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838 Walker Rd, Dover, Delaware,
19904, United States

For enquiries, email: hello@vitract.com

Gut Microbiome Analysis

Comprehensive Analysis, 16s rRNA Sequencing

[redacted]

This is your complete gut microbiome analysis containing condition related findings with food and supplements recommendation to optimize your gut health.

SECTION 1: Summary of your results

0-49 represents Poor • 50-79 represents Needs work • 80-100 represents Satisfactory

Gut Health Score

Needs work

Your Gut Health Score

Your Gut Health Score is the percentage value of all the bacteria & archaea enlisted in section 2 that are within the optimal range. Assuming all your values are within optimal ranges, then your score will be 100. For every taxa that is out of range, your score decreases accordingly.

Diversity Score

Satisfactory

Your Diversity Score

Your Diversity Score is computed using the Shannon Index. This accounts for the richness and evenness of the species found in your gut. Your score is a percentage value compared to the highest Shannon score of the population who have taken the Vitract Gut Microbiome Test.
Note that apart from diet, other factors such as age, geographical location, genetics, sleep patterns, antibiotic use, etc, can affect your diversity score

Disclaimer

- This report is not a diagnosis. It is for educational and informational purposes only. 'All associations between your microbiome profile, disease conditions and recommended food suggestions, are based on published peer-reviewed research papers. Note that other factors such as genetics, lifestyle, environment, etc, can contribute to disease or health associations. Always seek the advice of your doctor or healthcare provider for any issues relating to your diagnosis, disease prevention, impairment, symptoms or treatment. This report does not replace the role of your healthcare provider.

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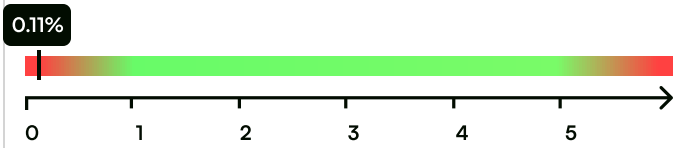
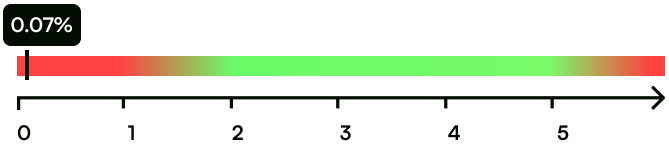
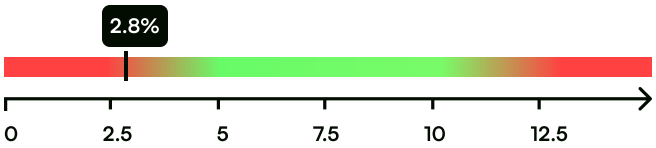
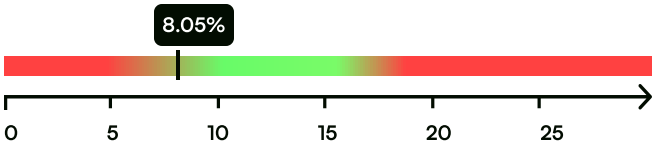
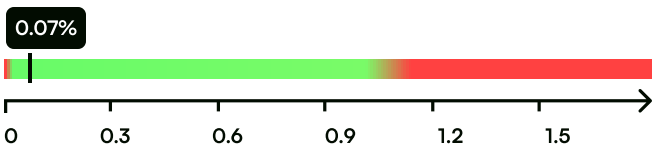
SECTION 2: Bacteria life forms

Health-associated bacteria	Disease-associated bacteria
Probiotic bacteria	Pathobiont overgrowth
Commensals	Exogenous pathogens

Probiotic bacteria

Probiotic bacteria are live microorganisms that, when consumed in sufficient quantities, provide health benefits by promoting a balanced and healthy gut microbiota.

Low Optimal High represents bacteria levels.

#	Probiotic bacteria	Implication
1	*Akkermansia* - 0.11% Low Optimal Range (1-5%) 	Low Low levels of *Akkermansia* can lead to adisruption in the gut barrier, allowing pathogens toinvade and potentially trigger inflammation. Also,it could lead to reduced activation of the host'simmune system.
2	*Bifidobacterium* - 0.07% Low Optimal Range (2-5%) 	Low Low amounts of Bifidobacterium can lead to dysbiosis, a microbial imbalance associated with various digestive disorders, including IBS, ulcerative colitis and IBD. Additionally, it can weaken the gut's barrier function, making it more susceptible to harmful pathogen invasion.
3	*Blautia* - 2.8% Low Optimal Range (5-10%) 	Low Low levels of Blautia have been reported in adults and children suffering from type 2 diabetes and Inflammatory bowel disease (IBD), including Crohn's disease (CD) and ulcerative colitis and also liver cirrhosis. Also, a reduction in the abundance of Blautia has been associated with colorectal cancer and colitis-related cancer.
4	*Faecalibacterium* - 8.05% Low Optimal Range (10-15%) 	Low Low amounts of Faecalibacterium have been linked to dysbiosis, an imbalance in the gut microbiota. This imbalance is associated with other gastrointestinal disorders such as irritable bowel syndrome (IBS). This reduction can also lead to weakened gut barrier function, making the intestines more susceptible to pathogenic infections and increased inflammation.
5	*Lactobacillus* - 0.07% Optimal Optimal Range (0.01-1%) 	Optimal Levels seen are optimal.

All bacteria optimal ranges in section 2, with the exception of *Dorea, Coprococcus, Clostridium butyricum, Veillonella, and Enterococcus faecalis*, are based on the recommendations of Dr. Jason Hawrelak of Probiotic Advisor.

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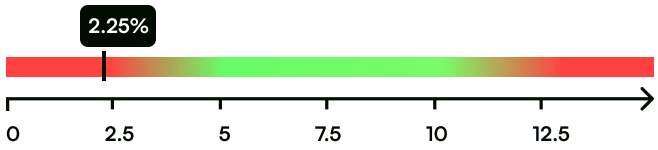
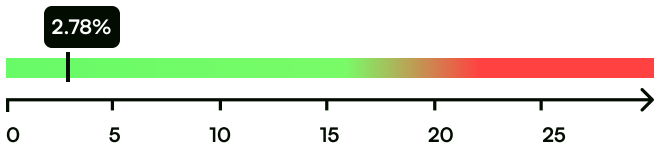
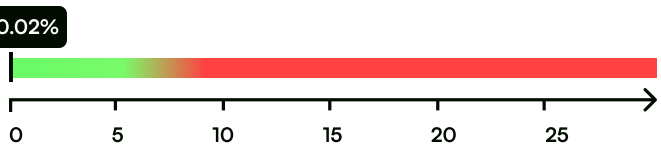
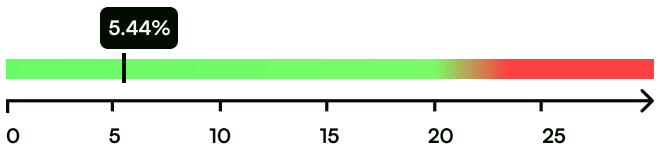
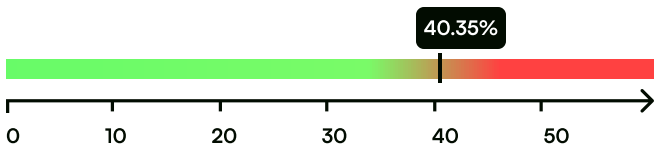
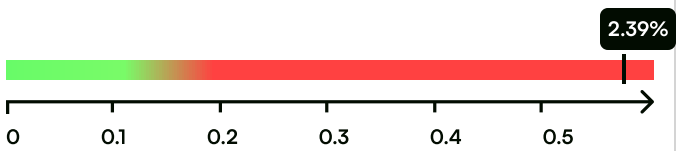
#	Probiotic bacteria	Implication
6	*Roseburia* - 2.25% Low Optimal Range (5-10%) 	Low Low levels of Roseburia can lead to an imbalance in the gut microbiota, which is associated with various gastrointestinal disorders, including irritable bowel syndrome (IBS) and inflammatory bowel diseases (IBD).
7	*Ruminococcus* - 2.78% Optimal Optimal Range (0-15%) 	Optimal Levels seen are optimal.

Commensals

Gut commensals are microorganisms that coexist with the host in the gastrointestinal tract without causing harm. They contribute to host wellbeing and gut homeostasis.

#	Commensals	Implication
1	*Alistipes* - 0.02% Optimal Optimal Range (0-5%) 	Optimal Levels seen are optimal.
2	*Bacteroides* - 5.44% Optimal Optimal Range (0-20%) 	Optimal Levels seen are optimal.
3	*Bacteroidetes* - 40.35% High Optimal Range (0-35%) 	High Excessive growth of certain *Bacteroidetes* species might lead to alterations in the production of polymer-degrading enzymes targeting host cellular components. *Bacteroidetes* also secrete various proteases, which can destroy human brush border digestive enzymes.
4	*Coprococcus* - 2.39% High Optimal Range (0-0.1%) 	High Abundance of *Coprococcus* may result in imbalance of the gut microbiota and can contribute to dysbiosis. Also, elevated levels of *Coprococcus* have been associated with certain autoimmune diseases and inflammatory conditions.

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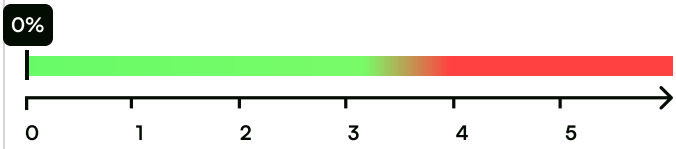
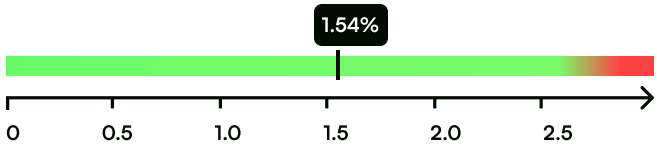
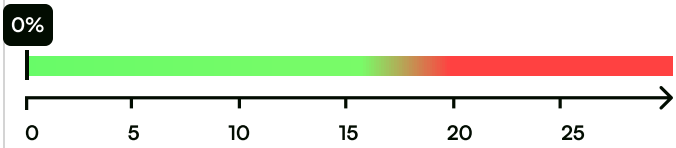
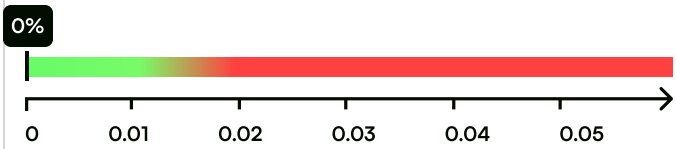
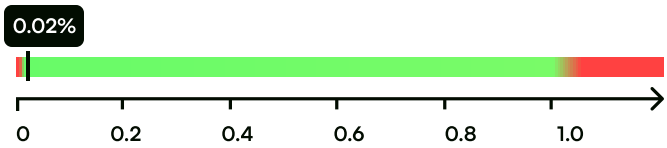
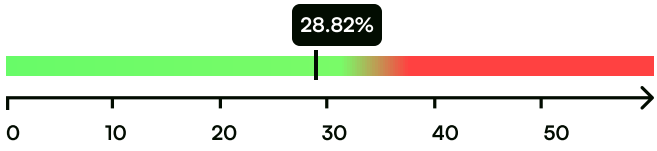
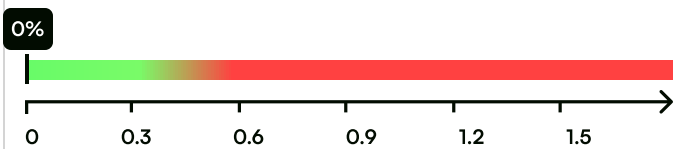
#	Commensals	Implication
5	*Clostridium butyricum* - 0% Optimal Optimal Range (0-3%) 	Optimal Levels seen are optimal.
6	*Dorea* - 1.54% Optimal Optimal Range (0-2.5%) 	Optimal Levels seen are optimal.
7	*Eubacterium* - 0% Optimal Optimal range (0-15%) 	Optimal Levels seen are optimal.
8	*Fusobacterium* - 0% Optimal Optimal range (0-0.01%) 	Optimal Levels seen are optimal.
9	*Oxalobacter* - 0.02% Optimal Optimal range (0.01-1%) 	Optimal Levels seen are optimal.
10	*Prevotella* - 28.82% Optimal Optimal range (0-30% for vegetarians) Optimal range (0-20% for non-vegetarians) 	Optimal Levels seen are optimal.
11	*Streptococcus* - 0% Optimal Optimal range (0-0.3%) 	Optimal Levels seen are optimal.

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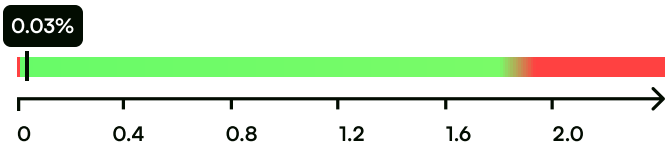
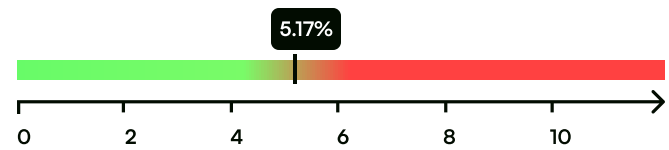
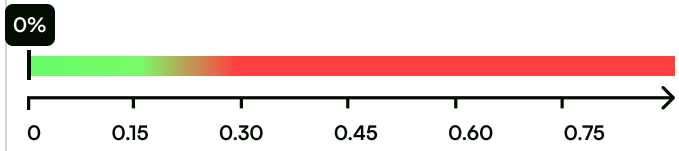
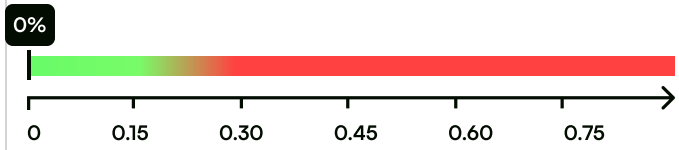
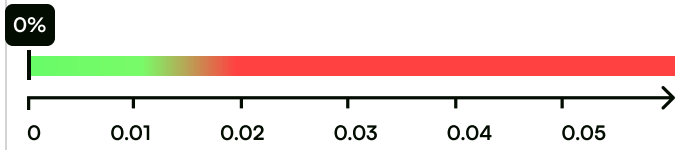
#	Commensals	Implication
12	*Veillonella* - 0.03% Optimal Optimal range (0.001-1.7%) 	Optimal Levels seen are optimal.

Pathobionts

Pathobionts are microorganisms that typically reside harmlessly in the gut but have the potential to cause disease under certain conditions or when the host's immune system is compromised. Pathobionts in this test are shown in 4 sub-categories:

#	Inflammatory lipopolysaccharide producers	Implication
1	*Proteobacteria* - 5.17% High Optimal range (0-4%) 	High Overabundance of pathogenic *Proteobacteria* can indicate an imbalance in the gut microbiota, known as dysbiosis. Dysbiosis can lead to various health issues including inflammation and disruption in the gut barrier, allowing harmful substances to enter the bloodstream.

#	Hydrogen sulfide producers	Implication
1	*Bilophila wadsworthia* - 0% Optimal Optimal range (0-0.15%) 	Optimal Levels seen are optimal.
2	*Desulfovibrio* - 0% Optimal Optimal range (0-0.15%) 	Optimal Levels seen are optimal.

#	Methane-producing archaea	Implication
1	*Methanobrevibacter* - 0% Optimal Optimal range (0-0.01%) 	Optimal Levels seen are optimal.

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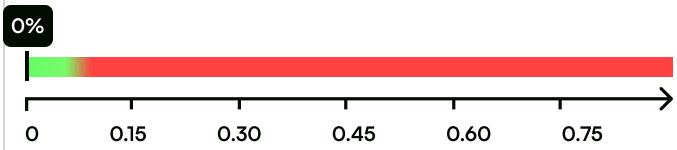
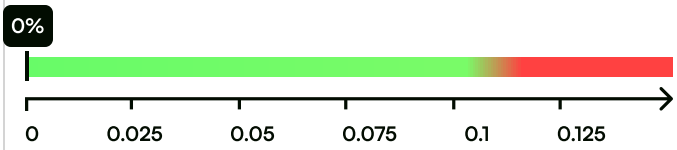
#	Enterotoxic & Inflammatory pathobionts	Implication
1	*Enterococcus faecalis* - 0% Optimal Optimal range (0-0.06%) 	Optimal Levels seen are optimal.
2	*Escherichia coli* - 0% Optimal Optimal range (0-0.1%) 	Optimal Levels seen are optimal.

Exogenous pathogens

Detected Not Detected represents bacteria detection.

#	Exogenous pathogens	Implication
1	*Campylobacter* - 0% Not Detected	Not Detected
2	*Shigella* - 0% Not Detected	Not Detected
3	*Salmonella* - 0% Not Detected	Not Detected
4	*Staphylococcus* - 0% Not Detected	Not Detected
5	*Vibrio* - 0% Not Detected	Not Detected
6	*Yersinia* - 0% Not Detected	Not Detected

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SECTION 3: Insights into metabolites

NOTE: For each metabolite, the closer your score is to 100, the better — with the exception of toxin producers and beta-glucuronidase.

Satisfactory | Needs work | High represents rating.

SHORT CHAIN FATTY ACIDS PRODUCERS

The closer your score is to 100, the better.

Metabolites	Percentile score	Impact
Butyrate Needs work	41 (0–100)	Energy source for colonocytes; Anti-inflammatory effects; Maintenance of gut barrier function
Acetate Needs work	48 (0–100)	Metabolic regulation; Anti-inflammatory effects; Neuroprotection and cognitive function
Propionate Satisfactory	99 (0–100)	Colonic pH regulation; Appetite regulation; Anti-inflammatory effects by promoting immune regulatory responses.

NEUROTRANSMITTER PRODUCERS

The closer you score is to 100, the better, except for histamine which should not be too low or too high

Metabolites	Percentile score	Impact
Acetylcholine Satisfactory	85 (0–100)	Key mediator of peristalsis; Stimulates the release of digestive enzymes from glands in the digestive system
Dopamine Needs work	42 (0–100)	Cognitive function; Regulates mood and sleep
GABA Needs work	44 (0–100)	Influences smooth muscle contraction and relaxation; Contributes to mood regulation and relaxation
Histamine Satisfactory	70 (0–100)	Metabolic regulation; Contributes to the body's defense mechanisms against pathogens; Involved in the regulation of wakefulness, arousal, and cognitive functions
Norepinephrine Needs work	34 (0–100)	Increases alertness; Involved in cognitive functions such as attention, learning, and memory
Serotonin Satisfactory	77 (0–100)	Mood regulation; Gastrointestinal motility; Involved in the regulation of appetite and satiety

Reference bacteria can be found on supplementary pages.

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VITAMINS PRODUCERS

The closer your score is to 100, the better.

Metabolites	Percentile score	Impact
Vitamin B1 (Thiamin) Satisfactory	70 (0–100)	Serves as a coenzyme in carbohydrate metabolism; Cellular growth and repair; Essential for the proper functioning of the enteric nervous system
Vitamin B2 (Riboflavin) Satisfactory	65 (0–100)	Aids in the breakdown of carbohydrates, proteins, and fats for energy; Antioxidant defense; Supports the growth and maintenance of gut epithelial cells
Vitamin B5 (Pantothenic Acid) Satisfactory	62 (0–100)	Energy production through metabolism of carbohydrates, proteins, and fats; Contributes to the synthesis of acetylcholine; Fatty acid and hormone synthesis
Vitamin B7 (Biotin) Satisfactory	74 (0–100)	Fatty acid synthesis; Carbohydrate metabolism; Cell growth and maintenance of gene expression
Vitamin B9 (Folate) Satisfactory	74 (0–100)	DNA synthesis and repair; Metabolism of amino acids; Involved in the synthesis of serotonin, dopamine, and norepinephrine
Vitamin B12 (Cobalamine) Satisfactory	62 (0–100)	Supports neurological function; Red blood cell formation; Energy production
Vitamin K2 Satisfactory	87 (0–100)	Essential for proper blood clotting and coagulation; Improves bone health; Prevents arterial calcification and reduces the risk of atherosclerosis

TOXIN PRODUCERS

The closer your score is to 0, the better.

Metabolites	Percentile score	Impact
Hydrogen sulfide Satisfactory	34 (0–100)	Increased risk of colorectal cancer; Impaired mucin production; Bloating and abdominal pain; Malodorous breath
Ammonia Needs work	57 (0–100)	Disruptions in the intestinal barrier function; Inflammation and abdominal pain; Neurotoxic effect; Gut microbiota disruption

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TOXIN PRODUCERS

The closer your score is to 0, the better.

Metabolites	Percentile score	Impact
Methane Satisfactory	1 (0–100)	Abdominal distension or bloating; Constipation, cramping and flatulence; Increased methane breath
Trimethylamine (TMA) and Trimethylamine-N-Oxide (TMAO) Needs work	58 (0–100)	Increased cardiovascular health risk; Cognitive function and neurological disorders; Inflammation and lipid accumulation in the blood vessels
Lipopolysaccharides (LPS) Needs work	72 (0–100)	Increased inflammation; Metabolic dysfunction and insulin resistance; Neurological effect; Increased contribution to chronic diseases

DETOXIFICATION BIOMARKERS

Scores too close to 0 or 100 are not desirable.

Metabolites	Percentile score	Impact
Beta glucoronidase Satisfactory	63 (0–100)	Deconjugation of bile acids; Influence the pharmacokinetics of drugs; Regulation of physiological estrogen metabolism

LONGEVITY

The closer your score is to 100, the better.

Metabolites	Percentile score	Impact
Indoles and Phenols Satisfactory	82 (0–100)	Indole is a precursor for neurotransmitter synthesis; Indoles regulates mood and sleep-wake cycles; Phenol reduces oxidative stress and inflammation
Myrosinase Satisfactory	75 (0–100)	Anti-cancer potential; Antioxidant and anti-inflammatory properties; Detoxification of harmful substances
Urolithin Satisfactory	79 (0–100)	Antioxidant activity; Mitochondrial health; Muscle health and exercise performance; Cellular senescence regulation

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LACTOSE AND OXALATE DEGRADERS

The closer your score is to 100, the better.

Metabolites	Percentile score	Impact
Oxalate Needs work	36 0 — 100	Prevention of kidney stone formation Maintain gut microbial balance
Lactose Degraders Satisfactory	69 0 — 100	Digestive efficiency and nutrient absorption Production of beneficial metabolites Immune system modulation

Reference bacteria can be found on supplementary pages.

SECTION 4: Food and supplement recommendation

Bacteria out of range

Akkermansia Low , *Bacteroidetes* High , *Bifidobacterium* Low , *Blautia* Low , *Coprococcus* High , *Proteobacteria* High , *Roseburia* Low

Modifiers	Bacteria shifted	Scientific evidence
FOOD To include: Cranberry [1], rye [2], cherry [3], sorghum [5], Olive Oil [6], apple [7], amaranth [10], asparagus [11], Beet [12], Pulses [17], cranberry bean flour [15], oarweed - seaweed [22], Peanut [23], spirulina(cyanobacteria) [24]	[1, 2, 3] Increase Akkermansia [5, 6, 7] Reduce Bacteroidetes [10, 11, 12] Increase Bifidobacterium [15, 16, 17] Increase Blautia [16, 15, 17] Reduce Coprococcus [6, 21, 7] Reduce Proteobacteria [22, 23, 24] Increase Roseburia	1. Effect of Sweetened Dried Cranberry Consumption on Urinary Proteo... 2. 5-Heptadecylresorcinol, a Biomarker for Whole Grain Rye Consumpti... 3. Effect of dark sweet cherry powder consumption on the gut microbio... 4. Recovery of ethanol-induced Akkermansia muciniphila depletion am... 5. Polyphenol-rich sorghum brans alter colon microbiota and impact sp... 6. Oleuropein Ameliorates Advanced Stage of Type 2 Diabetes in db/db... 7. Effects of Commercial Apple Varieties on Human Gut Microbiota Co... 8. Cocoa Polyphenols and Gut Microbiota Interplay: Bioavailability, Pre... 9. Effects of Walnut and Pumpkin on Selective Neurophenotypes of Aut... 10. The impact of fruit and soybean by-products and amaranth on the g... 11. Effects of ad libitum Free-Choice Access to Freshly Squeezed Domes... 12. Beet Pulp: An Alternative to Improve the Gut Health of Growing Pigs. 13. Effects of Blackcurrant and Dietary Fibers on Large Intestinal Health ... 14. Protective Effect of Aplysin Supplementation on Intestinal Permeabili... 15. Diets enriched with cranberry beans alter the microbiota and mitigat... ***full references for recommendations can be found on supplementary pages***
To avoid: ethanol [4], Cacao [8], Pumpkin [9], blackcurrant [13], red alga [14], Tangle [18], safflower oil [19], brown rice [20]	[4] Reduces Akkermansia [8, 9] Increase Bacteroidetes [13, 14] Reduces Bifidobacterium [8, 18] Reduces Blautia [19, 20] Increase Coprococcus [19] Reduces Roseburia	
PROBIOTICS To include: Enterococcus faecium [1], Lactobacillus kefiri [2], Lactobacillus brevis [4], Bifidobacterium animalis [7], bacillus pumilus [8], bacillus coagulans [9], Lactobacillus pentosus [12], Lactobacillus fermentum [14]	[1, 2] Increase Akkermansia [3, 4] Reduce Bacteroidetes [6, 7] Increase Bifidobacterium [8, 9] Increase Blautia [8, 9] Reduce Coprococcus [12, 13] Reduce Proteobacteria [14, 9] Increase Roseburia	1. Enterococcus faecium R0026 Combined with Bacillus subtilis R0179 ... 2. Antiobesity Effect of Exopolysaccharides Isolated from Kefir Grains. 3. Intestinal microbiota and oral administration of Enterococcus faecium... 4. Lactobacillus brevis Alleviates DSS-Induced Colitis by Reprograming ... 5. Saccharomyces boulardii Administration Changes Gut Microbiota an... 6. Effects of a probiotic, Enterococcus faecium, on growth performance... 7. Effect of Bifidobacterium animalis subsp. lactis MN-Gup on constipati... 8. Bacillus pumilus and Bacillus subtilis Promote Early Maturation of Ce... 9. Bacillus coagulans R11 maintained intestinal villus health and decreas... 10. Effects of a Saccharomyces cerevisiae fermentation product on feca... 11. Bifidobacterium pseudocatenulatum LI09 and Bifidobacterium caten... 12. Potential prebiotic properties of exopolysaccharides produced by a ... 13. Effects of pre-encapsulated and pro-encapsulated Enterococcus fae... 14. Probiotic effects of Lacticaseibacillus rhamnosus 1155 and Limosilact... ***full references for recommendations can be found on supplementary pages***
To avoid: saccharomyces boulardii [5], Bifidobacterium catenulatum [11]	[5] Increase Bacteroidetes [10] Reduces Blautia [11] Increase Coprococcus [5] Increase Proteobacteria [11] Reduces Roseburia	

Reference bacteria can be found on supplementary pages.

SECTION 4: Food and supplement recommendation

Bacteria out of range

Akkermansia Low , *Bacteroidetes* High , *Bifidobacterium* Low , *Blautia* Low , *Coprococcus* High , *Proteobacteria* High , *Roseburia* Low

Modifiers	Bacteria shifted	Scientific evidence
SUPPLEMENTS To include: Pterostilbene [1], grape seed extract [2], Sulforaphane [4], Rhubarb Peony Decoction [5], polyphenols [7], Gluco-Oligosaccharides [8], quercetin [10], Nicotine Patch [11], Baicalin [13], nobiletin [14] To avoid: glycerol monolaurate (Monolaurin) [3], GABA [6], Dextrin [9], Rutin [12]	[1, 2] Increase Akkermansia [4, 5] Reduce Bacteroidetes [7, 8] Increase Bifidobacterium [10, 11] Increase Blautia [10, 11] Reduce Coprococcus [13, 5] Reduce Proteobacteria [13, 14] Increase Roseburia [3] Reduces Akkermansia [6] Increase Bacteroidetes [9] Reduces Bifidobacterium [9] Reduces Blautia [12] Increase Coprococcus	1. Gut Microbiota Induced by Pterostilbene and Resveratrol in High-Fat-... 2. Strategies to promote abundance of Akkermansia muciniphila, an em... 3. Antimicrobial Emulsifier-Glycerol Monolaurate Induces Metabolic Syn... 4. Sulforaphane alter the microbiota and mitigate colitis severity on mic... 5. Rhubarb Peony Decoction ameliorates ulcerative colitis in mice by re... 6. Dietary ?-Aminobutyric Acid Supplementation Inhibits High-Fat Diet-I... 7. Effects of diet on gut microbiota profile and the implications for healt... 8. In vitro fermentation of commercial a-gluco-oligosaccharide by faec... 9. Modulation of the fecal microbiome and metabolome by resistant de... 10. Effect of Quercetin on Lipids Metabolism Through Modulating the G... 11. Chronic cigarette smoke exposure induces microbial and inflammato... 12. Conversion of Rutin, a Prevalent Dietary Flavonol, by the Human Gu... 13. Protective effect of baicalin on the regulation of Treg/Th17 balance, ... 14. Bidirectional interaction of nobiletin and gut microbiota in mice fed ... ***full references for recommendations can be found on supplementary pages***
PREBIOTICS To include: xylooligosaccharide [1], lactulose [2], galacto-oligosaccharides [3], fructo-oligosaccharides [4], Agavins [6], raffinose(sugar beet) [7], chitooligosaccharides [11], arabinogalactan [12] To avoid: non-starch polysaccharides [5]	[1, 2] Increase Akkermansia [3, 4] Reduce Bacteroidetes [6, 7] Increase Bifidobacterium [8, 9] Increase Blautia [8, 9] Reduce Coprococcus [11] Reduce Proteobacteria [8, 12] Increase Roseburia [5] Increase Bacteroidetes [10] Reduces Blautia [10] Increase Coprococcus [10] Reduces Roseburia	1. Supplemental Xylooligosaccharide Modulates Intestinal Mucosal Barri... 2. Effect of lactulose intervention on gut microbiota and short chain fatt... 3. High purity galacto-oligosaccharides enhance specific Bifidobacteriu... 4. Sex differences in gut fermentation and immune parameters in rats fe... 5. Flammulina velutipes polysaccharides improve scopolamine-induced... 6. Agave salmiana fructans as gut health promoters: Prebiotic activity a... 7. Fermentation of plant cell wall derived polysaccharides and their corr... 8. Lactulose drives a reversible reduction and qualitative modulation of ... 9. Effects of a galacto-oligosaccharide-rich diet on fecal microbiota an... 10. Impact of diet and individual variation on intestinal microbiota comp... 11. Effect of chitooligosaccharides on human gut microbiota and antigly... 12. Prebiotic effects of wheat arabinoxylan related to the increase in bifi... ***full references for recommendations can be found on supplementary pages***

Reference bacteria can be found on supplementary pages.

SECTION 4: Food and supplement recommendation

Bacteria out of range

Akkermansia Low , *Bacteroidetes* High , *Bifidobacterium* Low , *Blautia* Low , *Coprococcus* High , *Proteobacteria* High , *Roseburia* Low

Modifiers	Bacteria shifted	Scientific evidence
LIFESTYLE CHANGES To include: ketogenic diet [1], high fiber diet [3], fruit/legume fibre [6], nuts [9]	[1] Increase Akkermansia [3] Reduce Bacteroidetes [4] Increase Bifidobacterium [6] Increase Blautia [6] Reduce Coprococcus [4] Reduce Proteobacteria [9] Increase Roseburia	1. Ketogenic diet enhances neurovascular function with altered gut micr... 2. Far infrared radiation induces changes in gut microbiota and activate... 3. Lean rats gained more body weight than obese ones from a high-fibr... 4. Ketogenic diet poses a significant effect on imbalanced gut microbio... 5. Multivariate modelling of faecal bacterial profiles of patients with IBS ... 6. Microbiome Responses to an Uncontrolled Short-Term Diet Interventi... 7. Impact of Hypocaloric Hyperproteic Diet on Gut Microbiota in Overw... 8. Effects of Low Protein Diet on Production Performance and Intestinal... 9. Nuts and their Effect on Gut Microbiota, Gut Function and Symptoms... 10. Effects of the dietary protein level on the microbial composition and ... ***full references for recommendations can be found on supplementary pages***
To avoid: Far infrared Sauna [2], low fodmap diet [5], hypocaloric hyperproteic diet [7], low protein diet [8]	[2] Reduces Akkermansia [2] Increase Bacteroidetes [5] Reduces Bifidobacterium [7] Reduces Blautia [8] Increase Proteobacteria [10] Reduces Roseburia	

Reference bacteria can be found on supplementary pages.

SUPPLEMENTARY TABLE 1: References for dietary recommendations.

Food references

1. Effect of Sweetened Dried Cranberry Consumption on Urinary Proteome and Fecal Microbiome in Healthy Human Subjects.

2. 5-Heptadecylresorcinol, a Biomarker for Whole Grain Rye Consumption, Ameliorates Cognitive Impairments and Neuroinflammation in APP/PS1 Transgenic Mice.

3. Effect of dark sweet cherry powder consumption on the gut microbiota, short-chain fatty acids, and biomarkers of gut health in obese db/db mice.

4. Recovery of ethanol-induced Akkermansia muciniphila depletion ameliorates alcoholic liver disease.

5. Polyphenol-rich sorghum brans alter colon microbiota and impact species diversity and species richness after multiple bouts of dextran sodium sulfate-induced colitis.

6. Oleuropein Ameliorates Advanced Stage of Type 2 Diabetes in db/db Mice by Regulating Gut Microbiota.

7. Effects of Commercial Apple Varieties on Human Gut Microbiota Composition and Metabolic Output Using an In Vitro Colonic Model.

8. Cocoa Polyphenols and Gut Microbiota Interplay: Bioavailability, Prebiotic Effect, and Impact on Human Health.

9. Effects of Walnut and Pumpkin on Selective Neurophenotypes of Autism Spectrum Disorders: A Case Study.

10. The impact of fruit and soybean by-products and amaranth on the growth of probiotic and starter microorganisms.

11. Effects of ad libitum Free-Choice Access to Freshly Squeezed Domestic White Asparagus Juice on Intestinal Microbiota Composition and Universal Bio-Markers of Immuno...

12. Beet Pulp: An Alternative to Improve the Gut Health of Growing Pigs.

13. Effects of Blackcurrant and Dietary Fibers on Large Intestinal Health Biomarkers in Rats.

14. Protective Effect of Aplysin Supplementation on Intestinal Permeability and Microbiota in Rats Treated with Ethanol and Iron.

15. Diets enriched with cranberry beans alter the microbiota and mitigate colitis severity and associated inflammation.

16. Rumen microbial community and milk quality in Holstein lactating cows fed olive oil pomace as part in a sustainable feeding strategy.

17. In vitro fermentation of lupin seeds (Lupinus albus) and broad beans (Vicia faba): dynamic modulation of the intestinal microbiota and metabolomic output.

18. Fermentation of mucins and plant polysaccharides by anaerobic bacteria from the human colon.

19. A safflower oil based high-fat/high-sucrose diet modulates the gut microbiota and liver phospholipid profiles associated with early glucose intolerance in the absence of tis...

20. Gut microbiome composition is linked to whole grain-induced immunological improvements.

21. Anti-obesity effects of a-amylase inhibitor enriched-extract from white common beans (Phaseolus vulgaris L.) associated with the modulation of gut microbiota compositio...

22. Effect of Supplementing Seaweed Extracts to Pigs until d35 Post-Weaning on Performance and Aspects of Intestinal Health.

23. Peanuts as a nighttime snack enrich butyrate-producing bacteria compared to an isocaloric lower-fat higher-carbohydrate snack in adults with elevated fasting glucose: A ...

24. Spirulina Protects against Hepatic Inflammation in Aging: An Effect Related to the Modulation of the Gut Microbiota?

Continues on the next page

SUPPLEMENTARY TABLE 1: References for dietary recommendations.

Probiotics references

1. Enterococcus faecium R0026 Combined with Bacillus subtilis R0179 Prevent Obesity-Associated Hyperlipidemia and Modulate Gut Microbiota in C57BL/6 Mice.

2. Antiobesity Effect of Exopolysaccharides Isolated from Kefir Grains.

3. Intestinal microbiota and oral administration of Enterococcus faecium associated with the growth performance of new-born piglets.

4. Lactobacillus brevis Alleviates DSS-Induced Colitis by Reprograming Intestinal Microbiota and Influencing Serum Metabolome in Murine Model.

5. Saccharomyces boulardii Administration Changes Gut Microbiota and Attenuates D-Galactosamine-Induced Liver Injury.

6. Effects of a probiotic, Enterococcus faecium, on growth performance, intestinal morphology, immune response, and cecal microflora in broiler chickens challenged with Esc...

7. Effect of Bifidobacterium animalis subsp. lactis MN-Gup on constipation and the composition of gut microbiota.

8. Bacillus pumilus and Bacillus subtilis Promote Early Maturation of Cecal Microbiota in Broiler Chickens.

9. Bacillus coagulans R11 maintained intestinal villus health and decreased intestinal injury in lead-exposed mice by regulating the intestinal microbiota and influenced the func...

10. Effects of a Saccharomyces cerevisiae fermentation product on fecal characteristics, metabolite concentrations, and microbiota populations of dogs subjected to exercise c...

11. Bifidobacterium pseudocatenulatum LI09 and Bifidobacterium catenulatum LI10 attenuate D-galactosamine-induced liver injury by modifying the gut microbiota.

12. Potential prebiotic properties of exopolysaccharides produced by a novel Lactobacillus strain, Lactobacillus pentosus YY-112.

13. Effects of pre-encapsulated and pro-encapsulated Enterococcus faecalis on growth performance, blood characteristics, and cecal microflora in broiler chickens.

14. Probiotic effects of Lacticaseibacillus rhamnosus 1155 and Limosilactobacillus fermentum 2644 on hyperuricemic rats.

Supplements references

1. Gut Microbiota Induced by Pterostilbene and Resveratrol in High-Fat-High-Fructose Fed Rats: Putative Role in Steatohepatitis Onset.

2. Strategies to promote abundance of Akkermansia muciniphila, an emerging probiotics in the gut, evidence from dietary intervention studies.

3. Antimicrobial Emulsifier-Glycerol Monolaurate Induces Metabolic Syndrome, Gut Microbiota Dysbiosis, and Systemic Low-Grade Inflammation in Low-Fat Diet Fed Mice.

4. Sulforaphane alter the microbiota and mitigate colitis severity on mice ulcerative colitis induced by DSS.

5. Rhubarb Peony Decoction ameliorates ulcerative colitis in mice by regulating gut microbiota to restoring Th17/Treg balance.

6. Dietary ?-Aminobutyric Acid Supplementation Inhibits High-Fat Diet-Induced Hepatic Steatosis via Modulating Gut Microbiota in Broilers.

7. Effects of diet on gut microbiota profile and the implications for health and disease.

8. In vitro fermentation of commercial a-gluco-oligosaccharide by faecal microbiota from lean and obese human subjects.

9. Modulation of the fecal microbiome and metabolome by resistant dextrin ameliorates hepatic steatosis and mitochondrial abnormalities in mice.

10. Effect of Quercetin on Lipids Metabolism Through Modulating the Gut Microbial and AMPK/PPAR Signaling Pathway in Broilers.

11. Chronic cigarette smoke exposure induces microbial and inflammatory shifts and mucin changes in the murine gut.

12. Conversion of Rutin, a Prevalent Dietary Flavonol, by the Human Gut Microbiota.

13. Protective effect of baicalin on the regulation of Treg/Th17 balance, gut microbiota and short-chain fatty acids in rats with ulcerative colitis.

14. Bidirectional interaction of nobiletin and gut microbiota in mice fed with a high-fat diet.

Continues on the next page

SUPPLEMENTARY TABLE 1: References for dietary recommendations.

Prebiotics references

1. Supplemental Xylooligosaccharide Modulates Intestinal Mucosal Barrier and Cecal Microbiota in Laying Hens Fed Oxidized Fish Oil.

2. Effect of lactulose intervention on gut microbiota and short chain fatty acid composition of C57BL/6J mice.

3. High purity galacto-oligosaccharides enhance specific Bifidobacterium species and their metabolic activity in the mouse gut microbiome.

4. Sex differences in gut fermentation and immune parameters in rats fed an oligofructose-supplemented diet.

5. Flammulina velutipes polysaccharides improve scopolamine-induced learning and memory impairment in mice by modulating gut microbiota composition.

6. Agave salmiana fructans as gut health promoters: Prebiotic activity and inflammatory response in Wistar healthy rats.

7. Fermentation of plant cell wall derived polysaccharides and their corresponding oligosaccharides by intestinal bacteria.

8. Lactulose drives a reversible reduction and qualitative modulation of the faecal microbiota diversity in healthy dogs.

9. Effects of a galacto-oligosaccharide-rich diet on fecal microbiota and metabolite profiles in mice.

10. Impact of diet and individual variation on intestinal microbiota composition and fermentation products in obese men.

11. Effect of chitooligosaccharides on human gut microbiota and antiglycation.

12. Prebiotic effects of wheat arabinoxylan related to the increase in bifidobacteria, Roseburia and Bacteroides/Prevotella in diet-induced obese mice.

Lifestyle changes references

1. Ketogenic diet enhances neurovascular function with altered gut microbiome in young healthy mice.

2. Far infrared radiation induces changes in gut microbiota and activates GPCRs in mice.

3. Lean rats gained more body weight than obese ones from a high-fibre diet.

4. Ketogenic diet poses a significant effect on imbalanced gut microbiota in infants with refractory epilepsy.

5. Multivariate modelling of faecal bacterial profiles of patients with IBS predicts responsiveness to a diet low in FODMAPs.

6. Microbiome Responses to an Uncontrolled Short-Term Diet Intervention in the Frame of the Citizen Science Project.

7. Impact of Hypocaloric Hyperproteic Diet on Gut Microbiota in Overweight or Obese Patients with Nonalcoholic Fatty Liver Disease: A Pilot Study.

8. Effects of Low Protein Diet on Production Performance and Intestinal Microbial Composition in Pigs.

9. Nuts and their Effect on Gut Microbiota, Gut Function and Symptoms in Adults: A Systematic Review and Meta-Analysis of Randomised Controlled Trials.

10. Effects of the dietary protein level on the microbial composition and metabolomic profile in the hindgut of the pig.