranges, grapefruit and apricots)*, vegetables (*esp. carrots, tomatoes, potatoes)*, legumes *(esp. peas)* |
| **Resistant starch** | Cooked & cooled potatoes, cooked and cooled rice, legumes *(esp. lentils)*, green plantains |

There are three classes: soluble fiber, nonstarch polysaccharides, and resistant starch.

**Soluble fiber:**

- Best tolerated by patients with gut issues in general because they're not FODMAPs and they tend to have a soothing effect on the digestive tract.
- Glucomannan is well tolerated and has the added benefit of blood sugar regulation.
    - We use Now brand of glucomannan.
- Partially hydrolyzed guar gum (PHGG) for SIBO treatment.
    - Unlike other soluble fibers, it doesn't form a gel in the gut.
    - Best-tolerated fiber I've worked with of any of the fibers, especially for patients with FODMAP intolerance.
- Other options for soluble fiber include psyllium and acacia.
- **Modified citrus pectin:**
    - A naturally occurring substance found on the cell walls of most plants, especially concentrated in the peel and pulp of citrus fruits.
    - It has been used to prevent cancer and metastasis and bind heavy metals, especially when combined with an alginate complex like in products such as PectaSol.
    - Advise patients to start slowly because of potential detox reactions if they have toxins.

## SUMMARY OF SOLUBLE FIBER OPTIONS

| Fiber | Comments |
|---|---|
| **Partially hydrolyzed guar gum** (PHGG) | Very well tolerated; not viscous; easy to mix with water and food |
| **Glucomannan** (konjac root) | Well tolerated; shown to reduce blood sugar |
| **Psyllium husk** | Tendency to cause bloating; can be purchased as pure, organic powder |
| **Acacia** | Well tolerated; can be purchased as pure, organic powder |
| **Modified citrus pectin** (MCP) | Well tolerated; chelates heavy metals especially when combined with alginate comples |

We generally start with PHGG or glucomannan if the patient has blood sugar or weight regulation issues.

Advise patients to rotate back and forth between different forms of fermentable fiber.

## NONSTARCH POLYSACCHARIDES: (NOTE THAT MANY OF THESE ARE FODMAPS)

**Larch arabinogalactan:**

- Increases the Bifidobacteria and Lactobacilli and the production of SCFAs and has an immune-regulating effect.

**Beta-glucan:**

- Soluble fiber that's readily available in oat and barley grains; also in certain types of mushrooms such as reishi, shiitake, and maitake; yeast; seaweed; and algae.
- Has an immunoregulatory effect.

**Inulin and fructooligosaccharide (FOS):**

- Food for beneficial bacteria in the colon, especially Bifidobacteria.
- Most likely to cause GI symptoms such as gas and bloating.

**Galactooligosaccharides (GOS):**

- Technically not FODMAPs. Produce the least amount of gas and are better tolerated.
- Strong promoters of Bifidobacteria and Lactobacilli.

## SUMMARY OF THE NONSTARCH POLYSACCHARIDE OPTIONS

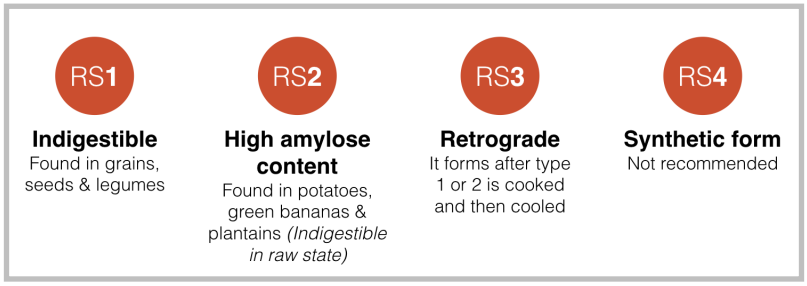
| Fiber | Comments |
|---|---|
| **Larch arabinogalactan** | Immune stimulator and regulator |
| **Beta-glucan** | Immune stimulator and regulator |
| **Inulin and oligosaccharide** (FOS) | Often used in functional foods; most likely to cause GI distress |
| **Galacooligosaccharide** (GOS) | Potent promoter of bifidobacteria and lactobacilli |

I recommend two products, BiotaGen and Galactomune, from Klaire Labs, and if you take both of these products, it covers the entire spectrum of nonstarch polysaccharides, so you can use them together or you can rotate them back and forth.

**Resistant starch (RS):**

- Is not digested in the stomach or small intestine and reaches the colon intact.
- Although it is a starch, it is not broken down into glucose, and it doesn't hit the bloodstream, so it doesn't have any effect on blood sugar.
- Is an insoluble fiber, but unlike other insoluble fibers, resistant starch is fermented by colonic bacteria.

## FOUR TYPES OF RESISTANT STARCH




Food sources of prebiotics:

- Cooked and cooled potatoes, sweet potatoes, and yams
- Cooked and cooled parboiled rice or other properly prepared rice
- Cooked and cooled properly prepared (soaked or sprouted) legumes
- Dehydrated plantain chips

Note that these cooked and cooled foods can be reheated at low temperatures less than 130 degrees and maintain the benefits of RS.

Resistant starch selectively stimulates the growth of beneficial species like Bifidobacteria and Lactobacilli. It also increases the concentration of SCFAs like butyrate and propionate and has been shown to protect against colon cancer, improve metabolic health, reduce fasting blood sugar and body weight, and improve insulin sensitivity.

The easiest way to supplement with resistant starch is gluten-free unmodified potato starch (Bob's Red Mill is a good brand) or green banana flour or green plantain flour at a dose of two to four tablespoons a day.

Start the patient at a quarter- to a half-teaspoon per day because it can produce intense GI symptoms.

## PROBIOTICS:

Probiotics help patients by temporarily—only when the patient is taking them—tuning and regulating the immune system, promoting anti-inflammatory pathways, and creating a favorable environment for beneficial bacteria.

## BRIEF SUMMARY OF BENEFICIAL EFFECTS OF PROBIOTICS

| | |
|---|---|
| Direct protection of the intestinal barrier | Modulation of neurotrophic chemicals, including brain-derived neurotrophic factor |
| Influence on local and systemic antioxidant status, reduction in lipid peroxidation; | Limitation of carbohydrate malabsorption |
| Direct, microbial-produced neurochemical production, for example, gamma-aminobutyric acid (GABA) | Improvement of nutritional status, for example, omega-3 fatty acids, minerals, dietary phytochemicals |
| Indirect influence on neurotransmitter or neuropeptide production | Limitation of small intestinal bacterial overgrowth |
| Prevention of stress-induced alterations to overall intestinal microbiota | Reduction of amine or uremic toxin burden |
| Direct activation of neural pathways between gut and brain | Limitation of gastric or intestinal pathogens (for example, Helicobacter pylori) |
| Limitation of inflammatory cytokine production | Analgesic properties |

## FERMENTED FOODS:

Fermented foods have several advantages over commercial probiotic products.

1. Hominids have been eating fermented foods for more than two million years, and we're adapted to getting microbes from these foods for this reason.
2. Some evidence that probiotic bacteria in foods may be better able to survive the stomach acid.

3. They increase the bioavailability of mood-regulating B vitamins, magnesium, and zinc, and they may improve vitamin D status.
4. The concentration of probiotic organisms is significantly higher in some fermented foods. For example, one cup of kefir contains approximately 2.35 trillion colony-forming units, or CFUs. Most probiotic supplements only have a few billion.
5. Fermented foods are much cheaper than commercial probiotics.

Clinically, I find kefir to be the most therapeutic, especially homemade kefir made from pasture-raised organic milk, if patients can tolerate it. It's rich in beneficial microbes, and it also contains fat-soluble vitamins such as A and K2. Note that even patients with lactose intolerance can often tolerate kefir when it's been fermented for 24 hours because that virtually eliminates the lactose.

See the guide to fermented foods provided as part of the ADAPT course for basic equipment and guidelines for fermentation.

Commercial probiotics can be used as part of an antimicrobial protocol to address a particular symptom such as constipation or diarrhea or to provide strains that may not be available in fermented foods. Also, commercial probiotics are useful for patients who do not tolerate fermented foods very well, especially patients with amine or histamine intolerance.
For ongoing maintenance and general health, I typically recommend a broad-spectrum soil-based product like TerraFlora or MegaSporeBiotic. A good maintenance dose is one capsule per day, in conjunction with fermented foods.

There are several other products with soil-based organisms, and examples include Primal Flora, Primal Defense, and AOR3.

SEED Daily Synbiotic is one of the "new generation" probiotics that contain probiotic and prebiotic fiber with a delayed release algae delivery system that allows the probiotics to withstand the many stages of digestion and reach the colon. We have found this to be a good maintenance symbiotic and often better tolerated in our sensitive patients or those that have had trouble tolerating probiotics in the past. Recommendation is two capsules at bedtime.

In cases where patients can't tolerate fermented foods, you may want to suggest a lactic acid probiotic for ongoing maintenance. Ther-Biotic Complete from Klaire Labs is a good choice. Alternatives such as VSL #3 and Elixa are more therapeutic-strength probiotics. VSL #3 in particular has been very well studied in IBD, ulcerative colitis, in particular. These products require refrigeration because they're lactic acid bacteria.

## ANTIBIOTIC RECOVERY PROTOCOL

| Intervention | Comments |
|---|---|
| **Fermented foods** | Dairy kefir particularly beneficial if tolerated |
| **Fermentable fiber** | Onions, garlic, jerusalem artichoke, chicory, etc. |
| **Probiotics** | SBOs + lactic acid bacteria, including *Saccharomyces boulardii* |
| **Prebiotics** | Soluble fiber, non-starch polysaccharides, and/or RS |

## POST-ANTIBIOTIC TREATMENT:

- Suggest plenty of fermented foods, fermentable fiber, and bone broth.
- Consider soil-based organisms like TerraFlora or MegaSporeBiotic.
- Add something with *Saccharomyces boulardii* in it, alone or in a product like ABX Support from Klaire Labs, which has *Saccharomyces boulardii, Lactobacillus rhamnosus, Bifidobacterium bifidum,* and *Bifidobacterium breve* to help with side effects while on antibiotics.
- Recent studies have made us question the benefit of post-antibiotic probiotic therapy, with some results indicating that taking probiotics after antibiotic therapy may slow recovery of the normal microbiome by up to five months. More research will need to be done, but in the meantime, we are more reluctant to recommend probiotics after antibiotic therapy unless there are circumstances that warrant probiotic support.