Biomesight Gut Microbiome Test

biomesight

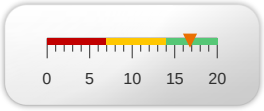
Sequencing type: 16s rRNA sequencing of v4 region

Report for: Member Example
Sample collection date: 7 August 2020

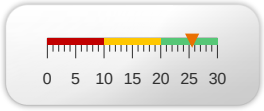
Gut Wellness Score

The gut wellness score combines the following indicators into a single metric.

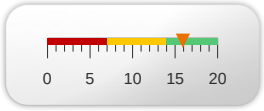
Diversity (84.00 %)



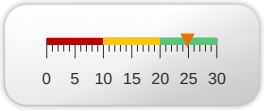
Probiotics (85.13 %)



Commensals (79.60 %)



Pathobionts (82.73 %)

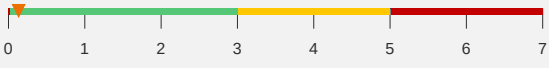


Important note: Our food and supplement recommendations are based on selectively feeding or crowding out specific bacteria and do not imply tolerance for a particular individual. Please introduce new foods and prebiotics gently and slowly. Refer to your overall recommendations to see the overall impact.

Probiotics

Probiotics are beneficial, protective bacteria. Probiotics are often called "good" bacteria. The beneficial impact of probiotics can be lost when present in concentrations exceeding the ideal range [1].

Probiotics - Akkermansia

Bacteria	Chart	Percent	Range	Interpretation	Score
Akkermansia		0.133%	(0.02-3.0%)	Optimal	100.0%

Akkermansia is a genus in the phylum Verrucomicrobia, containing only 2 species of which one, namely A. muciniphila is the most well known and is considered an integral part of a balanced human gut flora. Akkermansia muciniphila is currently being studied for its effects on human metabolism.

Recent studies have indicated that Akkermansia muciniphila in the intestinal tract may reduce obesity, type 2 diabetes, and inflammation. Elevated levels of Akkermansia muciniphila have been associated with multiple sclerosis and intestinal inflammation.

Muciniphila can degrade mucin and exert competitive inhibition on other pathogenic bacteria that degrade the mucin. These findings provide a rationale for A. muciniphila to become a promising probiotic and as such, several probiotic manufacturers are working on probiotic supplements and foods containing it.

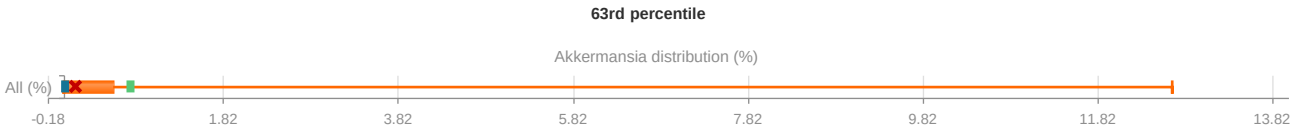
Please refer to our FAQ article on changes in Akkermansia.

Read more about it on our blog.

Recommendations To Reduce Akkermansia

Elevated levels of Akkermansia are usually caused by inflammation. To reduce Akkermansia, focus on decreasing inflammation unless you are taking specific supplements or consuming foods that increase Akkermansia (as outlined in the 'To increase' Akkermansia section). If the inflammation in the colon is due to microbiome imbalances, the primary goal should be to follow the overall recommendations to restore balance to the entire microbial ecosystem.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.002%	0.018%	0.768%	0.558%	12.674%

Probiotics - Bifidobacterium

Bacteria	Chart	Percent	Range	Interpretation	Score
Bifidobacterium	0 1 2 3 4	1.847%	(>=2.5-5.0%)	Low	73.88%

Bifidobacterium is a genus of gram-positive bacteria. They are ubiquitous inhabitants of the gastrointestinal tract, vagina and mouth of mammals, including humans. Bifidobacteria are one of the major genera of bacteria that make up the gastrointestinal tract microbiota in mammals. Some bifidobacteria are used as probiotics.

Different species and/or strains of bifidobacteria may exert a range of beneficial health effects, including the regulation of intestinal microbial homeostasis, the inhibition of pathogens and harmful bacteria that colonize and/or infect the gut mucosa, the modulation of local and systemic immune responses, the repression of procarcinogenic enzymatic activities within the microbiota, the production of vitamins, and the bioconversion of a number of dietary compounds into bioactive molecules. Bifidobacteria improve the gut mucosal barrier and lower levels of lipopolysaccharide in the intestine.

Bifidobacteria may also improve abdominal pain in patients with irritable bowel syndrome (IBS) though studies to date have been inconclusive. Naturally occurring Bifidobacterium may discourage the growth of Gram-negative pathogens in infants.

Read more about it on our blog.

Recommendations To Increase Bifidobacterium

Prebiotics & Other Ingredients

2-Fucosyllactose · Acacia fiber · Arabinogalactan · Galactooligosaccharides · Guar gum · Gum arabic · Lactose (not in lactose intolerant) · Lactulose · Milk oligosaccharides · Partially Hydrolyzed Guar Gum · Pectin · Raffinose · Resistant starch · Resveratrol · Stachyose · Xylooligosaccharides

Probiotics

Bifidobacterium longum

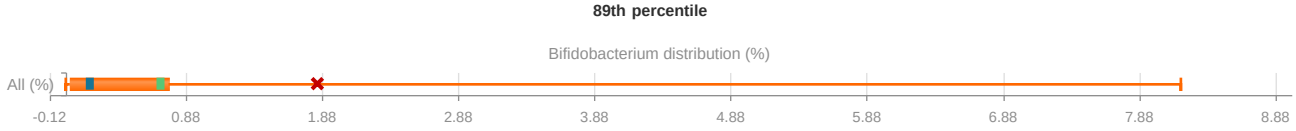
General Recommendations

Plant based diet

Recommended Foods

Acacia tree · Apples · Apricots · Artichoke · Asparagus · Banana · Beans · Beetroot · Broccoli · Carrots · Cashews · Cherries · Chickpeas · Chicory · Cottonseed flour · Cranberries · Fennel · Green banana · Green tea · Guar bean · Leek · Lentils · Lettuce · Matcha · Oat · Onions · Oranges · Peas · Pomegranate · Potato · Raddichio · Soy flour · Strawberries · White beans · Zhenjiang aromatic vinegar · Adzuki beans · Black sesame seeds · Walnuts

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.003%	0.028%	0.174%	0.698%	0.755%	8.186%

Probiotics - Blautia

Bacteria	Chart	Percent	Range	Interpretation	Score
Blautia	0 5 10 15 20	7.769%	(5.0-15.0%)	Optimal	100.0%

Blautia may assist in the digestion of complex carbohydrates. An abundance of these bacteria is a strong indication of a healthy gut. Blautia levels are increased in healthy people when compared to patients with liver disease and colorectal cancer and children with diabetes. Blautia produces anti-inflammatory short chain fatty acids called butyrate.

Recommendations To Reduce Blautia

Prebiotics & Other Ingredients

Chitooligosaccharides

Mannose oligosaccharides

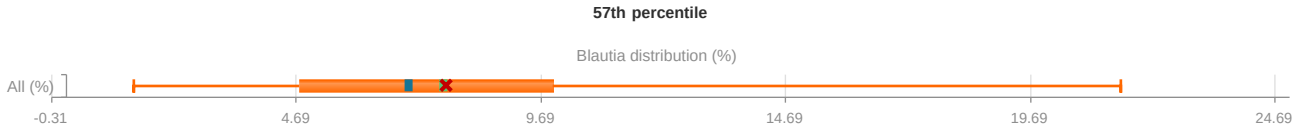
Triphala

Recommended Foods

Adzuki beans 

Walnuts 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
1.382%	4.777%	7.016%	7.724%	9.950%	21.565%

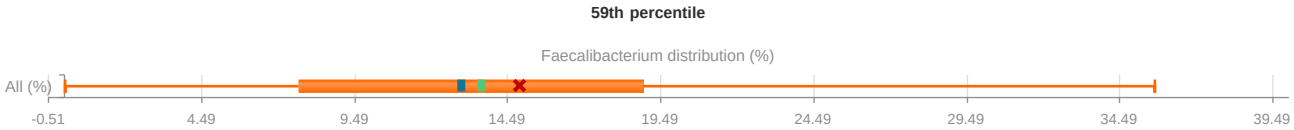
Probiotics - Faecalibacterium

Bacteria	Chart	Percent	Range	Interpretation	Score
Faecalibacterium	0 5 10 15 20	14.891%	(>=10.0-15.0%)	Optimal	100.0%

Faecalibacterium is a probiotic genus of bacteria. Its sole known species, Faecalibacterium prausnitzii is gram-positive and is one of the most abundant and important commensal bacteria of the human gut microbiota. It boosts the immune system, among other things.

Lower than usual levels of F. prausnitzii in the intestines have been associated with Crohn's disease, obesity, asthma and major depressive disorder, and higher than usual levels have been associated with psoriasis.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.058%	7.664%	13.006%	13.633%	18.935%	35.659%

Probiotics - Lactobacillus

Bacteria	Chart	Percent	Range	Interpretation	Score
Lactobacillus	0 0.5 1 1.5	0.007%	(0.01-0.5%)	Low	70.0%

Lactobacillus is a genus of Gram-positive, non-spore-forming bacteria. They are a major part of the lactic acid bacteria group (i.e., they convert sugars to lactic acid). In humans, they constitute a significant component of the microbiota at a number of body sites, such as the digestive system, urinary system, and genital system.
Lactobacillus forms biofilms in the vaginal and gut microbiota, allowing them to persist during harsh environmental conditions and maintain ample populations. Lactobacillus exhibits a mutualistic relationship with the human body, as it protects the host against potential invasions by pathogens, and in turn, the host provides a source of nutrients.
Lactobacillus is the most common probiotic found in food such as yogurt, and it is diverse in its application to maintain human well-being, as it can help treat diarrhea, vaginal infections, and skin disorders such as eczema.

Recommendations To Increase Lactobacillus

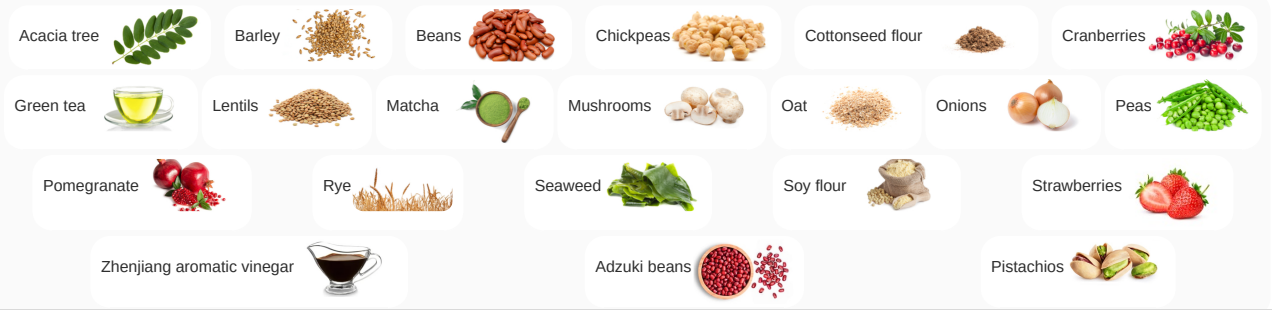
Prebiotics & Other Ingredients

Acacia fiber, Arabinogalactan, Beta-glucan, Calanus oil, Gum arabic, Konjac glucomannan, Lactose (not in lactose intolerant), Lactulose, Omega-3, Partially Hydrolyzed Guar Gum, Raffinose, Stachyose, Turmeric

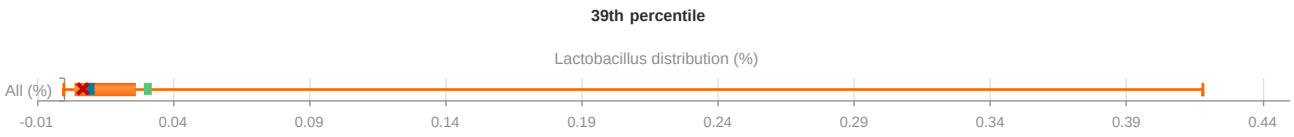
Probiotics

Lactobacillus acidophilus

Recommended Foods



Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.004%	0.010%	0.031%	0.026%	0.418%

Probiotics - Roseburia

Bacteria	Chart	Percent	Range	Interpretation	Score
Roseburia	0 5 10 15 20	2.608%	(5.0-11.0%)	Low	52.16%

The genus Roseburia consists of Gram-positive anaerobic bacteria. They are part of commensal bacteria producing short-chain fatty acids, especially butyrate, affecting colonic motility, immunity maintenance and anti-inflammatory properties. Modification in Roseburia spp. representation may affect various metabolic pathways and is associated with several diseases (including irritable bowel syndrome, obesity, Type 2 diabetes, nervous system conditions and allergies).

Recommendations To Increase Roseburia

Prebiotics & Other Ingredients

Partially Hydrolyzed Guar Gum · Psyllium · Resistant starch · Xylooligosaccharides

Probiotics

Bifidobacterium longum BB536

General Recommendations

Exercise 

Reduce animal products and fat 

Recommended Foods

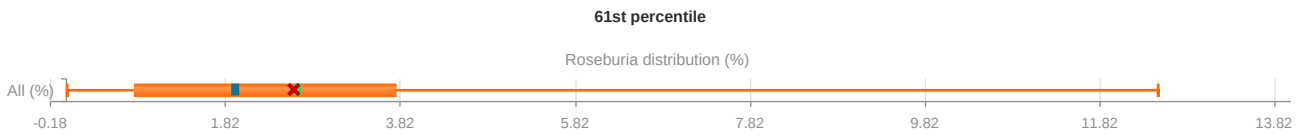
Artichoke  · Asparagus  · Banana  · Cashews  · Chicory  · Cranberries 

Garlic  · Green banana  · Green tea  · Leek  · Matcha  · Oat  · Onions 

Pomegranate  · Potato  · Strawberries  · White beans  · Zhenjiang aromatic vinegar 

Pinto beans  · Walnuts 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.013%	0.775%	1.931%	2.661%	3.766%	12.492%

Probiotics - Ruminococcus

Bacteria	Chart	Percent	Range	Interpretation	Score
Ruminococcus	0 10 20 30	11.446%	(0.0-15.0%)	Optimal	100.0%

Ruminococcus is a genus of bacteria in the class Clostridia. They are anaerobic, Gram-positive gut microbes.

Studies have found an association between lower abundance of some Ruminococcus species in people with inflammatory bowel disease. Ruminococcus is also less abdundant in patients with Parkinson's disease.

Recommendations To Reduce Ruminococcus

Prebiotics & Other Ingredients

Cinnamon · Ginger · ⚠ Oregano · Turmeric

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

Probiotics

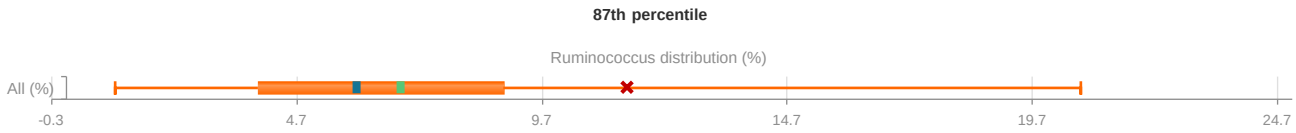
Bifidobacterium longum BB536 · Lactobacillus rhamnosus HN001

Recommended Foods

Cinnamon  Black pepper  Cayenne pepper  Ginger  ⚠ Oregano  Rosemary 

Turmeric 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.995%	3.908%	5.940%	6.830%	8.918%	20.702%

Commensals

While commensal bacteria are an integral part of a normal, balanced gut microbiome, a persistent overgrowth of these bacteria have been correlated with various disease states. A full score is awarded when the relative abundance of a measured commensal is within the recommended limits [1].

Commensals - Bacteroidetes

Bacteria	Chart	Percent	Range	Interpretation	Score
Bacteroidetes	0 20 40 60 80	46.664%	(0.0-35.0%)	High	66.67%

The phylum Bacteroidetes is composed of three large classes of Gram-negative bacteria, prevalent in the guts and on the skin of animals.

Although some Bacteroidetes can be opportunistic pathogens, many Bacteroidetes are symbiotic species highly adjusted to the gastrointestinal tract. They perform metabolic conversions that are essential for the host, such as degradation of proteins or complex sugar polymers.

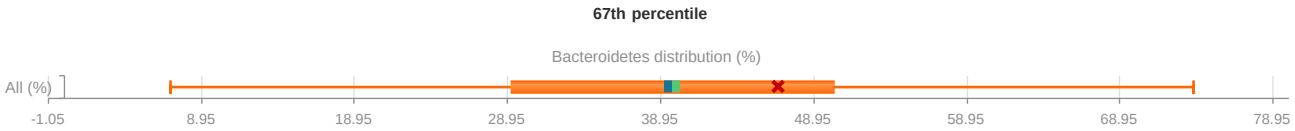
Bacteroidetes colonize the gastrointestinal already in infants, as non-digestible oligosaccharides in breast milk support the growth of both Bacteroides and Bifidobacterium.

Recommendations To Reduce Bacteroidetes

Prebiotics & Other Ingredients

Lactulose

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
6.973%	29.183%	39.500%	40.014%	50.315%	73.795%

Commensals - Bacteroides

Bacteria	Chart	Percent	Range	Interpretation	Score
Bacteroides (Bacteroidetes)	0 20 40 60	35.804%	(5.0-20.0%)	High	20.98%

Bacteroides species are normally mutualistic, making up the most substantial portion of the mammalian gastrointestinal microbiota, of which humans are no exception. They play a fundamental role in processing of complex molecules to simpler ones in the host intestine.

They can use simple sugars when available; however, the main sources of energy for Bacteroides species in the gut are complex host-derived and plant glycans. Studies indicate that long-term diet is strongly associated with the gut microbiome composition. In general, Bacteroides are resistant to a wide variety of antibiotics, hence a bacteroides overgrowth is commonly seen in those who have had antibiotics administered more frequently.

Bacteroides are gram-negative and contain LPS (endotoxin) in their cell membrane, however, the amount of endotoxin is smaller than many other gram-negative bacteria, which limits their pathogenicity.

Read more about it on our blog.

Recommendations To Reduce Bacteroides

Prebiotics & Other Ingredients

Galactooligosaccharides | Lactulose | Pectin | Yeast beta-glucan

Probiotics

Bacillus coagulans

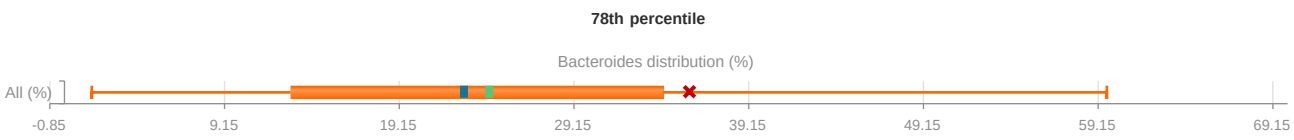
General Recommendations

High fiber foods | Reduce animal products and fat | Reduce sulfur additives

Recommended Foods

Apples | Apricots | Artichoke | Asparagus | Banana | Beans | Beetroot | Broccoli | Carrots | Cherries | Chickpeas | Chicory | Fennel | Garlic | Leek | Lentils | Lettuce | Onions | Oranges | Raddichio

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
1.628%	13.005%	22.881%	24.369%	34.286%	59.702%

Commensals - Prevotella

Bacteria	Chart	Percent	Range	Interpretation	Score
Prevotella (Bacteroidetes)	0 20 40 60 80	0.034%	(0.0-30.0%)	Optimal	100.0%

Prevotella is a genus of Gram-negative bacteria. Prevotella spp. are members of the oral, vaginal, and gut microbiota. Studies indicate that long-term diet is strongly associated with the gut microbiome composition - those who eat plenty of protein and animal fats have predominantly Bacteroides bacteria, while for those who consume more carbohydrates the Prevotella species dominate.
Prevotella copri feeds on fungal metabolites. An overgrowth of Prevotella, especially where it s not associated with diet, could therefore be down to a fungal overgrowth.

Read more about it on our blog.

Recommendations To Reduce Prevotella

Prebiotics & Other Ingredients

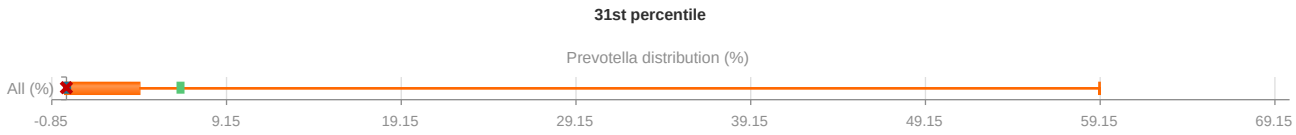
Curcumin | Lauric acid | Niacin | Olive leaf | Slippery elm | Triphala | Turmeric

General Recommendations

Reduce carbohydrates 

Reduce simple sugars 

Distribution



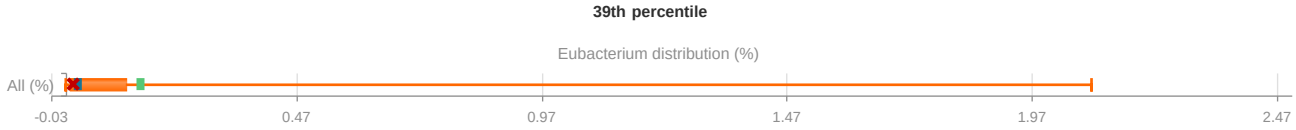
Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.003%	0.027%	0.090%	6.526%	4.179%	59.161%

Commensals - Eubacterium

Bacteria	Chart	Percent	Range	Interpretation	Score
Eubacterium	0 10 20 30	0.015%	(0.0-15.0%)	Optimal	100.0%

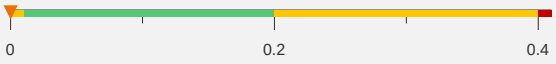
Eubacterium is a genus consisting of both gram-positive and gram-negative commendsal bacteria in the family Eubacteriaceae. These bacteria are characterised by a rigid cell wall.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.008%	0.025%	0.153%	0.123%	2.092%

Commensals - Oxalobacter

Bacteria	Chart	Percent	Range	Interpretation	Score
Oxalobacter		0%	(0.001-0.2%)	Low	90.0%

Even though Oxalobacter is part of the Proteobacteria Phylum, it is a valuable inhabitant of a healthy gut due to its ability to degrade oxalate. O. Formigenes is the most well-known species of the Oxalobacter genus in the human gut but all species from this genus degrade oxalate. O. Formigenes is under investigation as a potential therapeutic agent to prevent kidney stones. Oxalobacter are particularly sensitive to antibiotic use, and therefore its prevalence is low. On our platform, around 39% of samples contain Oxalobacter.

Oxalobacter can potentially be increased by increasing the consumption of oxalate and the reduction of antibiotics, but neither of these are recommendations as appropriate antibiotic use are often essential. Oxalate is an antinutrient that needs to be metabolized and excreted. It would be a better strategy to increase other oxalate degraders like Bifidobacteria and Lactobacillus, if necessary. To find out more about oxalate and other oxalate degraders, please refer to the Oxalates category within the intolerance section.

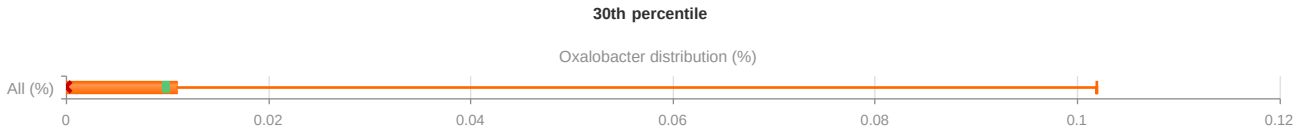
Read more about it on our blog.

Recommendations To Increase Oxalobacter

Notes

Can potentially be increased by increasing the consumption of oxalate and the reduction of antibiotics, but neither of these are recommendations as appropriate antibiotic use are often essential. Oxalate is an antinutrient that needs to be metabolized and excreted. It would be a better strategy to increase other oxalate degraders like Bifidobacteria and Lactobacillus, if necessary.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.010%	0.011%	0.102%

Commensals - Ruminococcus gnavus

Bacteria	Chart	Percent	Range	Interpretation	Score
Ruminococcus gnavus	0 0.5 1 1.5	0.023%	(0.0-0.5%)	Optimal	100.0%

Ruminococcus gnavus is part of the healthy human gut microbiota, however, it is disproportionately represented in many diseases, including long COVID, obesity, Type 2 diabetes as well as inflammatory gut conditions like Crohn s disease, IBD and ulcerative colitis.
Diet can influence its presence, and it has been associated with pro-inflammatory diets.
Note that R. Gnavus is technically no longer part of the Ruminococcus genus and is now part of genus Mediterraneibacter.

Recommendations To Reduce Ruminococcus gnavus

Probiotics

Bifidobacterium longum BB536

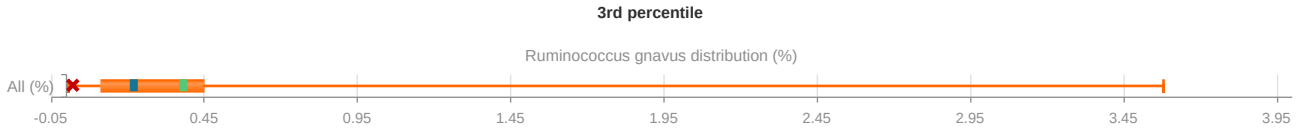
Lactobacillus rhamnosus HN001

Recommended Foods

Cranberry beans 

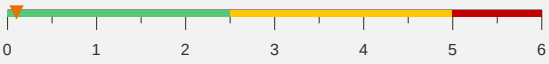
Raspberries 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.010%	0.115%	0.224%	0.383%	0.449%	3.583%

Commensals - Streptococcus

Bacteria	Chart	Percent	Range	Interpretation	Score
Streptococcus		0.101%	(0.0-2.5%)	Optimal	100.0%

Within the human gut ecosystem, the Streptococcus genus is generally considered a commensal bacterium. It consists of a wide variety of species, some with strains that are pathogenic, such as S. pyogenes, also known as Group A Streptococcus (GAS), and S. pneumoniae, which is known to produce toxins that can damage cell membranes, cause skin rashes, and even overactivate the immune system.
Depending on the species and/or strain, Streptococcus can produce lactic acid, acetate, histamine, serotonin, and dopamine. S. thermophilus is commonly found in yogurt, cheese and probiotic supplements.
Streptococcus is generally not regarded as a key player in modulating the overall microbial ecosystem.

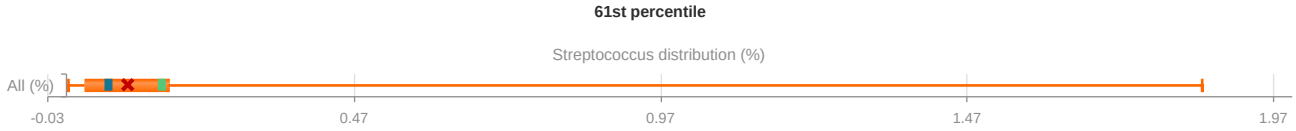
Recommendations To Reduce Streptococcus

Prebiotics & Other Ingredients

Colostrum

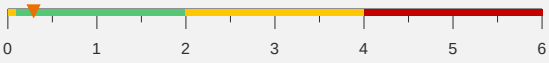
Pomegranate peel

Distribution



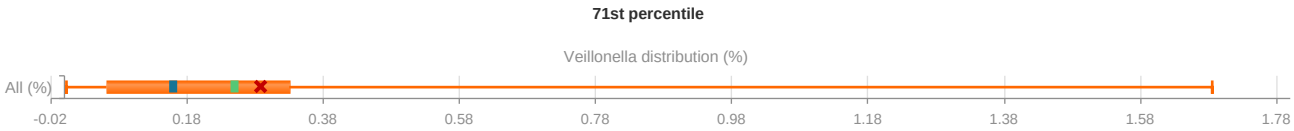
Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.005%	0.031%	0.069%	0.158%	0.168%	1.854%

Commensals - Veillonella

Bacteria	Chart	Percent	Range	Interpretation	Score
Veillonella		0.289%	(0.1-2.0%)	Optimal	100.0%

In a study on endurance athletes, researchers found that having more Veillonella in the gut is linked to better performance on a treadmill. What's intriguing is that they discovered that a substance called serum lactate, produced during exercise, can pass from the blood into the gut. They also found that when they put a similar substance called propionate into the rectum, it improved treadmill performance, much like what they observed when they introduced Veillonella bacteria into the gut. These findings suggest that Veillonella help improve athletic performance by converting exercise-produced lactate into propionate. This is a natural process encoded in our microbiome, and it enhances how well we can perform in sports.
Veillonella atypica is currently being investigated as a probiotic to reduce fatigue.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.003%	0.062%	0.160%	0.250%	0.330%	1.686%

Pathobionts

The pathobionts score is calculated based on the below subset of bacteria that can be identified on a Biomesight test. This is not an exhaustive list. A full score is awarded when the relative abundance of a measured pathobiont is below the levels associated with adverse effects. It is not necessary or even desired to have all pathobionts levels at 0 as pathobionts also contribute to gut diversity & overall balance.

Dr Carly Polland, ND: Lipopolysaccharide (LPS)

Dr Carly Polland, ND: Special Topics: Methanogens

Blog: Managing Proteobacteria Overgrowth

Blog: Managing Die-Off Symptoms

Pathobionts - Proteobacteria

Bacteria	Chart	Percent	Range	Interpretation	Score
Proteobacteria	0 4 8 12	1.871%	(0.0-4.0%)	Optimal	100.0%

Proteobacteria is a major phylum of Gram-negative bacteria. They include a wide variety of pathogenic genera, such as Escherichia, Salmonella, Vibrio, Helicobacter, Yersinia, Legionellales, and many others. Others are free-living (nonparasitic) and include many of the bacteria responsible for nitrogen fixation.

Increased abundance of proteobacteria has been associated with inflammatory bowel diseases such as Crohns.

Read more about it on our blog.

Recommendations To Reduce Proteobacteria

Prebiotics & Other Ingredients

Galactooligosaccharides

Lactulose

Probiotics

Bifidobacterium longum BB536

Lactobacillus rhamnosus HN001

General Recommendations

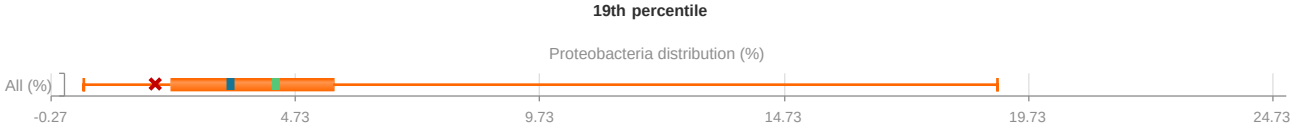
High fiber foods

Reduce animal products and fat

Recommended Foods

Artichoke, Beans, Beetroot, Broccoli, Chickpeas, Cranberries, Fennel, Green tea, Lentils, Lettuce, Matcha, Onions, Pomegranate, Raddichio, Strawberries, Zhenjiang aromatic vinegar

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.420%	2.170%	3.399%	4.348%	5.509%	19.101%

Pathobionts - Bilophila wadsworthia

Bacteria	Chart	Percent	Range	Interpretation	Score
Bilophila wadsworthia (Proteobacteria)	0 — 0.25 — 0.5 — 0.75	0.803%	(0.0-0.25%)	High	0.0%

Bilophila wadsworthia is a gram-negative bacteria linked to various diseases. The two unique characteristics of B. wadsworthia are the production of hydrogen sulfide and the rapid catalase reaction.

Although there are some benefits to hydrogen sulfide production in the gut like cardioprotection, hydrogen sulfide production also contributes to disease pathology.

Production of hydrogen sulfide has been linked to irritable bowel disease (IBD) by damaging the gut epithelium's mucus layer and to colorectal cancer. In addition, during treatments with antibiotics, hydrogen sulfide can aide opportunistic bacteria growth leading to antibiotic resistance.

This organism can produce hydrogen sulfide which can inhibit mitochondrial function directly. Mitochondria are the energy powerhouses of cells and runs a range of biological processes.

Read more about it on our blog.

Recommendations To Reduce Bilophila wadsworthia

Prebiotics & Other Ingredients

Calanus oil | Galactooligosaccharides | Nicotinamide mononucleotide | Omega-3 | Quercetin | Resveratrol | ShenLing BaiZhu San | Yeast beta-glucan

Probiotics

Lactobacillus rhamnosus GG

General Recommendations

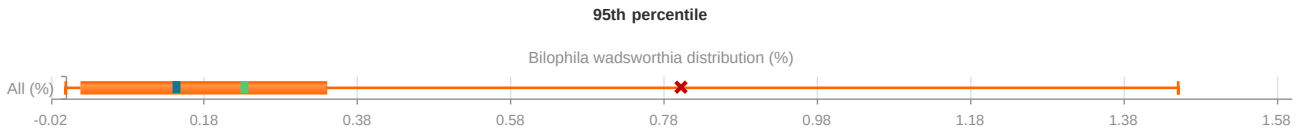
Reduce animal products and fat

Reduce milk fats

Recommended Foods

Artichoke, Asparagus, Banana, Beetroot, Chamomile, Chickpeas, Chicory, Cinnamon, Cloves, Fennel, Lentils, Lettuce, Raddichio, Vanilla, Adzuki beans, Cranberries, Pinto beans, Pistachios, Strawberries, Zhenjiang aromatic vinegar

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.020%	0.145%	0.233%	0.340%	1.452%

Pathobionts - Desulfovibrio

Bacteria	Chart	Percent	Range	Interpretation	Score
Desulfovibrio (Proteobacteria)	0 — 0.25 — 0.5 — 0.75	0.039%	(0.0-0.25%)	Optimal	100.0%

Desulfovibrio is a genus of Gram-negative sulfate-reducing bacteria. Most established species of Desulfovibrio are distributed in the environment, but some Desulfovibrio spp. reside in oral cavities and intestinal tracts of animals, including humans. This organism can produce hydrogen sulfide which can inhibit mitochondrial function directly. Mitochondria are the energy powerhouses of cells and runs a range of biological processes.

Although there are some benefits to hydrogen sulfide production in the gut like cardioprotection, hydrogen sulfide production also contributes to disease pathology. Production of hydrogen sulfide has been linked to irritable bowel disease (IBD) by damaging the gut epithelium's mucus layer and to colorectal cancer. In addition, during treatments with antibiotics, hydrogen sulfide can aide opportunistic bacteria growth leading to antibiotic resistance.

Recommendations To Reduce Desulfovibrio

Prebiotics & Other Ingredients

Codonopsis, Galactooligosaccharides, Lactulose, Quercetin, Resveratrol, ShenLing BaiZhu San

Probiotics

Bacillus coagulans

General Recommendations

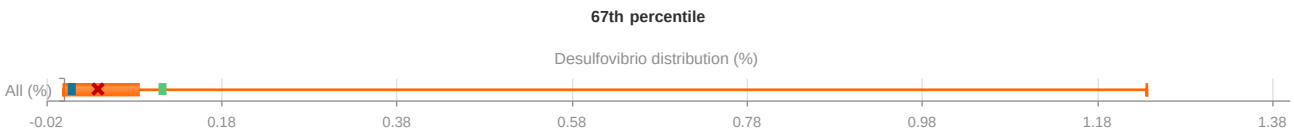
Reduce animal products and fat

Reduce sulfur additives

Recommended Foods

Artichoke, Asparagus, Banana, Beetroot, Chamomile, Chickpeas, Chicory, Cranberries, Fennel, Green tea, Lentils, Lettuce, Matcha, Pomegranate, Raddichio, Strawberries, Zhenjiang aromatic vinegar, Adzuki beans, Pistachios

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.002%	0.009%	0.113%	0.085%	1.237%

Pathobionts - Klebsiella

Bacteria	Chart	Percent	Range	Interpretation	Score
Klebsiella (Proteobacteria)	0 0.03 0.06 0.09	0%	(0.0-0.033%)	Optimal	100.0%

The genus Klebsiella is part of the normal intestinal flora. In humans, K. oxytoca can be cultured from the stool of 8 10% of healthy adults. Klebsiella pneumoniae has recently been found to be one of the pathogens commonly isolated in patients with gastrointestinal conditions.
It is one of the bacteria behind small intestinal bacteria overgrowth (SIBO). It s not possible to determine if a person has SIBO from a stool test, it also cannot help to identify the possible bacteria behind SIBO.
Klebsiella tend to be present in small quantities in the large intestine in quantities too small to be visible in a non-pathogen focused test like ours. It is important to follow a low starch (if present) or no starch diet (if overgrown) as well as avoiding lactose (most dairy) depending on the extent of the overgrowth.
It is not a good idea to follow a restricted diet for extended periods, so our recommendation is to reduce or eliminate starch & lactose for a short period of time (2 to 4 weeks) and then re-test. Depending on your symptoms and extent of overgrowth, it could be worth considering a pathogen focused test that includes antibacterial susceptibility.
Some Klebsiella species produces the toxin Hydrogen Sulfide.

Recommendations To Reduce Klebsiella

Prebiotics & Other Ingredients

⚠ Berberine ⚠ Neem ⚠ Oregano ⚠ Thyme

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

General Recommendations

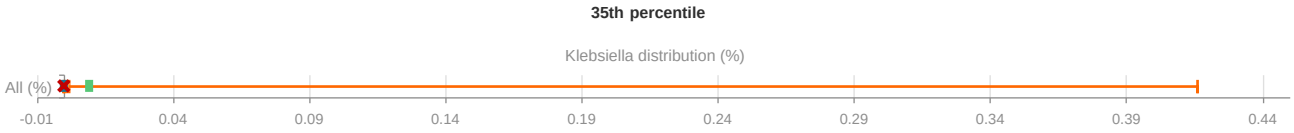
Avoid lactose 

Avoid starches 

Recommended Foods

⚠ Thyme 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.009%	0.002%	0.416%

Pathobionts - Sutterella

Bacteria	Chart	Percent	Range	Interpretation	Score
Sutterella (Proteobacteria)	0 2.5 5 7.5	0.373%	(0.0-2.5%)	Optimal	100.0%

Sutterella is one of the most abundant proteobacteria in the human gut, recognized for its mild pro-inflammatory nature. Its LPS content is less harmful than some other proteobacteria. Sutterella wadsworthensis is a notable species.
Imbalances in Sutterella abundance are linked to gut issues like irritable bowel disease, Crohn's disease, and neurological conditions like autism spectrum disorder. However, causal mechanisms are still under study.

Recommendations To Reduce Sutterella

Prebiotics & Other Ingredients

Berberine

Resveratrol

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

Probiotics

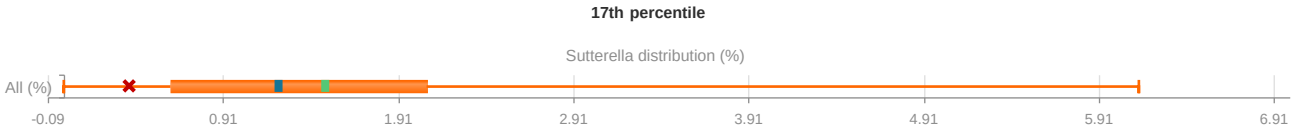
Bacillus subtilis HU58

Bacillus subtilis

Recommended Foods

Cranberries 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.003%	0.608%	1.224%	1.490%	2.070%	6.138%

Pathobionts - Citrobacter freundii

Bacteria	Chart	Percent	Range	Interpretation	Score
Citrobacter freundii (Proteobacteria)	0 0.01 0.02 0.03	0%	(0.0-0.01%)	Optimal	100.0%

Citrobacter freundii is capable of forming biofilms and showing potential for treating certain cancers. It inhabits various environments, including soil, water, sewage, and the intestines of animals and humans. In human health, it is primarily associated with opportunistic infections and the production of toxins, including cytotoxins and enterotoxins, which can contribute to gastrointestinal and other infections.

Recommendations To Reduce Citrobacter freundii

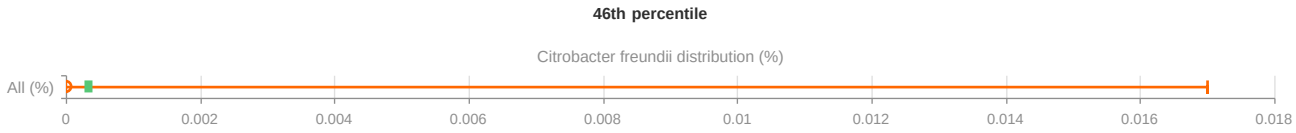
Prebiotics & Other Ingredients

Cinnamon Garlic

Recommended Foods

Cinnamon  Garlic 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.000%	0.000%	0.017%

Pathobionts - Escherichia

Bacteria	Chart	Percent	Range	Interpretation	Score
Escherichia (Proteobacteria)	0 0.3 0.6 0.9	0.311%	(0.0-0.3%)	High	96.33%

Escherichia, the predominant aerobic commensal bacteria in the human gut, can also thrive in anaerobic conditions. The most renowned species within this genus is E. coli, but it includes other pathogenic species as well. These bacteria synthesize vitamin K for their host and produce toxins such as endotoxins (lipopolysaccharides) and shiga toxins.

Recommendations To Reduce Escherichia

Prebiotics & Other Ingredients

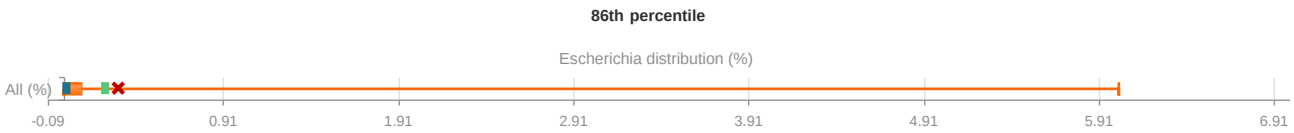
Berberine · Neem · Omega-3 · Thyme

Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

Recommended Foods

Thyme 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.002%	0.015%	0.235%	0.098%	6.027%

Pathobionts - Escherichia coli

Bacteria	Chart	Percent	Range	Interpretation	Score
Escherichia coli (Escherichia)	0 – 0.1 – 0.2 – 0.3	0.025%	(0.0-0.1%)	Optimal	100.0%

Escherichia coli (E. coli) bacteria normally live in the intestines of healthy people and animals in small quantities. Most varieties of E. coli are harmless or cause relatively brief diarrhea. But a few particularly nasty strains, can cause severe abdominal cramps, bloody diarrhea and vomiting.

You may be exposed to E. coli from contaminated water or food especially raw vegetables and undercooked ground beef.

The harmless strains are part of the normal microbiota of the gut, and can benefit their hosts by producing vitamin K2, (which helps blood to clot when you have a cut to form a scab) and preventing colonisation of the intestine with pathogenic bacteria, having a symbiotic relationship.

Recommendations To Reduce Escherichia coli

Prebiotics & Other Ingredients

Berberine | Galactooligosaccharides | Lactulose | Neem | Oregano | Resistant starch | Thyme

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

Probiotics

Lactobacillus rhamnosus NCIMB 30174 | Enterococcus faecium NCIMB 30176 | Lactobacillus acidophilus NCIMB 30175 | Lactiplantibacillus plantarum NCIMB 30173 | Bifidobacterium animalis lactis HN019 | Lactobacillus plantarum 299v | Saccharomyces boulardii

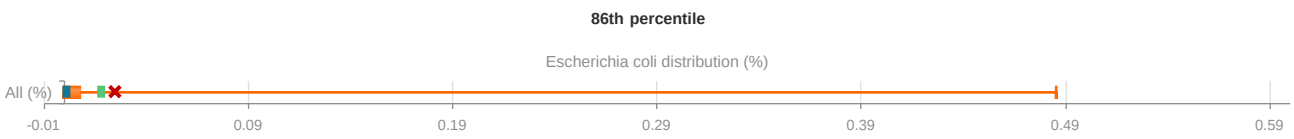
General Recommendations

High fiber foods

Recommended Foods

Artichoke | Beans | Beetroot | Broccoli | Cashews | Chickpeas | Fennel | Green banana | Lentils | Lettuce | Oat | Onions | Potato | Raddichio | ⚠ Thyme | White beans

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.001%	0.019%	0.008%	0.486%

Pathobionts - Methanobrevibacter

Bacteria	Chart	Percent	Range	Interpretation	Score
Methanobrevibacter	0 0.01 0.02 0.03	0.008%	(0.0-0.01%)	Optimal	100.0%

Methanobrevibacter is a genus of the Methanobacteriaceae. The species within Methanobrevibacter are strictly anaerobic archaea that produce methane , for the most part through the reduction of carbon dioxide via hydrogen. Most species live in the intestines of larger organisms, and are responsible for the large quantities of greenhouse gases that they produce. Mbr. smithii, found in the human intestine, may play a role in obesity.

Methane has been associated with gastrointestinal disorders, mainly chronic constipation and constipation predominant irritable bowel syndrome as well as metabolic diseases like obesity.

Read more about it on our blog.

Recommendations To Reduce Methanobrevibacter

Prebiotics & Other Ingredients

Allicin Garlic

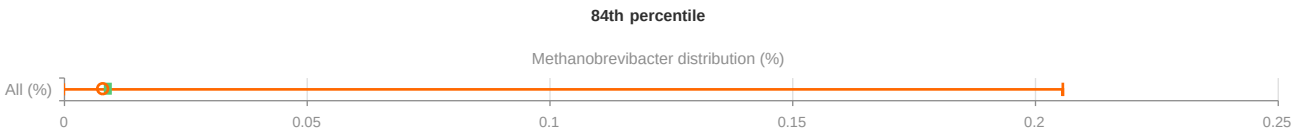
Probiotics

Lactobacillus rhamnosus HN001

Recommended Foods

Garlic 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.009%	0.000%	0.206%

Pathobionts - Fusobacteria

Bacteria	Chart	Percent	Range	Interpretation	Score
Fusobacteria	0 0.03 0.06 0.09	0%	(0.0-0.03%)	Optimal	100.0%

Fusobacteria are gram-negative, anaerobic bacteria found in the human gut and mouth (1).

F. nucleatum is the most studied species. Research has shown that Fusobacteria have significant genetic diversity, with a 2020 study identifying 218 unique genomes (2).
Although often considered harmful, there is limited research on their presence in healthy individuals (2). F. nucleatum, in particular, has been linked to diseases such as periodontal disease, lung and gynecological abscesses, sepsis from periodontal infections, colorectal cancer, and inflammatory bowel disease (1, 2, 3).
Our recommendations are specific to F. nucleatum only as this was the only research we could find at this point.

1. Stokowa-So?tys K, Wojtkowiak K, Jagiello K. Fusobacterium nucleatum - Friend or foe? J Inorg Biochem. 2021;224:111586. doi:10.1016/j.jinorgbio.2021.111586
2. Lawrence GW, Begley M, Cotter PD, Guinane CM. The more we learn, the less we know: deciphering the link between human gut fusobacteria and colorectal cancer. Digestive Medicine Research. 2020;3(0). doi:10.21037/dmr-2020-16
3. Profiling Fusobacterium infection at high taxonomic resolution reveals lineage-specific correlations in colorectal cancer | Nature Communications. Accessed March 25, 2024. https://www.nature.com/articles/s41467-022-30957-6

Recommendations To Reduce Fusobacteria

Prebiotics & Other Ingredients

Berberis goudotii | Cinnamon | Curcumin | Lauric acid | Omega-3

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

Probiotics

Lactobacillus salivarius salicinius AP-32 | Lactobacillus reuteri AN417 | Lactobacillus gasseri HHuMIN D | Lactobacillus paracasei ET-66 | Bifidobacterium animalis lactis CP-9

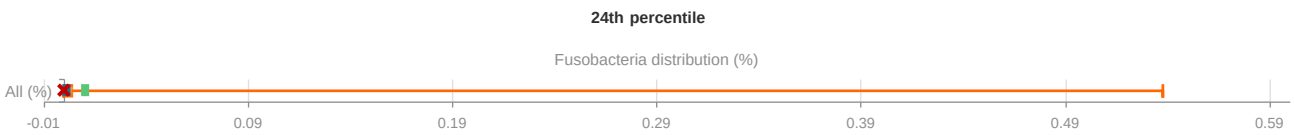
General Recommendations

High fiber foods

Recommended Foods

Cinnamon | Cranberries | Green tea | Matcha | Pomegranate | Strawberries | Zhenjiang aromatic vinegar | Whole grains

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.001%	0.010%	0.004%	0.538%

Pathobionts - Enterococcus faecalis

Bacteria	Chart	Percent	Range	Interpretation	Score
Enterococcus faecalis	0 0.01 0.02 0.03	0%	(0.0-0.01%)	Optimal	100.0%

Enterococcus faecalis is considered both a commensal and pathobiont and like Escherichia coli is available as a probiotic with health benefits. The effect is strain dependent.
E. faecalis is an oxalate degrader, it is capable of producing enzymes that support antioxidants like SOD and catalase. As a probiotic, it is used to support gut health and the immune system.
It is protected by biofilm and is also highly resistant to antibiotics. It produces toxins such as enterotoxins and cytolysin, which causes gastrointestinal issues and cell damage.

Recommendations To Reduce Enterococcus faecalis

Prebiotics & Other Ingredients

Berberine | Garlic | Licorice

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

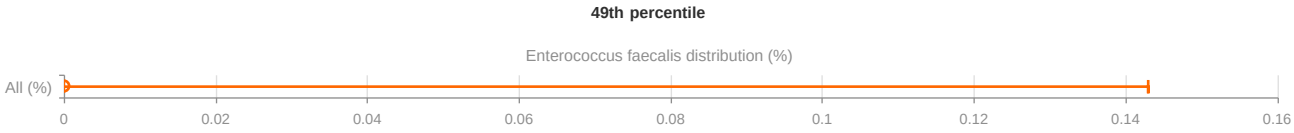
Probiotics

Lactobacillus plantarum | Lactobacillus casei

Recommended Foods

Garlic  | Cloves  | Holy basil 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.000%	0.000%	0.143%

Pathobionts - Clostridium perfringens

Bacteria	Chart	Percent	Range	Interpretation	Score
Clostridium perfringens	0 0.01 0.02 0.03	0%	(0.0-0.01%)	Optimal	100.0%

Clostridium perfringens is one of the most common causes of food poisoning in many developed countries. However, it can sometimes be ingested and cause no harm. Food poisoning in humans is caused by type A strains able to produce C. perfringens enterotoxin. This enterotoxin causes diarrhea and abdominal pain.

Recommendations To Reduce Clostridium perfringens

Prebiotics & Other Ingredients

Arabinogalactan | Cinnamon | Garlic | Glucomannan | ⚠ Thyme

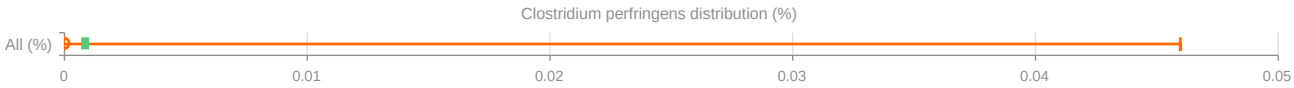
⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

Recommended Foods

Cinnamon  Garlic  ⚠ Thyme  Cacao  Rosemary 

Distribution

44th percentile



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.001%	0.000%	0.046%

Pathobionts - Clostridium histolyticum

Bacteria	Chart	Percent	Range	Interpretation	Score
Clostridium histolyticum	0 0.5 1 1.5	0.423%	(0.0-0.5%)	Optimal	100.0%

Clostridium histolyticum, also known as Hathewaya histolytica, is considered pathogenic in humans in relation to skin and soft tissue infections, however, as a gut inhabitant, research has not clearly uncovered its role yet. It produces collagenases which breaks down collagen. The collagenases produced is used in medications ranging from cellulite to wound healing as well as Dupuytren's contracture .
Hathewaya histolytica is capable of producing a number of toxins, including proteinases (enzymes that degrade protein), however this effect is strain dependent. It is one of the bacteria capable of causing gangrene. It is very commonly seen in samples on our platform.

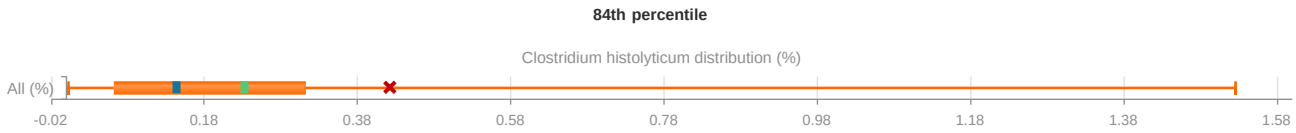
Recommendations To Reduce Clostridium histolyticum

Recommended Foods

Cacao 

Virgin coconut oil 

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.004%	0.062%	0.145%	0.233%	0.312%	1.527%

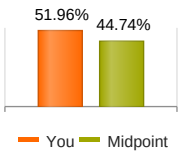
Short Chain Fatty Acids[beta]

SCFAs (Short Chain Fatty Acids) are beneficial anti-inflammatory end or intermediate metabolites produced by gut bacteria.

Dr Carly Polland, ND: Butyrate

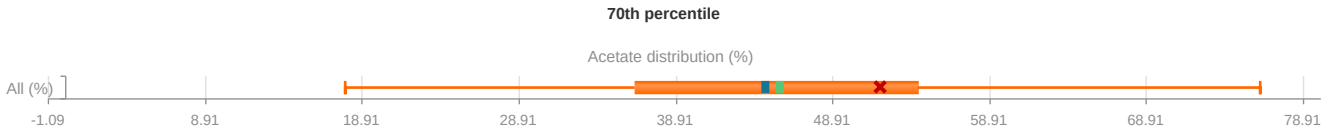
We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

It is important to note that this is not a measure of these metabolites found in the stool sample.

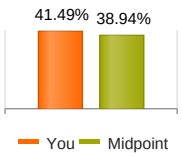
Short Chain Fatty Acids	Comparison	Associated Benefits	Rating [beta]
Acetate		Weight Management	

In general, acetate may modulate body weight control through different mechanisms that can affect central appetite regulation, gut-satiety hormones, and improvements in lipid metabolism and energy expenditure.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
17.834%	36.327%	44.683%	45.577%	54.337%	76.150%

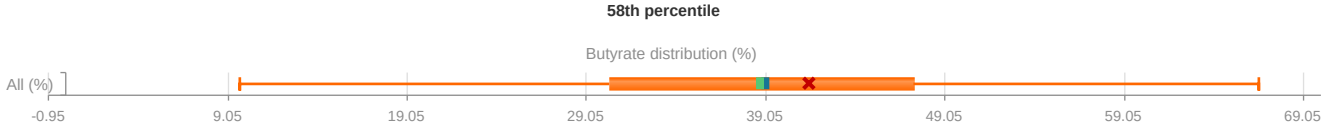
Short Chain Fatty Acids	Comparison	Associated Benefits	Rating [beta]
Butyrate		Gut Barrier Integrity Immune System Support Protection against colorectal cancer	

Butyrate is an essential short chain fatty acid, produced by colonic bacteria. The cells of the gut lining feed on butyrate and this makes butyrate essential for gut barrier maintenance. A shortage of butyrate has been implicated in diseases involving colonic inflammation such as ulcerative collitis. Due to the importance of butyrate as an inflammatory regulator and immune system contributor, butyrate depletions could be a key factor influencing the pathogenesis of many vasculitic conditions.

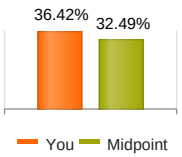
The anti-inflammatory capacity of butyrate has been extensively analyzed and supported by many studies. It has been found that microorganism-produced butyrate expedites the production of regulatory T cells. An increase in regulatory T cell numbers was observed upon a butyrate provision. More recently, it has been shown that butyrate plays an essential and direct role in modulating gene expression of cytotoxic T-cells. Although specific mechanism by which butyrate aids in the differentiation of T-cells is unclear, it has been determined that butyrate promotes the generation of regulatory T cells. This makes butyrate producing bacteria key for supporting the immune system.

Dr Jason Hawrelak's recommendation is for butyrate producers to constitute at least 40% of the microbiome. Butyrate producers in excess of 40% is likely to have a systemic anti-inflammatory effect.

Distribution

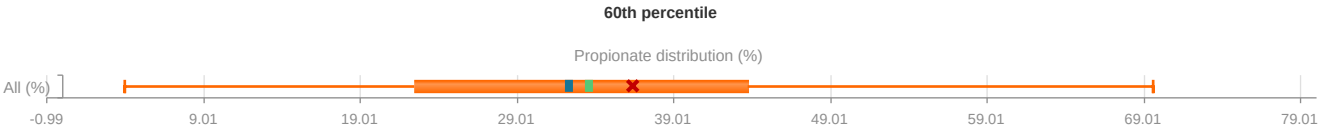


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
9.750%	30.340%	39.033%	38.786%	47.334%	66.594%

Short Chain Fatty Acids	Comparison	Associated Benefits	Rating beta
Propionate		Blood Pressure Control Weight Management Lowers Cholesterol	

Propionate is observed to be among the most common short-chain fatty acids produced by human gut microbiota in response to indigestible carbohydrates (fiber) in the diet. Another study found that fatty acid propionate can calm the immune cells that drive up blood pressure, thereby protecting the body from damaging effects of high blood pressure.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
4.008%	22.461%	32.335%	33.624%	43.743%	69.623%

Neurotransmitters beta

Please note: The section does not reflect the neurotransmitters in your brain.

The gut microbiota communicate with the brain through several different mechanisms. This includes production of neurotransmitters or modulation of host neurotransmitter catabolism, innervation via the vagus nerve, or activation of the HPA axis. These microbial molecules do not act directly on the brain, which is isolated and protected by a membrane called the blood-brain barrier. It appears that neurotransmitters produced by gut bacteria act on the cells lining the gastrointestinal wall in order to have them transmit their message to the central nervous system through the neurons of the gastrointestinal tract that are connected to the brain.

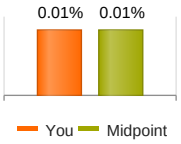
Dr Carly Polland, ND: Special Topics: Histamine

Blog: Exploring Gut Bacterial Metabolites

FAQ: Why are elevated levels not flagged as too high?

We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

It is important to note that this is not a measure of these metabolites found in the stool sample.

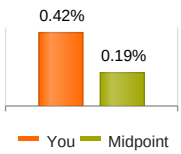
Neurotransmitters	Comparison	Associated Benefits	Rating beta
Acetylcholine		Concentration, Wakefulness, Improved Memory, Learning, Motivation, Improved Sleep	

Acetylcholine is neurotransmitter in the central and peripheral nervous systems. Acetylcholine is essential to the production of movement through acting at neuromuscular junctions in the peripheral nervous system. It also has a number of functions in the central nervous system, and is thought to be involved in attention, memory, and a variety of other processes.

Distribution

40th percentile

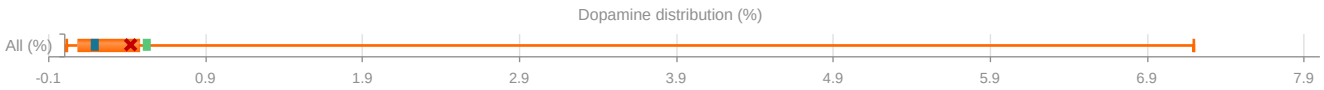
Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.004%	0.010%	0.031%	0.026%	0.416%

Neurotransmitters	Comparison	Associated Benefits	Rating beta
Dopamine		Motivation, Motor function	

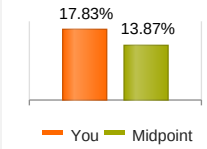
Dopamine is one of the major neurotransmitters in reward-motivated behavior - it is well-known for its role in movement, motivation, and addiction. Dopamine is a precursor for other catecholamines, like norepinephrine and epinephrine. Dopamine is involved in many brain functions.

Distribution

72nd percentile

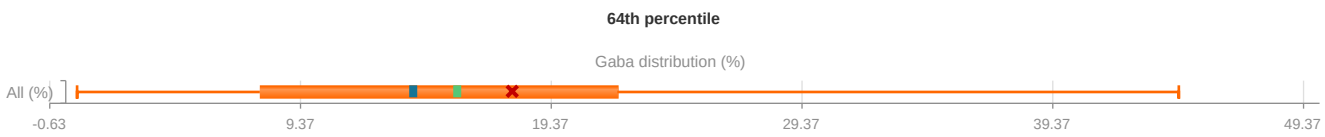


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.016%	0.086%	0.194%	0.527%	0.480%	7.198%

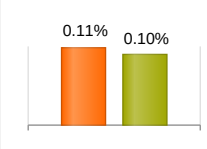
Neurotransmitters	Comparison	Associated Benefits	Rating beta
GABA		Calmness, Improved Sleep	Satisfactory

Gamma-aminobutyric acid (GABA) is the major inhibitory neurotransmitter of the central nervous system, and it and its receptors are widely distributed throughout the mammalian host. Substantial literature supports the link between altered GABAergic neurotransmission and numerous CNS disorders, including behavioral disorders, pain, and sleep, as well in the disruption of important functions of the ENS, such as intestinal motility and gastric emptying.

Distribution

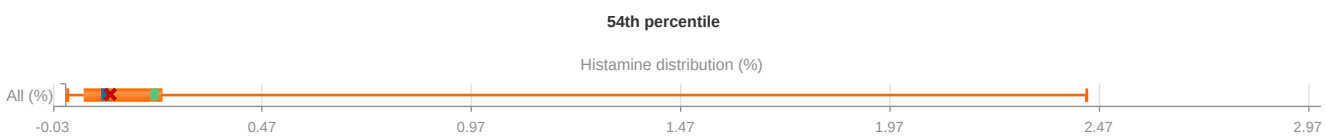


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.501%	7.765%	13.893%	15.649%	22.037%	44.425%

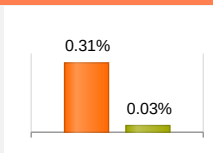
Neurotransmitters	Comparison	Associated Benefits	Rating beta
Histamine		Neuromodulation, Wakefulness	Satisfactory

Histamine is an biogenic amine that is endogenously produced by mast cells and basophils as part of inflammatory immune responses. Recent evidence also suggests that certain gut bacteria can convert histidine in food to histamine via histamine decarboxylase (HDC) enzyme production. It also performs several important functions in the bowel and acts as a neurotransmitter or chemical messenger that carries signals from one nerve to another.

Distribution

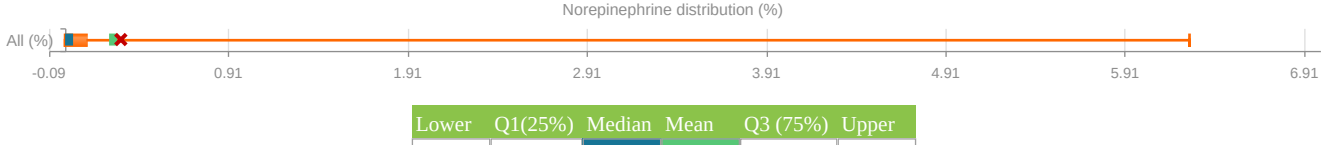


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.007%	0.046%	0.096%	0.213%	0.228%	2.442%

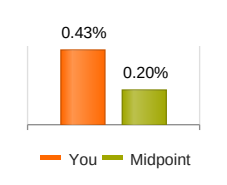
Neurotransmitters	Comparison	Associated Benefits	Rating beta
Norepinephrine		Concentration, Wakefulness, Improved Memory, Learning	Satisfactory

Norepinephrine is historically known for its role in arousal and alertness in the waking state as well as in sensory signal detection, but more recent work has found it is also involved in behavior and cognition, like memory, learning, and attention.

Distribution

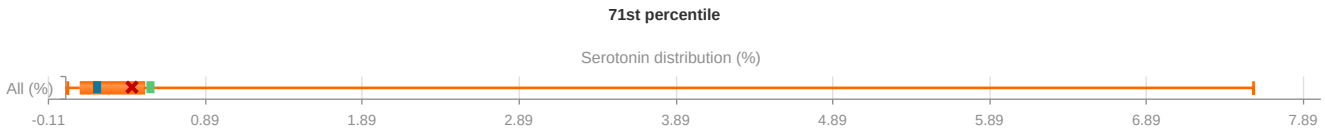


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.002%	0.008%	0.026%	0.266%	0.122%	6.274%

Neurotransmitters	Comparison	Associated Benefits	Rating beta
Serotonin		Improved Sleep Improved Memory Appetite Regulation Mood regulation Digestion Libido	

Serotonin is involved in regulating numerous physiological processes, including gastrointestinal secretion and peristalsis, respiration, vasoconstriction, behavior, and neurological function. While serotonin is broadly used throughout the body, 90 to 95 percent of serotonin resides in the gastrointestinal tract, mostly in epithelial enterochromaffin cells.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.017%	0.092%	0.203%	0.548%	0.501%	7.571%

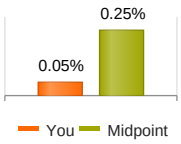
Detoxification beta

Gut bacteria affect the body's detoxification pathways through the production of enzymes causing toxins bound in the liver to be freed up and reabsorbed in the colon.

Dr Carly Polland, ND: Special Topics

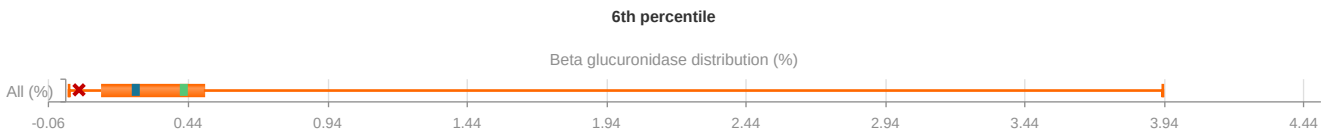
We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

It is important to note that this is not a measure of these metabolites found in the stool sample.

Detoxification	Comparison	Associated Symptoms	Rating beta
Beta-glucuronidase		Estrogen Dominance, Fatigue, Inflammation	

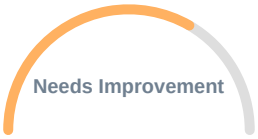
The liver excretes toxins by attaching them to glucuronic acid and sending this complex into the small intestine to eventually be excreted from the body. Beta-glucuronidase is an enzyme produced by intestinal bacteria that can break the bond between toxins and glucuronic acid. This enzyme needs to be present just the right amount - not too little and not too much. When beta-glucuronidase is in excess, the bonds between toxins and glucuronic acid are broken, and toxins and hormones that were meant to be excreted are then reabsorbed into the body.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.013%	0.129%	0.252%	0.427%	0.498%	3.937%

Toxins[beta]



Pathogenic gut bacteria produce small amounts of end or intermediate substances with various degrees of toxicity to humans.

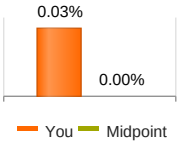
Dr Carly Polland, ND: Special Topics: Methanogens

Blog: Managing Proteobacteria Overgrowth

Blog: Managing Die-Off Symptoms

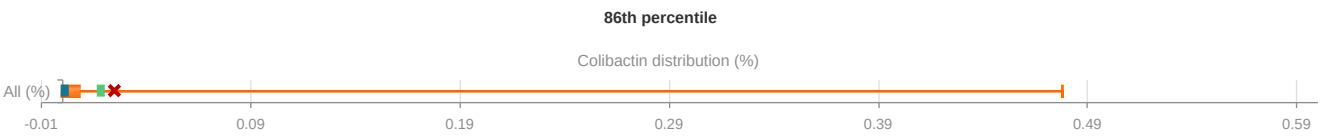
We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

It is important to note that this is not a measure of these metabolites found in the stool sample.

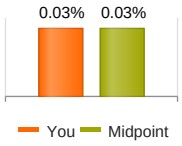
Toxins	Comparison	Associated Symptoms	Rating [beta]
Colibactin		Ageing	

Colibactin is a toxin produced by gut bacteria that induce chromosomal instability and DNA damage, which leads to senescence of epithelial cells and apoptosis of immune cells.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.001%	0.018%	0.008%	0.478%

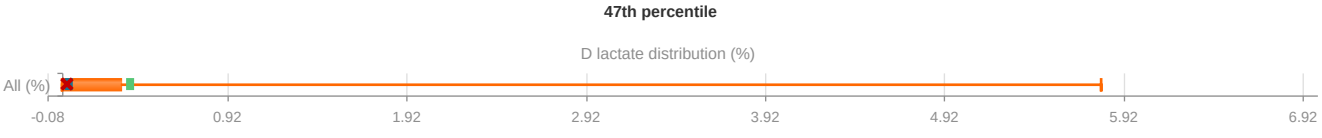
Toxins	Comparison	Associated Symptoms	Rating [beta]
D-Lactate		Fatigue, Brain Fog	

D-lactate is produced by bacteria residing in the colon when carbohydrates are not completely absorbed in the small intestine. When not metabolized and transformed into other substrates, it will be eliminated from the body through renal excretion.

The D-Lactate percentage we display here represents an approximation of the amount of D-lactate producing bacterial species that you have in your colon. Even if we calculate that you have a high level of D-lactate producing bacteria, that does not mean you produce elevated D-lactate, unless you have undigested carbohydrates reaching your colon.

Elevated D-lactate levels in the blood are highly unusual. D-lactic acidosis is typically only observed in patients with a malabsorptive disorder, such as short-bowel syndrome.

Distribution

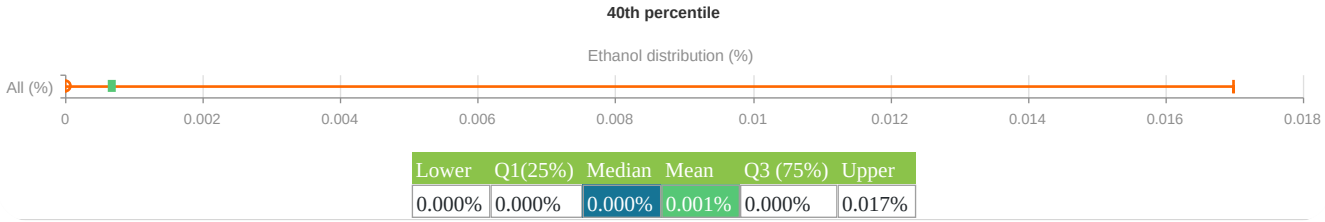


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.006%	0.034%	0.380%	0.330%	5.797%

Toxins	Comparison	Associated Symptoms	Rating beta
Ethanol	0.00% 0.00% You Midpoint	Fatigue	Satisfactory

Ethanol is the form of alcohol contained in beverages including beer, wine, and liquor.

Distribution



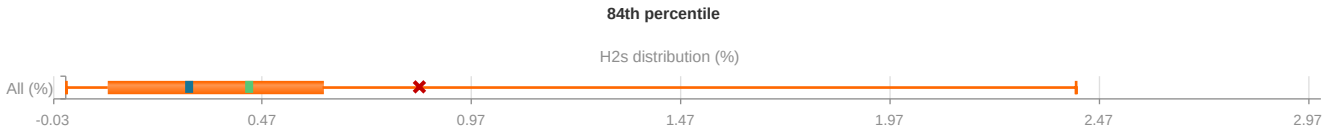
Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.001%	0.000%	0.017%

Toxins	Comparison	Associated Symptoms	Rating beta
Hydrogen Sulfide (H2S)	0.85% 0.30% You Midpoint	Fatigue Inflammation Bloat	Poor

Sulfate-reducing bacteria are the main producers of hydrogen sulfide in the gut. High concentrations of hydrogen sulfide are involved in gut inflammation. Lactic acid bacteria can be sensitive to hydrogen sulfide. Although there are some benefits to hydrogen sulfide production in the gut like cardioprotection, hydrogen sulfide production also contributes to disease pathology. Production of hydrogen sulfide has been linked to irritable bowel disease (IBD) by damaging the gut epithelium's mucus layer and to colorectal cancer. In addition, during treatments with antibiotics, hydrogen sulfide can aide opportunistic bacteria growth leading to antibiotic resistance.

Hydrogen sulfide can inhibit mitochondrial function directly. Mitochondria are the energy powerhouses of cells and runs a range of biological processes.

Distribution



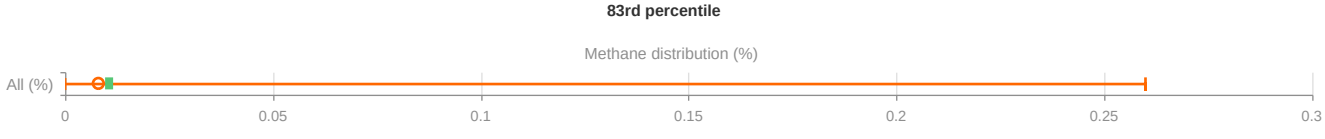
Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.003%	0.103%	0.298%	0.439%	0.615%	2.417%

Toxins	Comparison	Associated Symptoms	Rating beta
Methane	0.01% 0.00% You Midpoint	Constipation Obesity	Satisfactory

Methane gas is produced by intestinal methanogens that metabolize hydrogen gas, a product itself of bacterial fermentation of sugar substrates. Currently the main producers are thought to be single celled organisms belonging to the Kingdom Archaea including Methanobrevibacter smithii and Methanospaera stadmagnae and to a lesser extent some of the bacteria species of the clostridium and bacteroides type.

Methane has been associated with gastrointestinal disorders, mainly chronic constipation and constipation predominant irritable bowel syndrome as well as metabolic diseases like obesity.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.000%	0.000%	0.000%	0.011%	0.000%	0.260%

Nutrients beta

Our gut bacteria produces many nutrients, many of which are plentiful in our diets. This section focuses on nutrients that are beneficial (or even essential), but are uniquely produced by our gut bacteria. These nutrients are not present in foods (unless fermented or added) and cannot be synthesized by the human body itself.

Blog: Exploring Gut Bacterial Metabolites

We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

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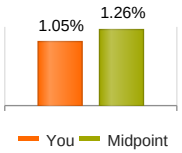
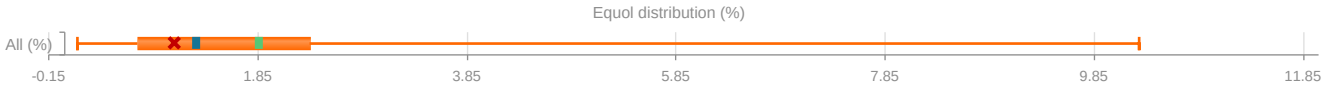
Nutrients	Comparison	Associated Benefits	Rating beta
Equol		Reduce skin ageing; Anti-oxidant; Reduce menopause symptoms	

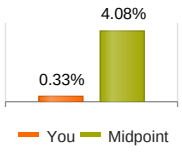
Equol is an isoflavonoid estrogen (phytoestrogen) metabolized from daidzein, a type of isoflavone found in soybeans and other plant sources, by bacterial flora in the intestines. Equol is a nonsteroidal estrogen. Not all humans can produce (S)-equol after soy consumption. The ability to do so depends on having certain strains of bacteria living within the intestine. Note that equol will only be produced if soy products are consumed.

Distribution

42nd percentile



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.125%	0.707%	1.263%	1.862%	2.343%	10.287%

Nutrients	Comparison	Associated Benefits	Rating beta
Vitamin K2 MK7		Calcium metabolism; Bone Health	

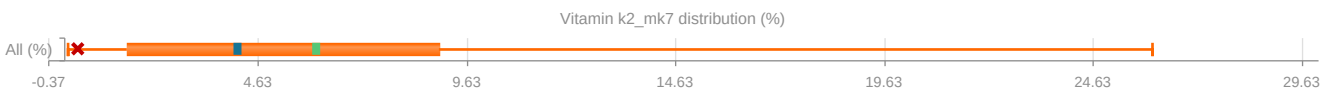
Vitamin K2 (Menaquinone) is one of three types of vitamin K, the other two being vitamin K1 (phylloquinone) and K3 (menadione). K2 is both a tissue and bacterial product (derived from vitamin K1 in both cases) and is usually found in animal products or fermented foods.

Long-chain menaquinones (longer than MK-4) include MK-7, MK-8 and MK-9 and are more predominant in fermented foods such as natto. Longer-chain menaquinones (MK-10 to MK-13) are produced by anaerobic bacteria in the colon, but they are not well absorbed at this level and have little physiological impact. MK4 are synthesized in humans from Vitamin K1 which are common in foods. This section is focused on MK7 from bacterial origin.

Vitamin K2 plays a central role in the metabolism of calcium the main mineral found in your bones and teeth. Vitamin K2 activates the calcium-binding actions of two proteins matrix GLA protein and osteocalcin, which help to build and maintain bones

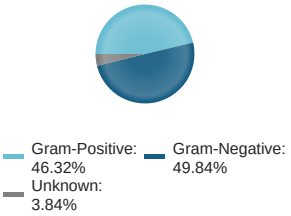
Distribution

5th percentile



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.085%	1.489%	4.156%	6.035%	8.982%	26.047%

Lipopolysaccharides (LPS)



Relative abundance by bacterial stain

Gut microbiome tests like ours cannot measure the degree of intestinal permeability. Instead, this section contains markers of bacterial byproducts that influence the extent to which you would be impacted by a compromised barrier, if it is compromised.

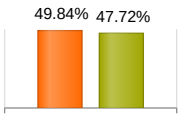
Dr Carly Polland, ND: Lipopolysaccharide (LPS)

Blog: Managing Proteobacteria Overgrowth

Blog: The role of LPS in Long-COVID

Blog: Managing Die-Off Symptoms

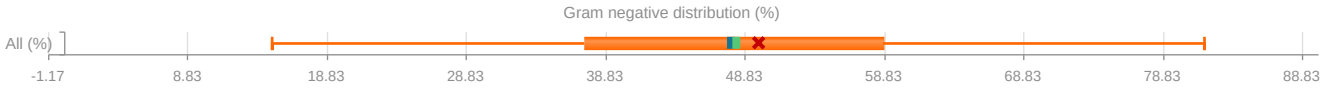
We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

Gram Stain Classification	Comparison	Associated Symptoms	Rating beta
Gram Negative		Fatigue, Inflammation, Obesity, Metabolic disorders	Satisfactory

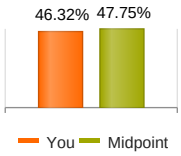
The cell membranes of Gram-negative bacteria contain LPS and is therefore of concern to those with higher levels of intestinal pereability. Note that while all Gram-negative bacteria contain LPS in their cell walls, the potency of the LPS differs between organisms. Proteobacteria that's found under the Pathobionts section contain more harmful LPS than those from Bacteroidetes (Commensals) and other bacteria.

Distribution

55th percentile



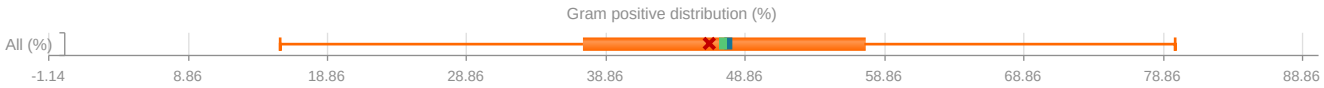
Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
14.961%	37.332%	47.872%	48.207%	58.746%	81.832%

Gram Stain Classification	Comparison	Associated Symptoms	Rating beta
Gram Positive			Satisfactory

The cell membranes of Gram-positive bacteria do not contain LPS and is therefore not of concern in relation to LPS.

Distribution

46th percentile



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
15.475%	37.249%	47.678%	47.283%	57.469%	79.755%

Food Intolerances beta

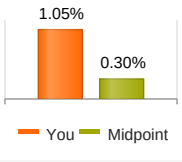
While many intolerances are predetermined genetically (e.g. through lack of enzyme production), some are also impacted by our gut microbiota. Many gut bacteria produce enzymes relevant to degrading substrates ingested both through diet as well as those produced as byproducts of metabolizing other substrates. Intolerance should not be confused with allergies. Intolerances are milder reactions based on lack of enzymes and not an immune reaction. For both lactose & oxalate degraders, close to or higher than the median is desired.

Blog: Exploring Gut Bacterial Metabolites

Blog: Deep dive into oxalates

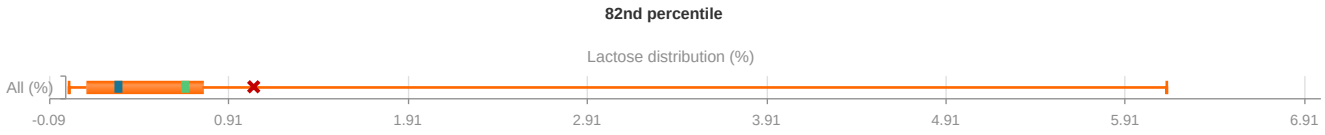
We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

It is important to note that this is not a measure of these metabolites found in the stool sample.

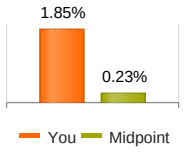
Degraded Substrate	Comparison	Associated Symptoms	Rating beta
Lactose		Bloat, Diarrhoea	

Lactose digestion is determined by the ability to produce the lactase enzyme. While all human babies produce lactase, many adults produce very little. Lactose intolerance (via endogenous lactase enzyme production) can be determined through a genetic test. A further factor influencing lactose intolerance is the presence/absence of lactose degrading bacteria in the small intestine and to a lesser degree in the colon.

Distribution

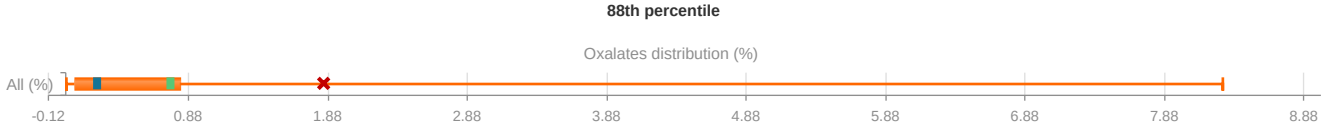


Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.019%	0.121%	0.300%	0.666%	0.765%	6.147%

Degraded Substrate	Comparison	Associated Symptoms	Rating beta
Oxalates		Kidney Stones, Reduced mineral absorpion, Inflammation, Autoimmunity	

Leafy greens and other popular plant foods contain an antinutrient called oxalate. Gut bacteria contribute to oxalate metabolism through the production of enzymes that degrade oxalate. Oxalates are not just ingested through the dietary intake but are also synthesized by the body. Most oxalates are produced by the body through the breakdown of Dehydroascorbic acid (DHA), an oxidized form of ascorbic acid (vitamin C). One of the main health concerns around oxalates is that it can bind to minerals in the gut and prevent the body from absorbing them. It also increases the risk of developing kidney stones as it is excreted through urine and stool.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.006%	0.066%	0.233%	0.751%	0.821%	8.297%

Longevity beta

Our gut microbiota are capable of producing enzymes implicated in longevity which we cannot produce ourselves. These enzymes are responsible for processing substrates from food into beneficial metabolites. They increase longevity by decreasing the slow damage associated with aging via their antioxidative properties. Additionally, these metabolites have been found to combat the three leading causes of death in both the USA and UK: cancer, heart disease, and neurological diseases such as dementia and Alzheimer's disease. Myrosinase producers close to or higher than the median is desired.

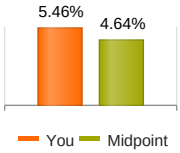
Important : Your rating is not a predictor of your longevity! It is simply feedback on an aspect of longevity that your gut microbiota contribute to.

Oliver Luk, BSc: Myrosinase

Research Summary: Myrosinase

We show how the relative abundances of the bacteria in your sample compares to the median levels (midpoint) of those within our sample set.

It is important to note that this is not a measure of these metabolites found in the stool sample.

Enzyme	Comparison	Associated Benefits	Rating beta
Myrosinase		Anti-carcinogenic, Anti-ageing	

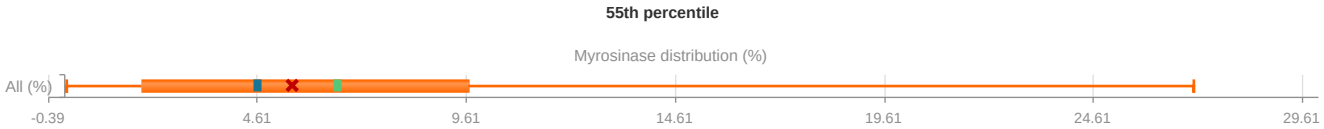
Inherently, humans cannot produce the enzyme myrosinase so instead, we rely on our gut microbiota to produce it. This enzyme is responsible for processing glucosinolate compounds into their isothiocyanate products. These glucosinolate compounds are typically found in vegetables from the Brassicaceae family, which includes cruciferous vegetables such as broccoli, Brussels sprouts, cabbage, and capers. The primary focus of research on these compounds is the glucosinolate glucoraphanin , and its isothiocyanate product sulforaphane .

These glucosinolates cannot be fully metabolised by the vegetable s own myrosinase after being cooked, since the heat partially inactivates or denatures the myrosinase enzymes. Despite this, the leftover glucosinolates are still metabolised to isothiocyanates in humans. This is explained by the gut microflora because within the gut of humans are myrosinase-producing bacteria.

Sulforaphane is a powerful organic sulfur-containing phytochemical that has been found to be associated with a wide range of health benefits, such as: protecting against cancer by inducing the detoxification and excretion of carcinogens, protecting against otherwise lethal pathogens such as SARS-CoV-2, and reducing blood sugar levels associated with type 2 diabetes.

Naturally, these antioxidative properties also extend to the reduction of other age-associated oxidative stress processes such as neurodegeneration, skin damage caused by UV radiation, build-up of plaque in the arteries, and increased blood pressure.

Distribution



Lower	Q1(25%)	Median	Mean	Q3 (75%)	Upper
0.072%	1.857%	4.637%	6.535%	9.683%	27.039%

Overall Recommendations

These recommendations are personalized using your completed health profile and selected microbiome sample. Our food and supplement recommendations are based on selectively feeding or crowding out specific bacteria and do not imply tolerance for a particular individual. Please introduce new foods and supplements gently and slowly.

FOOD TO ADD OR CONTINUE

☞ Green (enjoy): The number indicates the number of bacteria it is expected to improve. ☞ Try to consume some of these foods more regularly.

4 artichoke	4 asparagus	4 banana	4 chickpeas	4 chicory	4 lentils	4 onions	4 cranberries	4 strawberries	4 zhenjiang aromatic vinegar	3 beans
3 beetroot	3 fennel	3 leek	3 lettuce	3 raddichio	3 green tea	3 matcha	3 pomegranate	3 adzuki beans	2 apples	2 apricots
2 broccoli	2 carrots	2 cherries	2 garlic	2 oranges	2 acacia tree	2 cottonseed flour	2 soy flour	2 walnuts	2 pistachios	2 pinto beans
1 guar bean	1 thyme	1 barley	1 mushrooms	1 rye	1 seaweed	1 chamomile	1 cinnamon	1 cloves	1 vanilla	

FOOD TO REDUCE

☞ Orange/Red (reduce): The number indicates the number of bacteria it is expected to worsen. ☞ Try to reduce consumption of these foods.

1 rosemary extract

PREBIOTICS TO ADD OR CONTINUE

☞ Green (enjoy): The number indicates the number of bacteria it is expected to improve.

☞ Choose one or two of these supplements. ☞ Introduce them separately. Start with 1 capsule or 1/4 of a teaspoon and work up to the full dosage slowly to build tolerance. Refer to the package instructions for recommended dosage.

4 lactulose	3 Galactooligosaccharides	3 Omega-3	2 pectin	2 Yeast beta-glucan	2 acacia fiber
2 Arabinogalactan	2 gum arabic	2 raffinose	2 resveratrol	2 stachyose	2 xylooligosaccharides
2 calanus oil	1 guar gum	1 berberine ⚠	1 neem ⚠	1 thyme ⚠	1 beta-glucan
1 konjac glucomannan	1 turmeric	1 psyllium	1 nicotinamide mononucleotide	1 quercetin	1 ShenLing BaiZhu San

⚠ Supplements with this icon should be used with caution and for a limited time only as it can decrease Probiotic and Commensal bacteria. Please consult your practitioner.

PREBIOTICS TO REDUCE

☞ Orange/Red (reduce): The number indicates the number of bacteria it is expected to worsen.

1 milk oligosaccharides	1 Partially Hydrolyzed Guar Gum	1 pea fiber	1 resistant starch	1 taurine

PROBIOTICS TO ADD OR CONTINUE

☞ Green (enjoy): The number indicates the number of bacteria it is expected to improve.

☞ Choose one or two of these supplements. ☞ Introduce them separately. Start with 1 capsule or 1/4 of a teaspoon and work up to the full dosage slowly to build tolerance. Refer to the package instructions for recommended dosage.

1 Bacillus coagulans	1 Bifidobacterium longum	1 Lactobacillus acidophilus	1 Bifidobacterium longum BB536	1 Lactobacillus rhamnosus GG

LIFESTYLE TO ADD OR CONTINUE

☞ Green (enjoy): The number indicates the number of bacteria it is expected to improve.

2 High fiber foods	2 Exercise	1 Plant based diet	1 eat the rainbow	1 seasonal foods	1 Avoid snacking	1 spend time in nature

LIFESTYLE TO REDUCE

☞ Orange/Red (reduce): The number indicates the number of bacteria it is expected to worsen.

3 animal products and fat	1 sulfur additives	1 milk fats