

P: 1300 688 522  
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16 HARKER STREET  
BURWOOD VIC 3125

Dr.SAMPLE REPORT  
TEST HEALTH CENTRE  
123 TEST STREET  
BURWOOD VIC 3125






LAB ID : 3814049  
UR NO. :  
Collection Date : 01-JUL-2023  
Received Date: 01-JUL-2023










## Complete Microbiome Mapping Advanced

### General Macroscopic Description

	Result	Markers
Stool Colour	<b>Brown</b>	<b>Colour</b> - Brown is the colour of normal stool. Other colours may indicate abnormal gut health.
Stool Form	<b>Formed</b>	<b>Form</b> -Sample form is categorised using the Bristol stool chart. A comment on stool appearance can be found in the comments section.
Mucous	<b>Not Detected</b>	<b>Mucous</b> - Mucous production may indicate the presence of an infection and/or inflammation.
Occult Blood	<b>POSITIVE</b>	<b>Blood (Macro)</b> - 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	Result	Range	Units	
Short Chain Fatty Acids, Beneficial	17.0	> 13.6	umol/g	
Butyrate	16.0	10.8 - 33.5	%	
Acetate	56.0	44.5 - 72.4	%	
Propionate	27.0	0.0 - 32.0	%	
Valerate	1.0	0.5 - 7.0	%	

GIT Functional Markers	Result	Range	Units	
Calprotectin.	<b>90.0 *H</b>	0.0 - 50.0	ug/g	
Pancreatic Elastase	341.0	> 200.0	ug/g	
Secretory (slgA)	572.0	510.0 - 2010.0	ug/g	
Zonulin	101.0	0.0 - 107.0	ng/g	
Beta glucuronidase	4102.0	337.0 - 4433.0	U/g	
Steatocrit	9.0	0.0 - 15.0	%	
a-Transglutaminase IgA	30.0	0.0 - 100.0	units/L	

### Microbiome Mapping Summary

**Parasites & Worms**

Blastocystis hominis.  
Entamoeba coli.

**Bacteria & Viruses**

Streptococcus species  
Desulfovibrio piger  
Citrobacter freundii

**Fungi and Yeasts**

Candida species.

**Firmicutes:Bacteroidetes Ratio** **1.84 \*H** < 1.00 RATIO 

Relative Commensal Abundance of the 6 Phyla groups can be found on page 4 of this report



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### Parasites and Worms.

#### Parasitic Organisms

Organism	Result	Range	Units	Visual
Cryptosporidium species	<dl	< 1.0	x10 <sup>6</sup> org/g	●
Entamoeba histolytica.	<dl	< 1.0	x10 <sup>4</sup> org/g	●
Giardia intestinalis	<dl	< 1.0	x10 <sup>3</sup> org/g	●
Blastocystis hominis.	181.5 *H	< 1.0	x10 <sup>3</sup> org/g	●
Dientamoeba fragilis.	<dl	< 1.0	x10 <sup>5</sup> org/g	●
Endolimax nana	<dl	< 1.0	x10 <sup>4</sup> org/g	●
Entamoeba coli.	12.9 *H	< 5.0	x10 <sup>6</sup> org/g	●
Pentatrichomonas hominis	<dl	< 1.0	x10 <sup>2</sup> org/g	●

#### Worms

Ascaris lumbricoides, Roundworm	Not Detected	Necator americanus, Hookworm	Not Detected
Trichuris trichiura, Whipworm	Not Detected	Enterobius vermicularis, Pinworm	Not Detected
Enterocytozoon spp	Not Detected	Hymenolepis spp, Tapeworm	Not Detected
Strongyloides spp, Roundworm	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

Bacterium	Result	Range	Units	Visual
Bacillus species.	0.70	< 1.00	x10 <sup>5</sup> CFU/g	●
Enterococcus faecalis	0.30	< 1.00	x10 <sup>4</sup> CFU/g	●
Enterococcus faecium	0.55	< 1.00	x10 <sup>4</sup> CFU/g	●
Morganella species	<dl	< 1.00	x10 <sup>3</sup> CFU/g	●
Pseudomonas species	<dl	< 1.00	x10 <sup>4</sup> CFU/g	●
Pseudomonas aeruginosa.	<dl	< 3.00	x10 <sup>2</sup> CFU/g	●
Staphylococcus species	<dl	< 1.00	x10 <sup>4</sup> CFU/g	●
Staphylococcus aureus	<dl	< 5.00	x10 <sup>2</sup> CFU/g	●
Streptococcus species	3.85 *H	< 3.00	x10 <sup>3</sup> CFU/g	●
Methanobrevibacter smithii	4.00	< 5.00	x10 <sup>9</sup> CFU/g	●
Desulfovibrio piger	84.22 *H	< 18.00	x10 <sup>7</sup> CFU/g	●
Enterobacter complex.	<dl	< 1.00	x10 <sup>6</sup> CFU/g	●

#### Potential Autoimmune Triggers

Citrobacter species.	<dl	< 5.00	x10 <sup>5</sup> CFU/g	●
Citrobacter freundii.	6.87 *H	< 5.00	x10 <sup>5</sup> CFU/g	●
Klebsiella species	<dl	< 5.00	x10 <sup>3</sup> CFU/g	●
Klebsiella pneumoniae.	<dl	< 5.00	x10 <sup>4</sup> CFU/g	●
Prevotella copri	<dl	< 1.00	x10 <sup>7</sup> CFU/g	●
Proteus species	<dl	< 5.00	x10 <sup>4</sup> CFU/g	●
Proteus mirabilis.	<dl	< 1.00	x10 <sup>3</sup> CFU/g	●
Fusobacterium species	0.20	< 10.00	x10 <sup>7</sup> CFU/g	●

### Fungi & Yeast

Fungus	Result	Range	Units	Visual
Candida species.	5.58 *H	< 5.00	x10 <sup>3</sup> CFU/g	●
Candida albicans.	<dl	< 5.00	x10 <sup>2</sup> CFU/g	●
Geotrichum species.	<dl	< 3.00	x10 <sup>2</sup> CFU/g	●
Saccharomyces cerevisiae.	<dl	< 3.00	x10 <sup>3</sup> CFU/g	●
Rhodotorula species.	<dl	< 1.00	x10 <sup>3</sup> CFU/g	●

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Bacterial Pathogens	Result	Range	Units	
Aeromonas hydrophila.	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Campylobacter species.	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
C. difficile, Toxin A	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
C. difficile, Toxin B	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Enterohemorrhagic E. coli	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Enteroinvasive E. coli/Shigella	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Enterotoxigenic E. coli LT/ST	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Shiga-like Toxin E. coli stx1	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Shiga-like Toxin E. coli stx2	<dl	< 1.00	x10 <sup>3</sup> CFU/g	
Salmonella species.	<dl	< 1.00	x10 <sup>4</sup> CFU/g	
Vibrio species.	<dl	< 1.00	x10 <sup>5</sup> CFU/g	
Yersinia species.	<dl	< 1.00	x10 <sup>5</sup> CFU/g	
Helicobacter pylori	<dl	< 1.0	x10 <sup>3</sup> CFU/g	

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

H.pylori Virulence Factor, babA	Not Detected	H.pylori Virulence Factor, cagA	Not Detected
H.pylori Virulence Factor, dupA	Not Detected	H.pylori Virulence Factor, iceA	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		

Normal Bacterial GUT Flora	Result	Range	Units	
Bacteroides fragilis	35.0	1.6 - 250.0	x10 <sup>9</sup> CFU/g	
Bifidobacterium species	254.1	> 6.7	x10 <sup>7</sup> CFU/g	
Bifidobacterium longum	6.1	> 5.2	x10 <sup>6</sup> CFU/g	
Enterococcus species	40.1	1.9 - 2000.0	x10 <sup>5</sup> CFU/g	
Escherichia species	3705.0	3.7 - 3800.0	x10 <sup>6</sup> CFU/g	
Lactobacillus species	6102.0	8.6 - 6200.0	x10 <sup>5</sup> CFU/g	
Lactobacillus Rhamnosus	25.0	8.3 - 885.0	x10 <sup>4</sup> CFU/g	
Clostridium species	99.0 *H	5.0 - 50.0	x10 <sup>6</sup> CFU/g	
Oxalobacter formigenes	17.00	> 15.00	x10 <sup>7</sup> CFU/g	
Akkermansia muciniphila	<dl *L	1.00 - 50.00	x10 <sup>3</sup> CFU/g	
Faecalibacterium prausnitzii	1084.9	200.0 - 3500.0	x10 <sup>3</sup> CFU/g	

**Methodology:**

GIT Functional markers performed by GCMS,EIA,FEIA.

Bacteriology,Virology,Fungi,Parasites & Worms performed by PCR,qPCR and 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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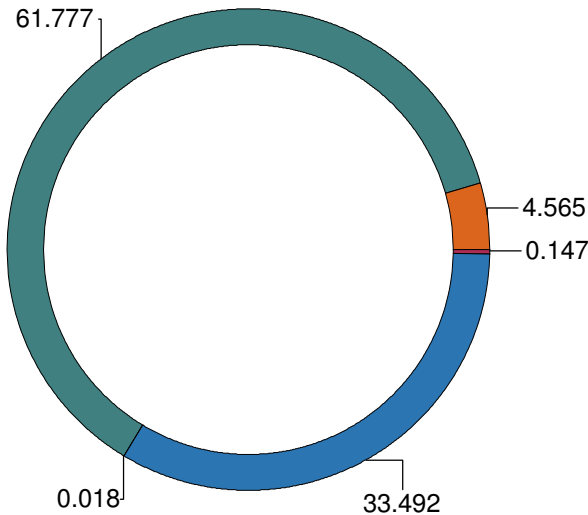
3814049

**Introduction:**

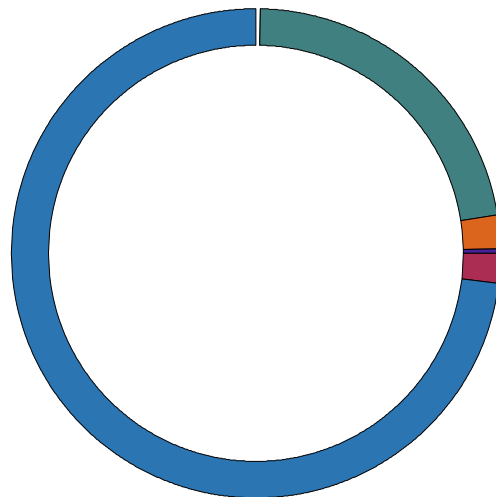
Your gut microbiome is a collective name for the 40 trillion cells and up to 1000 microbial species that include bacteria, viruses, fungi, parasites, and archaea and reside in our gut. The number of gut bacterial cells is approximately equal to the total number of human cells in our body, so if we consider 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	61.777 *H	3.500 - 40.000	%
 Bacteroidetes Phylum	33.492 *L	50.000 - 95.000	%
 Proteobacteria Phylum	4.565	0.500 - 12.500	%
 Actinobacteria Phylum	0.147	0.001 - 4.818	%
 Euryarchaeota Phylum	0.018	0.000 - 0.177	%
 Verrucomicrobia Phylum	0.000	0.000 - 2.400	%

**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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### ANTIBIOTIC SENSITIVITIES and NATURAL INHIBITORS

**Citrobacter freundii**

**Antibiotics**

Susceptible

Amoxicillin	N/A
Ampicillin	R
Augmentin	S
Ciprofloxacin	S
Norfloxacin	S
Meropenem	S
Cefazolin	N/A
Gentamycin.	S
Trimethoprim/Sulpha	S
Erythromycin	S
Penicillin.	N/A

LEGEND

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

Inhibition %

Berberine	60%
Black Walnut	40%
Caprylic Acid	100%
Citrus Seed	60%
Coptis	40%
Garlic-	60%
Golden seal	20%
Oregano	20%

LEGEND

Low Inhibition		High Inhibition			
0	20	40	60	80	100

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### YEAST - SENSITIVITIES and NATURAL ANTIFUNGALS

**Candida species**

**Antifungals**

Inhibition

Fluconazole	1.0=S
Voriconazole	<=0.12=S
Itraconazole	

**INHIBITION CATEGORY**

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

**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:

#### Macroscopy Comment

BROWN coloured stool is considered normal in appearance.

Faecal Occult Blood Negative:

Faecal occult blood has not been detected in this specimen. If the test result is negative and clinical symptoms persist, additional follow-up testing using other clinical methods is recommended.

#### 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 muciniphila*, *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.

### SCFA PRODUCTION TABLE

BACTERIA	BUTYRATE	PROPIONATE	ACETATE
<i>Akkermansia muciniphila</i>		▲▲▲	▲▲
<i>Anaerostipes caccae</i>	▲▲▲		
<i>Bacteroides</i> spp.		▲▲▲	
<i>Bifidobacterium</i> spp.		▲	▲▲▲
<i>Blautia obeum</i>		▲▲	▲▲▲
<i>Coprococcus eutactus</i>	▲		
<i>Escherichia coli</i>			▲
<i>Eubacterium rectale</i>	▲▲		
<i>Faecalibacterium prausnitzii</i>	▲▲▲		
<i>Lactobacillus</i> spp.	▲	▲	▲
<i>Roseburia homini</i>	▲▲		
<i>Ruminococcus bromii</i>	▲		▲
<i>Subdoligranulum variable</i>	▲		

**KEY**

- ▲ Low Producers
- ▲▲ Moderate Producers
- ▲▲▲ High Producers

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## **GIT Markers Comment**

**PANCREATIC ELASTASE: MILD TO MODERATE INSUFFICIENCY.**

Pancreatic insufficiency reflects trypsin, chymotrypsin, amylase and lipase activity.

PE1 is also useful in monitoring exocrine pancreatic function caused by: Chronic pancreatitis, Autoimmunopathies & connective tissue diseases, Chronic inflammatory bowel disease, Intestinal malabsorption with mucosal atrophy.

Treatment:

- Digestive enzyme supplementation
- A low-fat diet to control steatorrhea (excess fat in stools)
- Vitamin and mineral supplementation
- Investigate underlying causes for reduced pancreatic function (for eg. Coeliac disease, duodenal enteropathy, pancreatitis).

**CALPROTECTIN Normal:**

Faecal calprotectin values <50 ug/g are not indicative of inflammation in the gastrointestinal tract. Subjects with low faecal calprotectin levels normally do not need to be further investigated by invasive procedures. In patients with strong clinical indications of intestinal inflammation, repeat testing may be useful.

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.

**ZONULIN NORMAL:**

Zonulin is a protein that modulates intestinal barrier function. This results is considered normal.

**BETA-GLUCURONIDASE NORMAL:**

B-Glucuronidase is considered normal and is within reference range.

## **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 ENTAMOEBIA COLI LEVEL:**

Entamoeba Coli is generally considered non-pathogenic protozoa and infestation often remains asymptomatic. However, some patients may show gastrointestinal symptoms such as loose stools, colicky abdominal pain, and flatulence. High infection levels may also be associated with gastritis, indigestion, dyspepsia, or hyperacidity. It is transmitted through faecal-oral route. Typically, mature cysts are ingested from contaminated water and food sources.

**TREATMENT SUGGESTIONS:**

If the patient is symptomatic and no other organism or causes are found, treatment may be indicated. If treatment is warranted, diloxanide furoate 500 milligrams three times daily for ten days or Metronidazole 400 mg orally three times a day may be used. 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

STREPTOCOCCUS SPECIES ELEVATED:

PHYLUM: Firmicutes

DESCRIPTION:

Streptococcal species are a genus of gram-positive cocci which are normally diverse in the intestinal microbial community. Streptococcus spp. are involved in the fermentation of sugars, yielding lactic acid as their predominant fermentation end product. Elevated gut streptococci may be associated with diseases such as inflammatory bowel disease, liver cirrhosis or hypertension.

Higher levels in the intestine may result from low stomach acid, PPI use, reduced digestive capacity, SIBO or constipation; Elevated levels may also be indicative of intestinal inflammatory activity, and may cause loose stools.

TREATMENT SUGGESTIONS:

Treatment of streptococcus in gut flora is not always recommended. A practitioner may take into consideration a range of patient factors and symptoms. The 4R treatment protocol at the end of this report may be considered.

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 Desulfovibrio 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.

CITROBACTER FREUNDII ELEVATED:

PHYLUM: Proteobacteria

DESCRIPTION:

Citrobacter freundii is a species of facultative anaerobic Gram-negative predominantly soil-dwelling bacteria, but can also be found in water, sewage, food, and the intestinal tract. Citrobacter freundii is an emerging opportunistic pathogen and elevation may be a cause of nosocomial infections, diarrheal infections and has increasingly become multidrug resistant (MDR).

TREATMENT SUGGESTIONS:

A practitioner may take into consideration a range of patient factors and symptoms to determine if treatment is necessary. Citrobacter freundii infection is usually treated with antibiotics like fluoroquinolones, carbapenems and cephalosporins. The treatment plan depends up on the vulnerability of the microbe to the antibiotics and the degree of infection. Treatments may also include herbal antimicrobials and/or probiotics. Rule out allergy to above medication before prescribing/taking.

### Fungi/Yeasts Comment

CANDIDA SPECIES ELEVATED:

PHYLUM: Ascomycota

DESCRIPTION:

Candida is a genus of yeasts found in the environment and present in healthy persons colonizing the oropharyngeal, oesophageal and gastrointestinal mucosa. Most species are considered normal flora, however, they can behave as opportunistic pathogens. Candidiasis is an opportunistic infection due to Candida, which can affect the oral cavity, vagina, penis, or gastrointestinal tract. Elevated Candida colonization is associated with several diseases of the gastrointestinal tract including Ulcerative colitis, Crohn's and Gastric Ulcers 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.



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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 Firmicutes 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.

### Normal Bacterial Flora Comment

BIFIDOBACTERIUM SPECIES LOW NORMAL:

PHYLUM: Actinobacteria

**DESCRIPTION:**

Bifidobacterium is a genus of gram-positive, nonmotile anaerobic bacteria that are ubiquitous inhabitants of the gastrointestinal tract and considered a probiotic. Bifidobacterium species prevent diarrhea and intestinal infections, alleviate constipation, and stimulate the immune system. Whilst, the Bifidobacterium species level is in range, it is below the average mean.

Lower levels may result from low fibre intake or reduced mucosal health. Additionally, Lower levels may be associated with irritable bowel syndrome or with pathogenic bacteria infection.

**TREATMENT SUGGESTIONS:** Treatment may involve the use of Bifidobacterium containing probiotics and treatment of any intestinal infections.

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 LOW:

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. Decreased colonisation levels may be associated with obesity, type 2 diabetes, and inflammation.

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



# The Four “R” Treatment Protocol

<b>REMOVE</b>	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, zincarnosine, 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
<b>REPLACE</b>	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
<b>REINOCULATE</b>	Recolonisation with healthy, beneficial bacteria. Supplementation with probiotics, along with the use of prebiotics helps re-establish the proper microbial balance.	PREBIOTICS	Sippery elm, pectin, larch arabinogalactans
		PROBIOTICS	Bifidobacterium animalis subsp lactise, lactobacillus acidophilus, lactobacillus plantarum, lactobacillus casei, bifidobacterium breve, bifidobacterium bifidum, bifidobacterium longum, lactobacillus salivarius subsp salivarius, lactobacillus paracasei, lactobacillus rhamnosus, Saccaromyces boulardii
<b>REPAIR &amp; REBALANCE</b>	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, zincarnosine, Saccaromyces boulardii, omega 3 essential fatty acids, B vitamins
		SUPPORT CONSIDERATION	Seep, diet, exercise, and stress management