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PREBIOTICS



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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?



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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



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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



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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



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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



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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



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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



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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



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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



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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

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Butyrate

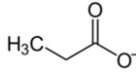


- Nourishes the colon intestinal wall lining and helps protect it
- Acts as an anti-inflammatory in the colon
- Helpful for IBD, colitis, allergy and autoimmunity
- Boost immune function and has some cancer protective benefits
- Helps prevent strokes and heart disease
- Helps stabilize blood sugar and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

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Propionate

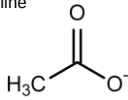
- Helps create a protective barrier against pathogens in the gut
- Helps with repair of the gut lining
- Help reduces food intake and aids the maintenance of weight (or could aid weight loss)
- Can lower lipogenesis (the storage of carbs as fats) and serum cholesterol
- Can also inhibit the formation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



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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



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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"

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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



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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.