



## COMPLETE MICROBIOME MAPPING

### General Macroscopic Description

	Result	Range	Markers
Stool Colour	<b>Brown</b>		<b>Colour</b> - Brown is the colour of normal stool. Other colours may indicate abnormal GIT conditions.
Stool Form	<b>Unformed</b>		<b>Form</b> -A formed stool is considered normal. Variations to this may indicate abnormal GIT conditions.
Mucous	<b>NEG</b>	< +	<b>Mucous</b> - Mucous production may indicate the presence of an infection, inflammation or malignancy.
Occult Blood	<b>NEG</b>	< +	<b>Blood (Macro)</b> - The presence of blood in the stool may indicate possible GIT ulcer, and must always be investigated immediately.

GIT Functional Markers	Result	Range	Units	
Calprotectin.	26.0	0.0 - 50.0	ug/g	
Pancreatic Elastase	>500.0	> 200.0	ug/g	
Faecal Secretory IgA	711.5	510.0 - 2010.0	ug/g	
Faecal Zonulin	116.0 *H	0.0 - 107.0	ng/g	
Faecal B-Glucuronidase	1100.7	337.0 - 4433.0	U/g	
Steatocrit	1.0	0.0 - 15.0	%	
anti-Gliadin IgA	<20	0.0 - 100.0	units/L	

### Microbiome Mapping Summary

#### Parasites & Worms

#### Bacteria & Viruses

Enterococcus faecalis  
Streptococcus species  
Methanobacteriaceae  
Citrobacter freundii.

#### Fungi and Yeasts

Geotrichum species.

#### Key Phyla Microbiota

Bacteroidetes	14.10	8.61 - 33.10	x10 <sup>11</sup> org/g	
Firmicutes	43.60 *H	5.70 - 30.40	x10 <sup>10</sup> org/g	
Firmicutes:Bacteroidetes Ratio	0.31	< 1.00	RATIO	

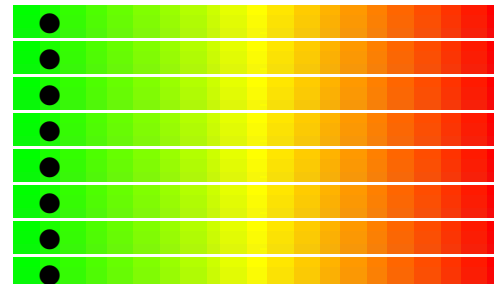




Parasites and Worms.	Result	Range	Units
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**Parasitic Organisms**

Cryptosporidium.	<dl	< 1.0	x10 <sup>6</sup> org/g
Entamoeba histolytica.	<dl	< 1.0	x10 <sup>4</sup> org/g
Giardia lamblia.	<dl	< 5.0	x10 <sup>3</sup> org/g
Blastocystis hominis.	<dl	< 2.0	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.	<dl	< 5.0	x10 <sup>6</sup> org/g
Pentatrichomonas hominis	<dl	< 1.0	x10 <sup>2</sup> org/g



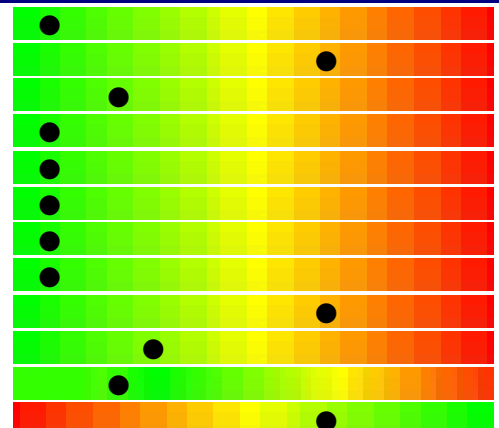
**Worms**

Ancylostoma duodenale, Roundworm	Not Detected
Ascaris lumbricoides, Roundworm	Not Detected
Necator americanus, Hookworm	Not Detected
Trichuris trichiura, Whipworm	Not Detected
Taenia species, Tapeworm	Not Detected
Enterobius vermicularis, Pinworm	Not Detected

Comment: Not Detected results indicate the absence of detectable DNA in this sample for the worms reported.

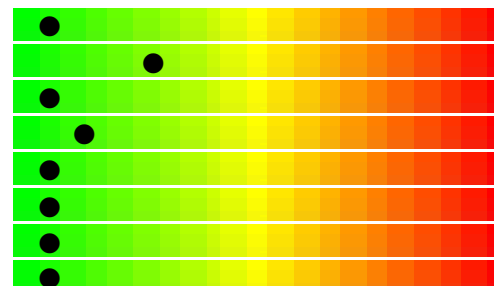
Opportunistic Bacteria/Overgr	Result	Range	Units
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Bacillus species.	<dl	< 1.5	x10 <sup>5</sup> org/g
Enterococcus faecalis	9.9 *H	< 1.0	x10 <sup>4</sup> org/g
Enterococcus faecium	0.9	< 1.0	x10 <sup>4</sup> org/g
Morganella species	<dl	< 1.0	x10 <sup>3</sup> org/g
Pseudomonas species	<dl	< 1.0	x10 <sup>4</sup> org/g
Pseudomonas aeruginosa.	<dl	< 5.0	x10 <sup>2</sup> org/g
Staphylococcus species	<dl	< 1.0	x10 <sup>4</sup> org/g
Staphylococcus aureus	<dl	< 5.0	x10 <sup>2</sup> org/g
Streptococcus species	12.3 *H	< 1.0	x10 <sup>3</sup> org/g
Methanobacteriaceae	7.74 *H	< 5.00	x10 <sup>9</sup> org/g
Desulfovibrio piger	<dl	0.0 - 18.0	x10 <sup>7</sup> org/g
Oxalobacter formigenes	135.1	> 15.0	x10 <sup>7</sup> org/g



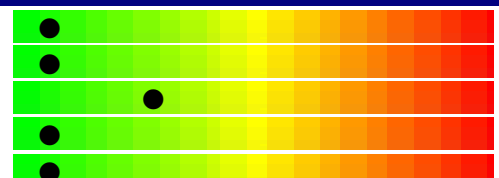
**Potential Autoimmune Triggers**

Citrobacter species.	<dl	< 5.0	x10 <sup>5</sup> org/g
Citrobacter freundii.	5.2 *H	< 5.0	x10 <sup>5</sup> org/g
Klebsiella species	<dl	< 5.0	x10 <sup>3</sup> org/g
Klebsiella pneumoniae.	2.4	< 5.0	x10 <sup>4</sup> org/g
Prevotella copri	<dl	< 1.0	x10 <sup>7</sup> org/g
Proteus species	<dl	< 5.0	x10 <sup>4</sup> org/g
Proteus mirabilis.	<dl	< 1.0	x10 <sup>3</sup> org/g
Fusobacterium species	1.12	< 10.00	x10 <sup>7</sup> org/g



Fungi & Yeast	Result	Range	Units
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Candida species.	<dl	< 5.0	x10 <sup>3</sup> org/g
Candida albicans.	<dl	< 5.0	x10 <sup>2</sup> org/g
Geotrichum species.	3.1 *H	< 3.0	x10 <sup>2</sup> org/g
Microsporidium species	<dl	< 5.0	x10 <sup>3</sup> org/g
Rhodotorula species.	<dl	< 1.0	x10 <sup>3</sup> org/g





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Bacterial Pathogens	Result	Range	Units	
Aeromonas species.	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Campylobacter.	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
C. difficile, Toxin A	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
C. difficile, Toxin B	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Enterohemorrhagic E. coli	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
E. coli O157	<dl	< 1.0	x10 <sup>2</sup> CFU/g	●
Enteroinvasive E. coli/Shigella	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Enterotoxigenic E. coli LT/ST	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Shiga-like Toxin E. coli stx1	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Shiga-like Toxin E. coli stx2	<dl	< 1.0	x10 <sup>3</sup> CFU/g	●
Salmonella.	<dl	< 1.0	x10 <sup>4</sup> CFU/g	●
Vibrio cholerae	<dl	< 1.0	x10 <sup>5</sup> CFU/g	●
Yersinia enterocolitica.	<dl	< 1.0	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	<dl	< 1.0	x10 <sup>10</sup> CFU/g	●
Norovirus GI/II	<dl	< 1.0	x10 <sup>7</sup> CFU/g	●
Bocavirus	<dl	< 1.0	x10 <sup>10</sup> CFU/g	●

Normal Bacterial GUT Flora	Result	Range	Units	
Bacteroides fragilis	6.3	1.6 - 250.0	x10 <sup>9</sup> CFU/g	●
Bifidobacterium species	390.1	> 6.7	x10 <sup>7</sup> CFU/g	●
Bifidobacterium longum	354.6	> 5.2	x10 <sup>6</sup> CFU/g	●
Enterococcus species	67.2	1.9 - 2000.0	x10 <sup>5</sup> CFU/g	●
Escherichia species	57.9	3.7 - 3800.0	x10 <sup>6</sup> CFU/g	●
Lactobacillus species	300.0	8.6 - 6200.0	x10 <sup>5</sup> CFU/g	●
Lactobacillus Rhamnosus	11.0	8.3 - 885.0	x10 <sup>4</sup> CFU/g	●
Clostridium species	43.5	5.0 - 50.0	x10 <sup>6</sup> CFU/g	●
Enterobacter species	2.7	1.0 - 50.0	x10 <sup>6</sup> CFU/g	●
Akkermansia muciniphila	5.80	0.01 - 50.00	x10 <sup>3</sup> CFU/g	●
Faecalibacterium prausnitzii	1183.4	1.0 - 500000	x10 <sup>3</sup> CFU/g	●

Short Chain Fatty Acids	Result	Range	Units	
Short Chain Fatty Acids, Beneficial	61.9	> 13.6	umol/g	●
Butyrate	23.8	10.8 - 33.5	%	●
Acetate	57.2	44.5 - 72.4	%	●
Propionate	17.8	0.0 - 32.0	%	●
Valerate	1.2	0.5 - 7.0	%	●



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**NICOLA TEO**  
**22-Feb-1995**      **Female**

2/55 SIR THOMAS MITCHELL ROAD  
BONDI BEACH NSW 26

LAB ID : 3818434  
UR NO. : 6607790  
Collection Date : 25-May-2022  
Received Date:27-May-2022



3818434

## Pathogen Summary:

### 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 CDSA markers such as pH, pancreatic elastase 1 & microbiology markers."

### Metabolism Comment

In a healthy gut Short Chain Fatty Acids are exhibited in the following proportions;

Butyrate, Acetate, Propionate ( 16% : 60% : 24% )

VALERATE:

Valerate is a short chain fatty acid that is important for gut health. Although Acetate, propionate, and butyrate make up the the most abundant SCFAs in gastrointestinal tract (95%), Valerate and other SCFA's make up the remaining and work optimally when within range.



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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 produce on average 500 ug/g of PE-1. Thus, levels below 500 ug/g and above 200 ug/g suggest a deviation from optimal pancreatic function.

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.

**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.

**FAECAL SECRETORY IgA:**

Production of sIgA is important to the normal function of the gastrointestinal mucosa as an immune barrier.

It represents the first line immune defense of the GIT.

Elevated levels are associated with an upregulated immune response.

**ELEVATED ZONULIN LEVELS:**

Zonulin is a protein that modulates intestinal barrier function. 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.

If it's gluten for gluten sensitivity or celiac disease, remove gluten.

If bacterial overgrowth or dysbiosis, treat the bacterial overgrowth.

**Treatment:**

Firstly, fix the gut. Treat/repair the gut before proceeding with other protocols; nutrients and other supplements can be damaging to the system if they get out of the gut

Follow a grain - free diet for at least 12 months.

Eliminate gluten, sugar, processed food, artificial flavorings, colors, trans fats.

**Supplementation:**

Caprylic acid, Probiotics, acidophylis and B complex, fish oil, Magnesium D3, CoQ10, Mg Citrate, Boswellia & Curcumin, Milk Thistle, Selenium

For patients with chronic digestive issue: Vitamin A, L-Glutamine, Probiotics

**Further investigations to consider:**

- SIBO Breath Test,
- IgG or IgA 96 Food Sensitivity



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## Opportunistic Bacteria Comment

### ELEVATED ENTEROCOCCUS FAECALIS LEVEL:

Enterococcus faecalis is a gram-positive bacterium that can cause a variety of infections of which urinary tract infections are the most common. These infections can be exceptionally difficult to treat because of drug resistance of many E. faecalis isolates.

#### Sources:

E. faecalis infections spread from person to person through poor hygiene. Because these bacteria are found in faeces, people can transmit the infection if they don't wash their hands after using the bathroom. The bacteria can get into food or onto common touched surfaces.

#### Treatment:

Enterococcus faecalis is challenging to treat due to its drug-resistant mechanisms. However, Ampicillin is the preferred antibiotic used to treat E. faecalis infections. For further treatment information, refer to the 4R treatment protocol located at the end of this report.

### STREPTOCOCCUS SPECIES:

#### Description:

Streptococcus is a gram-positive bacteria in the Firmicutes phylum. Streptococcus is generally a common isolate from gut flora. However, emerging research suggests that high 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.

#### Sources:

Recent infections with streptococcus pyogenes or scarlet fever can be linked to the presence of this species in faeces.

#### Treatment:

Treatment of streptococcus in gut flora is not always recommended. A practitioner may take into consideration a range of patient factors and symptoms to determine if treatment is necessary. In this case please refer to the 4R treatment protocol located at the end of this report.

### METHANOBACTERIACEAE:

Family of bacteria-like microbes that produce methane. Facilitates carbohydrate fermentation and short-chain fatty acid production by beneficial bacteria.

LOW levels may indicate reduced production of short-chain fatty acids and may be associated with inflammation.

HIGH levels linked to chronic constipation, as well as some types of SIBO and IBS.

### DESULFOVIBRIO COMMENT:

Sulfate is present in different concentrations in the intestine dependent on diet. Remnants not absorbed, alongside the presence of lactate, promote the growth of Sulfate reducing bacteria (SRB). Desulfovibrio Piger is the dominant SRB genus and has been implicated in gastrointestinal disorders such as ulcerative colitis via the reduction of sulfate to hydrogen sulphide in the gut.

High Desulfovibrio piger levels serves as an indicator of inflammatory bowel disease.

Treatment options include lowering the intake of sulfate rich foods such as some breads, dried fruits, beers, ciders and wines.

Reference: Kushkevych et. Al., J. Clin. Med. 2019, 8, 1054; doi:10.3390/jcm8071054

### OXALOBACTER COMMENT:

Oxalate is formed in the liver by amino acid catabolism as well as present in a wide range of foods including tea, coffee, chocolate and certain fruits and vegetables. High concentration of oxalate in the urine is related to the potential formation of calcium oxalate kidney stones. Oxalobacter Formigenes is the main known bacterial species involved in oxalate degradation in the gut.

Levels of O. Formigenes tends to decrease with age as well as with the use of antibiotics or other drugs, with low levels identified as a risk factor for calcium oxide stone formation. Treatment options include probiotic treatment and low oxalate diet modification.

Urinary oxalate levels can also be monitored by test code 4025 (oxalate urinary).

Reference: Duncan et. al., Applied and Environmental Microbiology, Aug. 2002, p. 3841-3847

Kaufman et. al., J Am Soc Nephrol. 2008 Jun; 19(6): 1197-1203.

## Potential Autoimmune Comments

### ELEVATED CITROBACTER FREUNDII LEVEL:

#### Sources:

Citrobacter is a gram-negative bacteria in the Enterobacteriaceae family. Common in the environment and may be spread by person-to person contact. Several outbreaks have occurred in babies in hospital units. Isolated from water, fish, animals and food.

#### Pathogenicity:



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Citrobacter is considered an opportunistic pathogen and therefore can be found in the gut as part of the normal flora.

**Symptoms:**

Citrobacter has occasionally been implicated in diarrheal disease, particularly *C. freundii* and *C. diversus* and *C. koseri*

**Treatment:**

Treatment is not generally required in low amounts. However, where high levels are present and patients are symptomatic. A combination of oregano, plant tannins and oregano has shown high susceptibility.

For further information, refer to the 4R treatment protocol located at the end of this report.

**FUSOBACTERIUM SPECIES:**

Fusobacterium species is a gram-negative bacteria in the Fusobacteria phylum. The bacteria is a common member of the human oral microbiome, this pro-inflammatory bacterium can also be found in the human gut. In the mouth, high levels are strongly linked to oral hygiene. In the gut, high levels have been observed in individuals with colon cancer and appendicitis.

**Sources:**

It primarily uses protein as its main source. However, research also shows that it can thrive from sugar.

**Treatment:**

Antimicrobial botanicals such as berberine, oregano, quercetin, curcumin, green and black tea extracts, blueberry extract, cinnamon and rosemary have shown to decrease levels.

## **Fungi/Yeasts Comment**

**ELEVATED GEOTRICHUM SPECIES LEVEL:**

Geotrichum are a yeast belonging to the Endomycetaceae family.

**Sources:**

This organism can be found in soil, dairy products and in human skin and mucosae.

**Pathogenicity:**

Usually only considered an opportunistic pathogen in immune-compromised hosts. Geotrichum candidum is the etiological agent of Geotrichosis. Geotrichum may also play a role in IBS.

**Symptoms:**

Symptoms have been associated with diarrhea and enteritis. Symptoms of Geotrichosis may resemble those of candidiasis.

**Treatment:**

Currently, standard texts provide no specific antifungal guidelines for GI overgrowth of Geotrichum. Oral azoles and have been recommended for extra intestinal infections.

## **Phyla Microbiota Comment**

**ELEVATED FIRMICUTES LEVEL:**

Gram-positive Firmicutes are bacterial phyla that make up a large proportion of the entire human digestive tract, including the mouth, nose, throat, and colon. Elevated Firmicutes may suggest microbial imbalance which may be related to increased caloric extraction from food, fat deposition and lipogenesis, impaired insulin sensitivity, and increased inflammation.

**Treatment:**

Consider using Bifidobacteria probiotics and Saccharomyces boulardii primarily. It may also be suggested to optimise the patient diet. A lower fat diet may help to normalize Firmicutes levels.





# 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 subsp. lactis, lactobacillus acidophilus, lactobacillus plantarum, lactobacillus casei, bifidobacterium breve, bifidobacterium bifidum, bifidobacterium longum, lactobacillus salivarius, 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