

PREBIOTICS



Prebiotics

- Prebiotics are a type of fiber that feed the good bacteria – in particular the residential bacteria in the gastrointestinal system
- They are the number 1 way to promote the growth of residential bacteria
- Currently being added to foods to create “functional foods”
- Found in foods that already have numerous health benefits
- Do all plants have prebiotic fiber?



Benefits of Prebiotics

- Recent studies of prebiotics found that they can modify the brain in a similar way that probiotics can
- Rat fed FOS and GOS have stimulate neuroendocrine responses (based on their ability to proliferate bacteria
- These types of studies means that prebiotics are helping residential good bacteria
- This is why they are seeing similar result in comparison to probiotics



Oligosaccharides

- They are smaller saccharides chains of 3-9 glucose molecules or other monosaccharides
- Fructo-oligosaccharides (FOS) consists of fructose molecules
- FOS is produced by the degradation of inulin fiber and found in fruits and vegetables
- Galacto-oligosaccharides (GOS) consists of galactose molecules and is produced by an enzyme conversion of lactose
- GOS is found in dairy products and legumes



FOS

- Can stimulate the growth of good bacteria when added to infant formula
- Promote good bacteria levels and SCFA
- Increases nutrient absorption, lowers serum cholesterol, triglycerides and phospholipids
- Too much FOS can cause flatulence and bloating
- There is some research that FOS might be able to feed bad bacteria such as *Klebsiella* and *E coli* but it was in vitro



GOS

- GOS relieves constipation
- It stimulates lactobacillus and bifidus strain in infants
- Inhibits growth of pathogens
- Aids nutrient absorption and synthesis of vitamins
- Aids the brain gut connection
 - studies of people have shown GOS can lower cortisol and reduce anxiety
- More than 12 g per day has been linked to flatulence



Isomaltooligosaccharides (IMO)

- Similar to FOS and GOS
- It is the least likely to cause gas, bloating or other digestive discomfort.
- One study found it is better hydrolyzed in the small intestines than FOS and GOS
- Now being added to GI supplements instead of FOS
- Also being used as a food additive as a replacement for sugar
- Help promote gut bacteria in a similar fashion to FOS
- Found in grains and potatoes



Resistant Starch

- Several types of resistant starch can be present in the same food
- Resistant starch is considered helpful for those suffering from Crohn's, Colitis, diverticulitis, constipation and diarrhea
- Resistant starch in one meal will stabilize the blood sugar in that meal and the next one plus increase the sensation of fullness so less food is eaten
- Also improves insulin sensitivity (after consuming 15-20 g for 4 weeks in one study)
- Only has 2 calories per g



Resistant Starch

- Increases SCFA production in the colon
- Reduces inflammation and the risk of colon cancer
- Feeds the good bacteria to help them reproduce
- May bind with bad bacteria and force them to be excreted
- Resistant starch is more likely to feed the good bacteria in the small intestine as it takes longer to degrade and therefore provides more opportunity to help feed the bacteria



Resistant Starch

- Type of fiber found in wheat, barley, rye, rice, spelt, kamut corn, potatoes, sweet potatoes, legumes, quinoa, and some source say nuts and seeds as well.
- There are different types of resistant starch
- One type is created when starch is heated and cooled (such as found in potatoes, wheat and rice)
- This same type also increases when re-heated
- Think about cooking your pasta or rice ahead of time and re-heating it



Short Chain Fatty Acids (SCFA)

- Currently there is a lot of interest in SCFA
- Sufficient good bacteria is needed for proper SCFA production
- SCFA aid colon function
- SCFA are absorbed into the body for more benefits
- Primary source is from the fermentation of carbohydrates by good bacteria

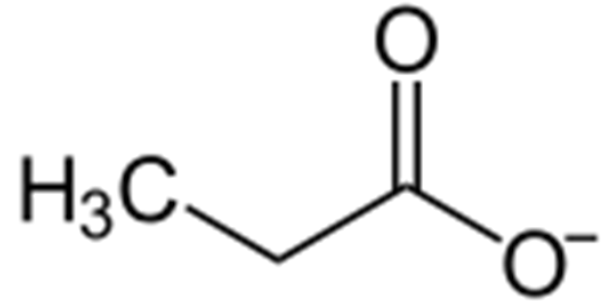
Butyrate

- Nourishes the colon intestinal wall lining and helps protect it
- Acts as an anti-inflammatory in the colon
- Helpful for IBD, colitis, allergy and autoimmunity
- Boost immune function and has some cancer protective benefits
- Helps prevent strokes and heart disease
- Helps stabilizes blood sugar and prevent diabetes
- Helps memory and cognition



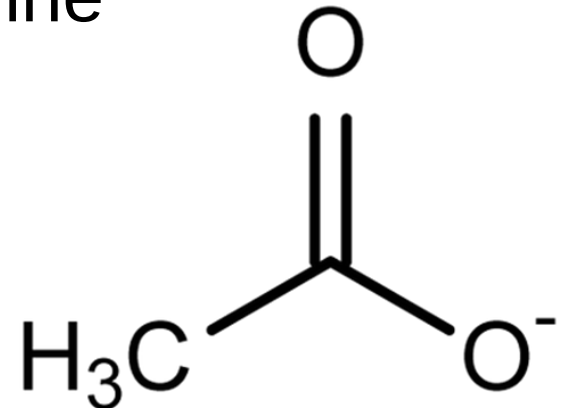
Propionate

- Helps create a protective barrier against pathogens in the gut
- Helps with repair of the gut lining
- Help reduces food intake and aids the maintenance of weight (or could aid weight loss)
- Can lower lipogenesis (the storage of carbs as fats) and serum cholesterol
- Can also inhibit the formation of cancer cells
- Helps glucose metabolism and lowers glycemic response



Acetate

- It helps with liver detoxification
- Acetate is the most predominant SCFA in feces
- It also aids gut motility and maintaining the gut lining
- Can help fuel the production of acetyl groups which can help make acetylcholine
 - essential for memory and cognition



Keystone Bacteria

- Ruminococcus bromii is a special type of bacteria researchers are calling a “keystone” bacteria and aids the break down of resistant starch
- Lack of this bacteria strains and it's relatives, limits degradation of resistant starch, producing less SCFA
- May explain people who have issues with resistant starch
- No food or supplement sources for this bacteria at this time
- Other bacteria may also be “keystone”

Prebiotic Food Sources

- FOS and Inulin: Jerusalem artichokes, chicory, garlic, onions, dandelion greens, asparagus, bananas, blueberries, almonds, broccoli, cabbage, kale, cauliflower, radish, chia, flax, tomatoes
- GOS: Dairy products and legumes
- Resistant Starch: Wheat, rye, spelt, kamut, barley, oats, corn, brown rice (and cooled white rice), potatoes, sourdoughm quinoa, sweet potatoes



In Conclusion...

- Prebiotics can be irritating to some people in supplements
- Too many in the diet can also be irritating to some people but for most people, there is no issue
- Look at your diet to see what prebiotic foods you are consuming
- Fermenting prebiotic foods can eliminate the issue.

