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1620 Linden Av N
Shoreline WA, 98133
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TEST PATIENT
01-Jan-1990 Female

LAB ID : 4026995
Collection Date : 24-Sep-2024
Request Date: 24-Sep-2024

GI Advanced

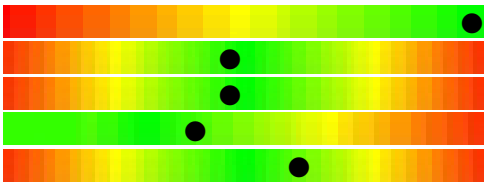
General Macroscopic Description

	Result	Markers
Stool Colour	**Brown**	**Colour** - Brown is the colour of normal stool. Other colours may indicate abnormal gut health.
Stool Form	**Unformed**	**Form** -Sample form is categorised using the Bristol stool chart. A comment on stool appearance can be found in the comments section.
Mucous	**DETECTED**	**Mucous** - Mucous production may indicate the presence of an infection and/or inflammation.
Occult Blood	**POSITIVE**	**Blood (Macro)**- The presence of blood in the stool may be the result of several causes besides colorectal bleeding, including hemorrhoids or gastrointestinal infection.

Short Chain Fatty Acids

Methodology: GC/MS

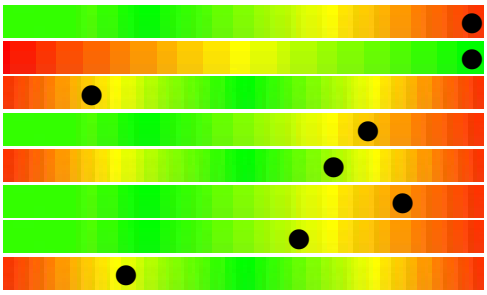
	Result	Range	Units
Short Chain Fatty Acids, Beneficial	**38.0**	> 13.6	umol/g
Butyrate	**21.0**	10.8 - 33.5	%
Acetate	**60.0**	44.5 - 72.4	%
Propionate	**14.0**	0.0 - 32.0	%
Valerate	**5.0**	0.5 - 7.0	%



GIT Functional Markers

Methodology: FEIA, EIA, CLIA, pH electrode

	Result	Range	Units
Calprotectin.	***70.0* *H**	0.0 - 50.0	ug/g
Pancreatic Elastase	**450.0**	> 200.0	ug/g
Secretory (sIgA)	***390.0* *L**	510.0 - 2040.0	ng/mL
Zonulin	***110.0* *H**	0.0 - 107.0	ng/mL
Beta glucuronidase	**5422.0**	368.0 - 6266.0	U/g
Steatocrit	***11.0* *H**	0.0 - 10.0	%
a-Transglutaminase IgA	**70.0**	0.0 - 100.0	units/L
pH	**6.4**	6.3 - 7.7	



Microbiome Mapping Summary

Parasites & Worms

Blastocystis hominis.
Dientamoeba fragilis.
Enterobius vermicularis,Pinworm

Bacteria & Viruses

Bacillus species.
Pseudomonas aeruginosa.
Streptococcus mutans.
Streptococcus oralis.
Streptococcus salivarius.
Methanobrevibacter smithii
Desulfovibrio piger
Fusobacterium species
Helicobacter pylori

Mycology

Candida albicans.

Key Phyla Microbiota

Firmicutes:Bacteroidetes Ratio	**1.91 *H**	< 1.00	RATIO

Relative Commensal Abundance of the 6 Phyla groups can be found on page 6 of this report

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Parasites and Worms.	Result	Range	Units
Parasitic Organisms			
Cryptosporidium species	<dl	< 1.0	x10^5 org/g
Entamoeba histolytica.	<dl	< 1.0	x10^5 org/g
Giardia intestinalis	<dl	< 1.0	x10^5 org/g
Blastocystis hominis.	9.6 *H	< 1.0	x10^5 org/g
Dientamoeba fragilis.	72.1 *H	< 1.0	x10^5 org/g
Endolimax nana	<dl	< 1.0	x10^5 org/g
Entamoeba coli.	<dl	< 5.0	x10^5 org/g
Pentatrichomonas hominis	<dl	< 1.0	x10^5 org/g
Worms			
Ancylostoma duodenale, Roundworm	Not Detected		
Ascaris lumbricoides, Roundworm	Not Detected		
Trichuris trichiura, Whipworm	Not Detected		
Enterocytozoon spp	Not Detected		
Strongyloides spp, Roundworm	Not Detected		
Necator americanus, Hookworm	Not Detected		
Enterobius vermicularis,Pinworm	DETECTED		
Hymenolepis spp, Tapeworm	Not Detected		
Taenia species, Tapeworm	Not Detected		

Comment: Not Detected results indicate the absence of detectable DNA in the sample for the worms reported.
NOTE: Reflex testing is performed on clinically indicated samples

Opportunistic Bacteria/Overgrowth	Result	Range	Units
Bacillus species.	1.70 *H	< 1.00	x10^4 CFU/g
Enterococcus faecalis	<dl	< 1.00	x10^5 CFU/g
Enterococcus faecium	<dl	< 1.00	x10^5 CFU/g
Morganella species	<dl	< 1.00	x10^5 CFU/g
Pseudomonas species	<dl	< 1.00	x10^4 CFU/g
Pseudomonas aeruginosa.	11.34 *H	< 3.00	x10^4 CFU/g
Staphylococcus species	<dl	< 1.00	x10^3 CFU/g
Staphylococcus aureus	<dl	< 5.00	x10^3 CFU/g
Streptococcus agalactiae.	<dl	< 3.00	x10^4 CFU/g
Streptococcus anginosus.	<dl	< 1.00	x10^6 CFU/g
Streptococcus mutans.	7.27 *H	< 1.00	x10^4 CFU/g
Streptococcus oralis.	2.16 *H	< 1.00	x10^6 CFU/g
Streptococcus salivarius.	5.11 *H	< 5.00	x10^6 CFU/g
Methanobrevibacter smithii	5.54 *H	< 1.00	x10^5 CFU/g
Desulfovibrio piger	396.23 *H	< 18.00	x10^6 CFU/g
Enterobacter cloacae complex.	<dl	< 5.00	x10^5 CFU/g
Potential Autoimmune Triggers			
Citrobacter species.	<dl	< 5.00	x10^4 CFU/g
Citrobacter freundii.	0.55	< 5.00	x10^4 CFU/g
Klebsiella species	1.37	< 5.00	x10^3 CFU/g
Klebsiella pneumoniae.	<dl	< 5.00	x10^5 CFU/g
Prevotella copri	<dl	< 1.00	x10^9 CFU/g
Proteus species	<dl	< 5.00	x10^5 CFU/g
Proteus mirabilis.	<dl	< 1.00	x10^4 CFU/g
Fusobacterium species	42.42 *H	< 10.00	x10^4 CFU/g

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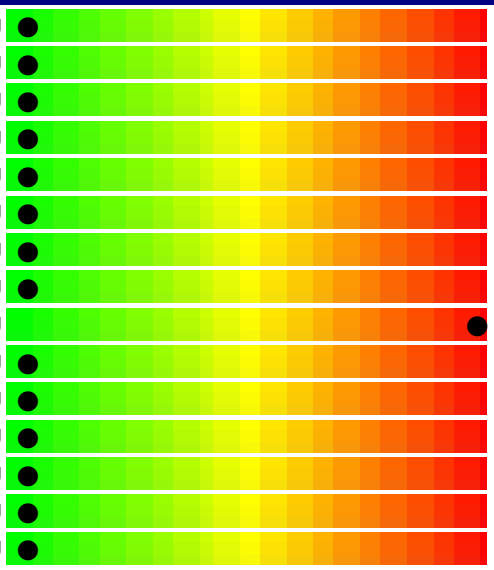
Mycology	Result	Range	Units
Candida dubliniensis.	<dl	< 1.00	x10^5 CFU/g
Candida glabrata.	<dl	< 1.00	x10^5 CFU/g
Candida intermedia.	<dl	< 1.00	x10^5 CFU/g
Candida krusei.	<dl	< 1.00	x10^5 CFU/g
Candida lambica.	<dl	< 1.00	x10^5 CFU/g
Candida lusitaniae.	<dl	< 1.00	x10^5 CFU/g
Candida parapsilosis.	<dl	< 1.00	x10^5 CFU/g
Candida tropicalis.	<dl	< 1.00	x10^5 CFU/g
Candida albicans.	6.00 *H	< 1.00	x10^5 CFU/g
Candida famata.	<dl	< 1.00	x10^5 CFU/g
Candida keyfr.	<dl	< 1.00	x10^5 CFU/g
Candida lipolytica.	<dl	< 1.00	x10^5 CFU/g
Geotrichum species.	<dl	< 1.00	x10^5 CFU/g
Rhodotorula species.	<dl	< 1.00	x10^5 CFU/g
Saccharomyces cerevisiae:	<dl	< 1.00	x10^5 CFU/g



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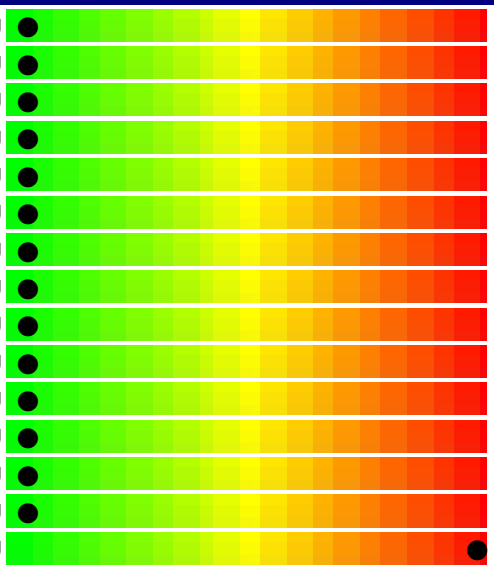
Bacterial Pathogens:	Result	Range	Units
Aeromonas hydrophila.	<dl	< 1.00	x10^3 CFU/g
Campylobacter species.	<dl	< 1.00	x10^5 CFU/g
C. difficile, Toxin A	<dl	< 1.00	x10^4 CFU/g
C. difficile, Toxin B	<dl	< 1.00	x10^4 CFU/g
Enteroaggregative E. coli	<dl	< 1.00	x10^3 CFU/g
Enteropathogenic E. coli	<dl	< 1.00	x10^3 CFU/g
E. coli O157	<dl	< 1.00	x10^2 CFU/g
Hypervirulent Clostridium difficile	<dl	< 1.00	x10^3 CFU/g
Enteroinvasive E. coli/Shigella	<dl	< 1.00	x10^3 CFU/g
Enterotoxigenic E. coli LT/ST	<dl	< 1.00	x10^5 CFU/g
Salmonella species.	<dl	< 1.00	x10^5 CFU/g
Shiga toxigenic E.coli	<dl	< 1.00	x10^3 CFU/g
Vibrio species.	<dl	< 1.00	x10^4 CFU/g
Yersinia species.	<dl	< 1.00	x10^5 CFU/g
Helicobacter pylori	15.0 *H	< 1.0	x10^3 CFU/g



Comment: Helico Pylori virulence factors will be listed below if detected POSITIVE

H. pylori Resistance Genes	Result	Range	Units

Comment: Helico Pylori clarithromycin resistance genes will be listed below if detected

Gene: A2142C	DETECTED		
Gene: A2142G	Not Detected		
Gene: A2143G	Not Detected		
H.pylori Virulence Factor, babA	Not Detected	H.pylori Virulence Factor, cagA	Not Detected
H.pylori Virulence Factor, oipA	Not Detected	H.pylori Virulence Factor, vacA	Not Detected
H.pylori Virulence Factor, virB	Not Detected	H.pylori Virulence Factor, virD	Not Detected

Viral Pathogens	Result	Range	Units
Adenovirus 40/41	Not Detected		
Norovirus GI/II	Not Detected		
Rotavirus A	Not Detected		
Sapovirus (I,II,IV,V)	Not Detected		
Astrovirus (hAstro)	Not Detected		

GIT Functional markers performed by GCMS,EIA,FEIA.
Bacteriology,Virology,Fungi,Parasites & Worms performed by PCR,qPCR & MALDI-TOF.
AST performed by Vitek 2 System,M50 Phoenix Microbial Antibiotic susceptibility,Manual Minimum Inhibition Concentration.
<dl = result below detectable limit. *H = Result greater than the reference range. *L = Result less than the reference range

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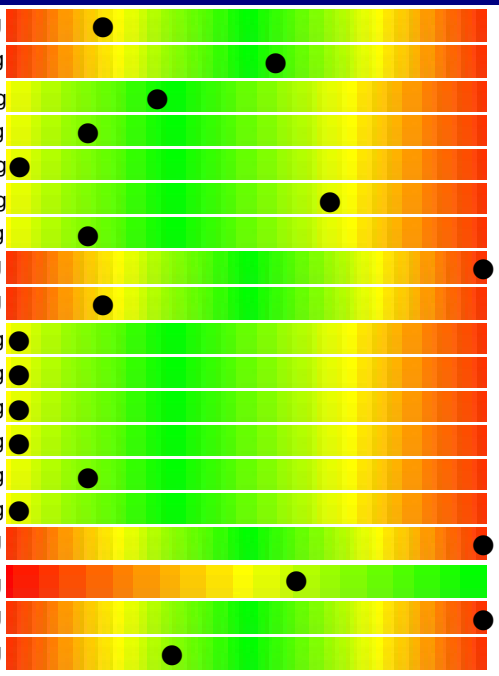
Normal Bacterial GUT Flora.	Result	Range	Units
Bacteroides fragilis	10.0	1.6 - 250.0	x10^5 CFU/g
TOTAL BIFIDOBACTERIA	1174.1	5.0 - 2000.0	x10^6 CFU/g
Bifidobacterium adolescentis	297.2	4.6 - 1000.0	x10^6 CFU/g
Bifidobacterium bifidum.	6.9	4.6 - 1000.0	x10^6 CFU/g
Bifidobacterium breve.	<dl	4.6 - 1000.0	x10^6 CFU/g
Bifidobacterium longum	870.0	4.6 - 1000.0	x10^6 CFU/g
Enterococcus species	56.5	1.9 - 2000.0	x10^3 CFU/g
Escherichia species	5385.4*H	3.7 - 3800.0	x10^4 CFU/g
TOTAL LACTOBACILLI	1.9	1.7 - 3000.0	x10^3 CFU/g
Lactobacillus acidophilus.	<dl	1.7 - 500.0	x10^3 CFU/g
Lactobacillus casei.	<dl	1.7 - 500.0	x10^3 CFU/g
Lactobacillus delbrueckii	<dl	1.7 - 500.0	x10^3 CFU/g
Lactobacillus plantarum.	<dl	1.7 - 500.0	x10^3 CFU/g
Lactobacillus rhamnosus	1.9	1.7 - 500.0	x10^3 CFU/g
Lactobacillus salivarius	<dl	1.7 - 500.0	x10^3 CFU/g
Clostridium species	114.7*H	5.0 - 50.0	x10^7 CFU/g
Oxalobacter formigenes	5.69	> 5.00	x10^6 CFU/g
Akkermansia muciniphila	118.00*H	1.00 - 50.00	x10^7 CFU/g
Faecalibacterium prausnitzii	890.2	200.0 - 3500.0	x10^6 CFU/g



A total count of Lactobacillus and Bifidobacterium has been included to offer a broad overview of the species present in the microbiome, which may assist in guiding clinical treatment decisions. However, identifying individual strains of Lactobacillus and Bifidobacterium can yield more detailed and clinically specific information, as different strains exhibit distinct physiological effects, as outlined in the probiotics action chart below.

Actions

Actions	L. plantarum HEAL9	L. paracasei 8700:2	L. plantarum HEAL19	L. plantarum 6595	L. plantarum 299V	L. rhamnosus GG	L. acidophilus LA02	B. animalis subsp. lactis BS01	L. casei LC03	B. breve BR03	L. fermentum LF08	L. crispatus strains	B. animalis subsp. lactis BA05	L. plantarum LP01	L. rhamnosus LR06	B. longum 04	L. fermentum LF16	L. salivarius LS01	B. breve B632	L. fermentum LF10	L. salivarius LS03	L. helveticus Rosell-52	L. rhamnosus Rosell-11	B. longum Rosell-75	S. boulardii CNCM I-1079	S. thermophilus FP4
Intestinal epithelial barrier health				•	•	•			•	•								•				•	•		•	
Mucous membrane health				•		•																	•		•	
Normalisation of bowel movements					•	•	•	•		•				•								•				
Normalisation of bloating					•	•	•	•		•				•												
Normalisation of peristalsis					•	•	•	•		•				•											•	
Autoimmune immunomodulation	•	•	•		•	•																				
Inhibition of pathogenic overgrowth				•	•	•				•									•		•	•	•	•	•	
Inactivate microbial toxins																									•	
Increase infection resistance	•	•		•		•		•														•		•	•	
Th1/Th2 immune cell modulation						•				•								•	•			•	•			
Staphylococci inhibition										•								•								
Gut-brain axis support					•									•	•	•	•					•		•		
GABA production						•			•																	
Bone resorption inhibition	•	•	•																							
E. coli inhibition										•				•	•				•			•	•	•	•	
Oxalate degradation						•	•							•												

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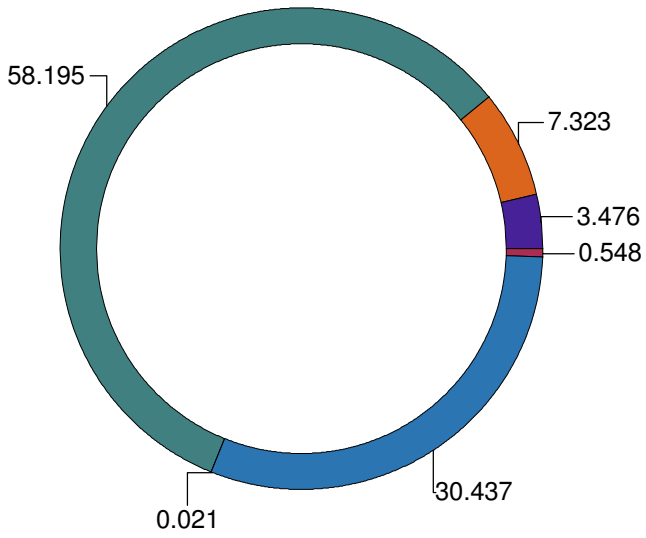
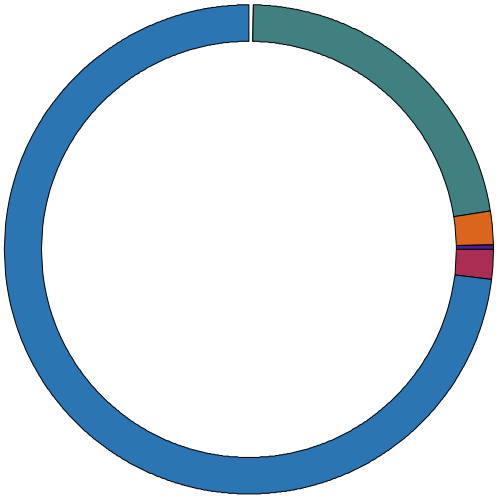
Introduction:
Your gut microbiome is a collective name for the 40 trillion cells and up to 1000 microbial species that include bacteria, viruses, fungi, parasites, and archaea and reside in our gut. The number of gut bacterial cells is approximately equal to the total number of human cells in our body, so if we consider only cell counts, we are only about half human. In terms of gene counts, the microbiome contains about 200 times more genes than the human genome, making bacterial genes responsible for over 99% of our body's gene content! Of all the microbial communities in the human body, the gut microbiome is by far the most dense, diverse, and physiologically important ecosystem to our overall health.

Relative Commensal Abundance	Result	Range	Units
Firmicutes Phylum	*58.195* *H	3.500 - 40.000	%
Bacteroidetes Phylum	*30.437* *L	50.000 - 95.000	%
Proteobacteria Phylum	7.323	0.050 - 12.500	%
Verrucomicrobia Phylum	*3.476* *H	0.000 - 2.400	%
Actinobacteria Phylum	0.548	0.001 - 4.818	%
Euryarchaeota Phylum	*0.021* *H	0.000 - 0.010	%

Your Phyla:



Healthy Phyla:



References:
NOTE: Relative abundance reference ranges have been based on a healthy population study.
King CH, et., al. (2019) Baseline human gut microbiota profile in healthy people and standard reporting template. PLoS One. 2019 Sep 11;14(9):e0206484.

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Microbiome (Culture) MALDI-TOF

Matrix-assisted laser desorption/ionization-time of flight (MALDI-TOF) mass spectrometry (MS) has become a widely used technique for the rapid and accurate identification of pathogenic bacteria, opportunistic bacteria and fungi/yeast in clinical microbiology laboratory testing. The specimen received has been tested under various culture conditions and results are reported below.

Pathogenic Bacteriology

Organism	Growth	Range	Classification

Pathogen: Organisms that fall under this category have a well-recognised mechanism of pathogenicity in clinical literature and are considered significant regardless of the quantity that appears in culture.

Opportunistic Bacteriology

Organism	Growth	Range	Classification
Pseudomonas aeruginosa	4+ *H	< 4+	Possible Pathogen
Bacillus species	4+ *H	< 4+	Possible Pathogen
Streptococcus oralis	3+	< 4+	Non-Pathogen
Streptococcus salivarius	3+	< 4+	Non-Pathogen

Non-Pathogen: Organisms that fall under this category are those that consistute normal, commensal flora, or have not been recognized as etiological agents of disease. Results in this category should be interpreted in context of clinical symptoms.

Possible Pathogen: Organisms that fall under this category are considered potential or opportunistic pathogens when present in heavy growth.

Mycology (Fungi & Yeast)

Organism	Growth	Range	Classification
Candida albicans	2+ *H	< 2+	Possible Pathogen

Non-Pathogen: Organisms that fall under this category are those that consistute normal, commensal flora, or have not been recognized as etiological agents of disease. Results in this category should be interpreted in context of clinical symptoms.

Possible Pathogen: Organisms that fall under this category are considered potential or opportunistic pathogens when present in heavy growth.

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ANTIBIOTIC SENSITIVITIES and NATURAL INHIBITORS

Antibiotics

	Pseudomonas aeruginosa	Bacillus species
	Susceptible	Susceptible
Amoxicillin	N/A	N/A
Ampicillin	N/A	N/A
Augmentin	N/A	N/A
Ciprofloxacin	S	N/A
Norfloxacin	N/A	N/A
Meropenem	N/A	N/A
Cefazolin	N/A	N/A
Gentamycin.	S	N/A
Trimethoprim/Sulpha	S	N/A
Erythromycin	N/A	N/A
Penicillin.	N/A	N/A

LEGEND

S = Sensitive	R = Resistant	N/A = Not Tested

Inhibitors

	Inhibition %	Inhibition %
Berberine	60%	60%
Black Walnut	60%	60%
Caprylic Acid	80%	60%
Citrus Seed	60%	80%
Coptis	40%	40%
Garlic-	60%	60%
Golden seal	20%	60%
Oregano	60%	60%

LEGEND

Low Inhibition — High Inhibition

0	20	40	60	80	100

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YEAST - SENSITIVITIES and NATURAL ANTIFUNGALS

Candida albicans

Antifungals

	Inhibition
Fluconazole	
Voriconazole	
Itraconazole	

INHIBITION CATEGORY

R	Resistant	This category indicates that the organism is not inhibited by obtainable levels of the pharmaceutical agent
I	Intermediate	This category indicates where the minimum inhibiition concentrations (MIC) approach obtainable pharmaceutical agent levels and for which response rates may be lower than for susceptible isolates
SDD	Susceptible, Dose Dependent	This category indicates that clinical efficay is achieved when higher than normal dosage of a drug is used to achieve maximal concentrations
S	Susceptible	This category indicates that the organisms are inhibited by the usual achievable concentration of the agent
NI	No Interpretative Guidelines	This category indicates that there are no established guidelines for MIC interpreatation for these organisams

Non-absorbed Antifungals

	Inhibition %
Nystatin	60%

Natural Antifungals

	Inhibition %
Berberine.	60%
Garlic	40%
Black Walnut.	40%
Citrus Seed.	40%
Coptis.	20%
Golden seal.	20%
Oregano.	20%

LEGEND

Low Inhibition — High Inhibition

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Pathogen Summary:

DISCLAIMER:
Any information provided by us is for information purposes only.
Commentary is provided to the practitioner for educational purposes and should not be interpreted as diagnostic or as treatment recommendations.
Diagnosis and treatment decisions are the practitioner's responsibility.

Testing performed by: NutriPATH Pathology 16 Harker Street, Burwood 3125 AU. Lab Director: Jillian Harrington, PhD, HCLD (ABB). CLIA#99D2282774

Macroscopy Comment

BROWN coloured stool is considered normal in appearance.

UNFORMED/LIQUID stools may indicate the presence of infection and/or inflammation.
Consider dysbiosis, food sensitivity, high dose vitamin C and magnesium, infection, intestinal permeability, laxative use, malabsorption, maldigestion, stress. Other causes: bacterial, fungal, viral and other parasitic infections.
Treatment:
• Investigate and treat possible underlying cause.
• Assess other gut markers (e.g pH, pancreatic elastase 1, etc).

MUCOUS HAS BEEN DETECTED IN THIS SPECIMEN:
The presence of mucous in the stool may be due to prolonged irritation of the intestinal mucosa. An increase of visible mucous may also be reflective of an inflammatory gastrointestinal condition such as: Crohns, Ulcerative colitis, irritable bowel syndrome (IBS) and infection.
Treatment:
• Investigate and treat possible underlying cause.
• Assess other Gut markers (e.g. calprotectin, M2PK, etc).

FAECAL OCCULT BLOOD POSITIVE:
Faecal occult blood has been detected in this specimen. The presence of blood in the stool may be the result of several causes besides colorectal bleeding, including hemorrhoids or gastrointestinal infection. Results should be considered with other clinical information available to the physician.
Please note: A positive result indicates that the sample likely contains a human haemoglobin concentration >20ng/ml (Limit of detection).

Review this result with other inflammation markers such as calprotectin.

Metabolism Comment

In a healthy gut Short Chain Fatty Acids (SCFAs) exhibited in the following proportions; Butyrate, Acetate, Propionate (16%:60%:24%).
The primary SCFAs butyrate, propionate and acetate are produced by predominant commensal bacteria via fermentation of soluble dietary fibre and intestinal mucus glycans.

Key producers of SCFAs include Faecalibacterium prausnitzii, Akkermansia mucinphila, Bacteroides fragilis, Bifidobacterium, Clostridium and Lactobacillus Spp.
The SCFAs provide energy for intestinal cells and regulate the actions of specialised mucosal cells that produce anti-inflammatory and antimicrobial factors, mucins that constitute the mucus barriers, and gut active peptides that facilitate appetite regulation and euglycemia. Abnormal SCFAs may be associated with dysbiosis, intestinal barrier dysfunction and inflammatory conditions.

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TEST PATIENT
01-Jan-1990 Female

LAB ID : 4026995
Collection Date : 24-Sep-2024
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GIT Markers Comment

PANCREATIC ELASTASE: Normal exocrine pancreatic function.
Pancreatic Elastase reflects trypsin, chymotrypsin, amylase and lipase activity.
This test is not affected by supplements of pancreatic enzymes.
Healthy individuals should be producing >500 ug/g of PE-1 under normal/healthy conditions.
PE-1 levels between 200 - 500 ug/g may indicate suboptimal production.
PE-1 levels <200 ug/g indicate clear inadequate production.
The clinician should therefore consider digestive enzyme supplementation if one or more of the following conditions is present:
Loose watery stools, Undigested food in the stools, Post-prandial abdominal pain, Nausea or colicky abdominal pain, Gastroesophageal reflux symptoms, Bloating or food intolerance.

Testing performed by chemiluminescence immunosassay (CLIA).
ELEVATED CALPROTECTIN:
Elevated faecal calprotectin indicates a high probability of intestinal inflammation.
For patients with known inflammatory bowel disease in remission, faecal calprotectin above 50 ug/g is associated with an increased risk of relapse over the next 12 months. In patients with faecal calprotectin below 50u/g with strong clinical indications of intestinal inflammation, repeat testing may be useful. In small bowel Crohn's disease, the faecal calprotectin may not be elevated. Elevated faecal calprotectin may occur with other conditions including colorectal cancer, NSAID ulceration, coeliac disease, diverticulitis and chronic inflammation.
Further investigative procedures are necessary to determine the cause of inflammation.
Test performed by Phadia EliA Fluorescence enzyme immunoassay (FEIA).

LOW SECRETORY IGA:
Secretory IgA represents the first line of defence of the gastrointestinal mucosa and is central to the normal function of the gastrointestinal tract as an immune barrier.

Secretory IgA binds to invading microorganisms and toxins and entrap them in the mucus layer or within the epithelial cells, so inhibiting microbial motility, agglutinating the organisms, and neutralising their exotoxins and then assist in their harmless elimination from the body in the faecal flow. sIgA also 'tags' food as acceptable, so low sIgA leads to increased sensitivity to foods.
Several studies link stress and emotionality with levels of sIgA. Production is adversely affected by stress, which is mediated by cortisol levels.
Often low levels of Secretory IgA correlates with low beneficial flora levels and an increase in pathogenic and parasitic organism being present.

Treatment: Investigate the root cause and rule out parasitic organisms or pathogenic bacteria. Consider the use of probiotics (saccharomyces boulardii), choline, essential fatty acids, glutathione, glycine, glutamine, phosphatidylcholine, Vitamin C and Zinc which are all required for efficient production of Secretory IgA.
PLEASE NOTE: A low Secretory IgA should be reviewed in conjunction with the stool formation. An artefactually low level may be due to fluid dilution effects in a watery or unformed/loose stool sample.

ELEVATED ZONULIN LEVELS:
Zonulin is a protein that modulates intestinal barrier function and can also be considered as a potential inflammatory marker. Review other markers in conjunction to this result such as faecal calprotectin.
Zonulin release facilitates the opening of tight junctions between the cells of the intestinal lining to allow for passage of nutrients and fluids into the body. However, Zonulin release can be "overstimulated" by certain external factors to cause excessive opening of tight junctions, leading to intestinal hyperpermeability or "leaky gut", inflammation, liver overload, nutrient deficiencies, rheumatoid arthritis and autoimmune disorders.
Identify the possible cause/s (Gut microorganism imbalance or the presence of dietary Gluten/gliadin) and remove to reduce further damage.

beta-GLUCORONIDASE NORMAL:
B-Glucuronidase is considered normal and is within reference range.

ELEVATED STEATOCRIT:
The presence of steatorrhea is an indirect indicator of incomplete fat digestion. Consider high dietary fat intake, cholestasis, malabsorption and digestion (diarrhoea, pancreatic or bile salt insufficiency), intestinal dysbiosis, parasites, NSAIDs use, short bowel syndrome, whipple disease, crohn's disease, food allergies & sensitivities.
Treatment:
o Prebiotic and probiotic supplementation
o Supplement hydrochloride, digestive enzymes or other digestive aids
o Investigate underlying causes
o Investigate food sensitivities and allergies
o Remove potential irritants
o Review markers such as pancreatic elastase 1 and calprotectin

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Parasites/Worms Comment

ELEVATED BLASTOCYSTIS HOMINIS LEVEL:
Blastocystis hominis may be the cause of persistent, mild diarrhoea. Although considered endemic, it may also be associated with recent overseas travel. Detection suggests the ingestion of contaminated material or contact with farm animals. Continued symptoms may require further testing for the detection of bacterial, viral and/or parasitic co-pathogens.

TREATMENT SUGGESTIONS:
Mild symptoms are self-limiting.
If treatment is warranted, metronidazole 400 - 750mg (child 12-17mg/kg up to 750mg) three times daily for at least 10 days.
Lower dosages are usually associated with treatment failure.
Paromomycin has also shown to be effective as an alternative treatment option.
Rule out allergy to above medication before prescribing/taking. Consult ID specialist if patient is showing severe symptoms or immunocompromised.

ELEVATED DIENTAMOEBA FRAGILIS LEVEL:
Dientamoeba fragilis appears to be extremely common and may have a cosmopolitan distribution, although there are large variations in prevalence. Dientamoeba fragilis has been linked to intestinal symptoms, especially in children. The most common symptoms associated with this organism are abdominal pain, intermittent diarrhoea, bloating and anorexia.

TREATMENT SUGGESTIONS:
Mild symptoms are self-limiting.
If treatment is warranted, metronidazole for 10 days or a single 2g dose of Tinidazole may be used. Tetracycline has also proven effective in adults.
Rule out allergy to above medication before prescribing/taking. Consult ID specialist if patient is showing severe symptoms or immunocompromised.

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Opportunistic Bacteria Comment

BACILLUS SPECIES ELEVATED:

PHYLUM: Firmicutes

DESCRIPTION:
Bacillus species are spore forming, gram-positive rods belonging to the Bacillaceae family. The majority of Bacillus species have little or no pathogenicity. However, some species, particularly Bacillus cereus and licheniformis, have been implicated in food poisoning and opportunistic infections, which may be characterised by abdominal pain with diarrhea or nausea and vomiting and transmitted via ingestion of contaminated food.

TREATMENT SUGGESTIONS:
Infection is usually self-limited and does not require any targeted therapy. In severe cases or immunocompromised, treatment with vancomycin, gentamicin, chloramphenicol, or carbapenems should be considered. Rule out allergy to above medication before prescribing/taking.

PSEUDOMONAS AERUGINOSA ELEVATED:

PHYLUM: Proteobacteria

DESCRIPTION:
Pseudomonas aeruginosa is a gram-negative, aerobic, non-spore forming bacteria that can cause a variety of infections in both immunocompetent and immunocompromised hosts. It is commonly found in the environment, particularly in freshwater, hot tubs, and swimming pools. Chronic gastrointestinal colonization is acknowledged to be an important component of P. aeruginosa diarrheal disease and systemic infections. Since disruption of the normal flora by antibiotics can reduce colonization resistance and promote pathologic colonization with P. aeruginosa, enterocolitis due to P. aeruginosa may also be considered to be an antibiotic-associated gastroenteritis.

Pseudomonas aeruginosa in the gastrointestinal tract can cause inflammation, epithelial barrier dysfunction, tight cell junction interruption, and intestinal permeability.

TREATMENT SUGGESTIONS:
If treatment is warranted, Pseudomonas is usually susceptible to antipseudomonal penicillins, aminoglycosides, carbapenems, 3rd generation cephalosporins and gentamycin. Plant-derived anti-biofilm products identified against P. aeruginosa include alkaloids, organosulfur compounds, flavonoids, phenolic compounds and terpenoids. Rule out allergy to above medication before prescribing/taking.

STREPTOCOCCUS MUTANS ELEVATED:

PHYLUM: Firmicutes

DESCRIPTION:
Streptococcus mutans is a key bacterium primarily known for its role in the oral microbiome, where it significantly contributes to dental caries. It ferments dietary sugars to produce lactic acid, which lowers the pH in the mouth and demineralises tooth enamel, leading to cavities. Although S. mutans is primarily associated with the oral cavity, it can also influence gut health. The ingestion of S. mutans from the oral cavity can impact the gut microbiome, potentially contributing to an imbalance when oral hygiene is poor. Maintaining a balanced diet and good oral hygiene is crucial to manage S. mutans levels, reducing its impact on both oral and gut health.

STREPTOCOCCUS ORALIS ELEVATED:

PHYLUM: Firmicutes

DESCRIPTION:
Streptococcus oralis is a Gram-positive bacterium in the gut and oral microbiome, part of the Streptococcus mitis group. In the gut, S. oralis is part of the complex microbial community that supports digestive health. However, in immunocompromised individuals or those with disrupted microbiomes, S. oralis can become an opportunistic pathogen.

STREPTOCOCCUS SALIVARIUS ELEVATED:

PHYLUM: Firmicutes

DESCRIPTION:
Streptococcus salivarius is a Gram-positive bacterium primarily found in the oral and upper respiratory microbiomes but also present in the gut microbiome. It plays a protective role by producing bacteriocins (BLIS), which inhibit pathogens such as Streptococcus pyogenes. In the gut, S. salivarius contributes to maintaining a balanced microbial environment, supporting overall gut health and enhancing the immune system. Its ability to produce antimicrobial substances helps to prevent the overgrowth of harmful bacteria,

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promoting a healthy gut microbiome.

METHANOBREVIBACTER SMITHII ELEVATED:

PHYLUM: Euryarchaeota

DESCRIPTION:
Methanobrevibacter smithii is a methane-producing microbe that plays an important role in the gut ecosystem by facilitating carbohydrate fermentation and production of short-chain fatty acids by commensal bacteria. Elevated levels may be associated with abdominal bloating, constipation, flatulence, inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), colorectal cancer, diverticulosis or obesity and often correlate with a positive SIBO test.
Methanobrevibacter smithii has also been closely correlated with the presence of Blastocystis hominis.

TREATMENT SUGGESTIONS:
Elimination of methanogenic flora using antibiotic treatment may contribute to therapeutic benefits and include neomycin or rifaximin. Antimicrobial herbs may also be beneficial in treatment (including garlic and oregano). Rule out allergy to above medication before prescribing/taking.

DESULFOVIBRIO PIGER ELEVATED:

PHYLUM: Proteobacterium

DESCRIPTION:
Desulfovibrio piger is part of a group called sulfate-reducing bacteria (SRB) and are normal inhabitants of the intestine. Sulfate is present in different concentrations in the intestine dependent on diet. Remnants not absorbed, alongside the presence of lactate, promote the growth of SRB. Desulfovibrio Piger has been implicated in gastrointestinal disorders such as ulcerative colitis via the reduction of sulfate to hydrogen sulfide in the gut. High Delsulfovibrio piger levels may be associated with diarrhea or inflammatory bowel disease.

TREATMENT SUGGESTIONS:
Treatment options include lowering the intake of sulfate rich foods such as some breads, dried fruits, beers, ciders and wines. It is also suggested to avoid foods high in fat.

Potential Autoimmune Comments

FUSOBACTERIUM SPECIES ELEVATED:

PHYLUM: Fusobacteriota

DESCRIPTION:
Fusobacterium species are gram-negative bacteria and are common members of the human oral and faecal microbiome. It has been demonstrated to promote the release of intestinal inflammatory factors and disrupt the intestinal barrier function. As such F. nucleatum elevation may contribute to the etiology of some gastrointestinal disorders, such as appendicitis, colon cancer, and inflammatory bowel disease (IBD). It may also induce an increase in secretory IgA and a decrease in beneficial bacteria levels such as Lactobacillus. Review this level with faecal calprotectin.

TREATMENT SUGGESTIONS: If treatment is warranted, effective antibiotics may include metronidazole or erythromycin. The use of herbal antimicrobials (Tea polyphenols- green and black tea extracts and peppermint) and probiotic treatment may also be effective. Rule out allergy to above medication before prescribing/taking.

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Fungi/Yeasts Comment

CANDIDA ALBICANS ELEVATED:

PHYLUM: Ascomycota

DESCRIPTION:
Candida albicans is a genus of yeasts found in the environment and present in healthy persons colonizing the oropharyngeal, oesophageal, and gastrointestinal mucosa. Considered an opportunistic pathogen, C. albicans can cause superficial but also more severe systemic infections. Candidiasis is an opportunistic infection due to Candida, which can affect the oral cavity, vagina, penis, or gastrointestinal tract. Elevated Candida gastrointestinal colonization is associated with several diseases including Crohn's and inflammatory bowel disease as well as with antibiotic usage.

Other common symptoms include: Gas, bloating, constipation, nausea and skin conditions such as Eczema.

TREATMENT SUGGESTIONS: Dietary: Reduce intake of sugars, starches, and fungi.
Candida infections may be treated if warranted with antifungal medications such as nystatin, clotrimazole, amphotericin B or miconazole. Probiotic Lactobacillus treatment may also be effective. Rule out allergy to above medication before prescribing/taking.

Bacterial Pathogens Comment

HELICOBACTER PYLORI ELEVATED:

PHYLUM: Proteobacteria

DESCRIPTION:
Helicobacter pylori is a gram-negative bacterium found on the luminal surface of the gastric epithelium.
An elevated result indicates a current infection and is not affected by the presence of other organisms, antacids, barium sulphate, blood or fat. Please correlate infection clinically with signs and symptoms.
Treatment:
Triple therapy: PPI, clarithromycin and amoxicillin or metronidazole, 7-14 days.
If penicillin allergic: PPI, clarithromycin and clindamycin or metronidazole, 7-14 days.

If the patient is asymptomatic consider other alternative therapies including:
o Black currant seed oil and fish oil
o Lactobacillus Probiotics
o Vitamin C
o Mastic gum.

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Phyla Microbiota Comment

FIRMICUTES (PHYLUM) ELEVATED:

DESCRIPTION:
Firmicutes are a phylum of diverse bacteria which are primarily grouped into classes, Bacilli, Clostridia, Erysipelotrichia and Negativicutes. They are found in various environments, including the intestinal tract, and the group includes some notable pathogens. Firmicutes are involved in energy resorption in the gut microbiome and levels may be affected by diet. Elevated levels and disturbance of gastrointestinal microbiome balance, particularly Firmicutes/Bacteroidetes ratio, have been associated with inflammation, obesity, diabetes and with a high sugar/ fat diet.

TREATMENT SUGGESTIONS: Consider using Bifidobacterium or Saccharomyces containing probiotics. It may also be suggested to optimise the patient diet. A lower fat diet may help to normalize Firmicutes levels.

FIRMICUTES/BACTEROIDETES RATIO ELEVATED:
Elevated Firmicutes/Bacteroidetes ratio is frequently cited in the scientific literature as a hallmark of obesity, metabolic syndrome, irritable bowel syndrome or diabetes risk. The ratio may also be used to evaluate commensal microbial balance.

The calculation provided in this report is made by the sum of abundance of Firmucutes tested divided by the sum of abundance Bacteroidetes. Reference ranges are based off internal cohort studies.

Treatment:
Balance commensal bacteria using the 4R Protocol which is located at the end of this test report. When firmicutes are high, consider using Bifidobacterium probiotics and Saccharomyces boulardii primarily. Lactobacillus spp. and Bacillus spp. (found in probiotics) can elevate firmicutes. It is further suggested to optimize the patient diet. A lower fat diet may assist to normalize the F/B ratio.

VERRUCOMICROBIA (PHYLUM) ELEVATED:

DESCRIPTION:
Verrucomicrobia is a phylum of Gram-negative bacteria that contains only a few described species, found in the environment and gastrointestinal tract.
Akkermansia spp. is involved in gut membrane integrity and may be increased with polyphenols and prebiotics.

Verrucomicrobia aid in glucose homeostasis of the human gut and have anti-inflammatory properties that further aid in intestinal health.

TREATMENT SUGGESTIONS: Probiotic use and dietary modification use may assist in the rebalancing of microbial flora.

EURYARCHAEOTA (PHYLUM) ELEVATED:

DESCRIPTION:
Euryarchaeota are a phylum of a diverse range of bacteria, including methanogens, halophiles and sulfate-reducers. Three distinct species within the group of Euryarchaeota have been regularly detected within the human body. Among these is the primary colonizer of the human gut system Methanobrevibacter smithii and the less frequently found species Methanosphaera stadtmanae, while in the oral cavity M. oralis is the predominating methanogenic species. Methanogens support the growth of fermenting bacteria, which themselves could be either true pathogens or at least opportunistic pathogens but also members of the commensal flora.

They may also transform heavy metals or metalloids into volatile methylated derivatives which are known to be more toxic than the original compounds. Elevated Euryarchaeota may be associated with inflammatory bowel disease, Crohn's, irritable bowel syndrome, colorectal cancer, diverticulosis, and obesity. It may also affect short chain fatty acid production and absorption.

TREATMENT SUGGESTIONS: If treatment is warranted, Statins may be used to inhibit methanogenic archaea growth without affecting bacterial numbers. Symptoms may also be treated with dietary modification (low FODMAP) and probiotics.

A lactulose SIBO test may be considered to assess Methanogen levels.

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Normal Bacterial Flora Comment

BIFIDOBACTERIUM BREVE LOW:

PHYLUM: Actinobacteria

DESCRIPTION:
Bifidobacterium breve is a Gram-positive, anaerobic bacterium that is commonly found in the human gastrointestinal tract, particularly in the intestines of infants. B. breve is known for its ability to metabolise various carbohydrates, including human milk oligosaccharides, which is essential for the development of a healthy gut flora in newborns.
Studies demonstrate that B. breve exhibits several beneficial properties, including the production of short-chain fatty acids (SCFAs) such as acetate, which contribute to gut health by lowering pH and inhibiting the growth of pathogenic bacteria.
Additionally, B. breve may alleviate symptoms of irritable bowel syndrome (IBS) and improve symptoms of atopic dermatitis.

ESCHERICHIA SPECIES ELEVATED:

PHYLUM: Proteobacteria

DESCRIPTION:
Escherichia is a genus of Gram-negative, non-spore-forming, facultatively anaerobic, rod-shaped bacteria and normal inhabitants of the gastrointestinal tract. Species include E. albertii, E. fergusonii, E. hermannii, E. marmotae and most notably E. coli. High levels may be indicative of increased intestinal inflammatory activity and be associated with irritable bowel syndrome, Crohn's, ulcerative colitis and diarrhea. Studies have also revealed that chronic psychological stress may be associated with an increase in E.Coli colonisation.

TREATMENT SUGGESTIONS: Commensal probiotic cocktails are suggested to prevent and reverse gut elevated colonization.

LACTOBACILLUS ACIDOPHILUS LOW:

PHYLUM: Firmicutes

DESCRIPTION:
Lactobacillus acidophilus is a Gram-positive, rod-shaped, non-spore-forming bacterium commonly found in the human gut and fermented foods. It plays a key role in oxalate degradation, bowel normalisation and may assist patients with bloating.

TREATMENT SUGGESTIONS:
Consider probiotic supplementation containing L. acidophilus.

LACTOBACILLUS CASEI LOW:

PHYLUM: Firmicutes

DESCRIPTION:
Lactobacillus casei is a Gram-positive, rod-shaped, non-spore-forming, anaerobic probiotic bacterium involved in the fermentation of foods like cheese and yogurt. It produces antimicrobial substances, enhances gut barrier function, reduces pathogenic bacteria, and modulates the immune system. This bacterium is used to prevent and may assist various forms of diarrhea, including infectious diarrhea, traveller's diarrhea, and antibiotic-associated diarrhea.

TREATMENT SUGGESTIONS:
Consider probiotic supplementation containing L. casei and consuming fermented foods such as cheese and yogurt.

LACTOBACILLUS PLANTARUM LOW:

PHYLUM: Firmicutes

DESCRIPTION:
Lactobacillus plantarum is a Gram-positive, non-spore-forming, rod-shaped bacterium. L. plantarum plays a crucial role in gut health by enhancing intestinal barrier function, modulating the immune system, and inhibiting pathogenic bacteria. Additionally, it is beneficial for conditions such as irritable bowel syndrome, ulcerative colitis, and high cholesterol.

TREATMENT SUGGESTIONS:
Consider probiotic supplementation containing L. plantarum.

LACTOBACILLUS SALIVARIUS LOW:

PHYLUM: Firmicutes

DESCRIPTION:

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Lactobacillus salivarius is a Gram-positive, rod-shaped, non-spore-forming bacterium predominantly found in the human oral cavity, gastrointestinal tract, and vagina. It plays a significant role in maintaining oral and gut health by producing lactic acid and bacteriocins, which inhibit the growth of pathogenic bacteria. L. salivarius enhances gut barrier function, modulates the immune system, and helps in the digestion of proteins and complex carbohydrates. It has been studied for its potential benefits in managing conditions such as irritable bowel syndrome (IBS), periodontal disease, and atopic dermatitis, highlighting its importance in promoting overall health and preventing infections.

TREATMENT SUGGESTIONS:
Consider L. salivarius as a probiotic strain which may improve intestinal permeability and immune response.

CLOSTRIDIUM SPECIES ELEVATED:

PHYLUM: Firmicutes

DESCRIPTION:
Clostridium is a genus of anaerobic, Gram-positive bacteria found in the environment and the intestinal tract. This genus includes several species and can utilize large amounts of nutrients that cannot be digested by host and produce short-chain fatty acids (SCFAs), which play a noticeable role in intestinal homeostasis. Colonisation of Clostridium species may be affected by diet (carbohydrate and protein in diet) and general health and may be protective against inflammation and infection. However, some species may act as potential pathogens. Elevated Clostridium species may indirectly damage the intestinal epithelial cells. Another symptom may include constipation.

TREATMENT SUGGESTIONS: Treatment may involve the use of probiotics, treatment of any intestinal infections and dietary modification (reduce consumption of different fibres, such as inulin, oligofructose, arabinoxylan, guar gum and starch).

AKKERMANSIA MUCINIPHILA ELEVATED:

PHYLUM: Verrucomicrobia

DESCRIPTION:
Akkermansia muciniphila is a Gram-negative, strictly anaerobic, non-motile bacterium, often considered a human intestinal symbiont. There is growing evidence to suggest that the prevalence of this bacteria is associated with intestinal homeostasis, immunity, and a healthy gut. However, elevated colonisation may be associated with intestinal inflammation.

TREATMENT SUGGESTIONS: Treatment may involve the use of probiotics, treatment of any intestinal infections and dietary modification.

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The Four "R" Treatment Protocol

REMOVE	Using a course of antimicrobial, antibacterial, antiviral or anti parasitic therapies in cases where organisms are present. It may also be necessary to remove offending foods, gluten, or medication that may be acting as antagonists. Consider testing IgG96 foods as a tool for removing offending foods.	ANTIMICROBIAL	Oil of oregano, berberine, caprylic acid
		ANTIBACTERIAL	Liquorice, zinc carnosine, mastic gum, tribulus, berberine, black walnut, caprylic acid, oil of oregano
		ANTIFUNGAL	Oil of oregano, caprylic acid, berberine, black walnut
		ANTIPARASITIC	Artemesia, black walnut, berberine, oil of oregano
		ANTIVIRAL	Cat's claw, berberine, echinacea, vitamin C, vitamin D3, zinc, reishi mushrooms
		BIOFILM	Oil of oregano, protease
REPLACE	In cases of maldigestion or malabsorption, it may be necessary to restore proper digestion by supplementing with digestive enzymes.	DIGESTIVE SUPPORT	Betaine hydrochloride, tilactase, amylase, lipase, protease, apple cider vinegar, herbal bitters
REINOCULATE	Recolonisation with healthy, beneficial bacteria. Supplementation with probiotics, along with the use of prebiotics helps re-establish the proper microbial balance.	PREBIOTICS	Slippery elm, pectin, larch arabinogalactans
		PROBIOTICS	Bifidobacterium animalis sup lactise, lactobacillus acidophilus, lactobacillus plantarum, lactobacillus casei, bifidobacterium breve, bifidobacterium bifidum, bifidobacterium longum, lactobacillus salivarius ssp salivarius, lactobacillus paracasei, lactobacillus rhamnosus, Saccaromyces boulardii
REPAIR & REBALANCE	Restore the integrity of the gut mucosa by giving support to healthy mucosal cells, as well as immune support. Address whole body health and lifestyle factors so as to prevent future GI dysfunction.	INTESTINAL MUCOSA IMMUNE SUPPORT	Saccaromyces boulardii, lauric acid
		INTESTINAL BARRIER REPAIR	L-Glutamine, aloe vera, liquorice, marshmallow root, okra, quercetin, slippery elm, zinc carnosine, Saccaromyces boulardii, omega 3 essential fatty acids, B vitamins
		SUPPORT CONSIDERATION	Sleep, diet, exercise, and stress management