



## 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>Formed</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.	3.0	0.0 - 50.0	ug/g	
Pancreatic Elastase	>500.0	> 200.0	ug/g	
Faecal Secretory IgA	786.1	510.0 - 2010.0	ug/g	
Faecal Zonulin	65.8	0.0 - 107.0	ng/g	
Faecal B-Glucuronidase	6641.7 *H	337.0 - 4433.0	U/g	
Steatocrit	3.0	0.0 - 15.0	%	
anti-Gliadin IgA	<20	0.0 - 100.0	units/L	

### Microbiome Mapping Summary

#### Parasites & Worms

Blastocystis hominis.

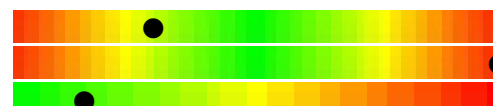
#### Bacteria & Viruses

Streptococcus species  
Methanobacteriaceae  
Desulfovibrio piger

#### Fungi and Yeasts

### Key Phyla Microbiota

Bacteroidetes	12.60	8.61 - 33.10	x10 <sup>11</sup> org/g
Firmicutes	56.27 *H	5.70 - 30.40	x10 <sup>10</sup> org/g
Firmicutes:Bacteroidetes Ratio	0.45	< 1.00	RATIO





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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.	288.8 *H	< 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.	0.5	< 1.5	x10 <sup>5</sup> org/g	
Enterococcus faecalis	<dl	< 1.0	x10 <sup>4</sup> org/g	
Enterococcus faecium	<dl	< 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	0.2	< 5.0	x10 <sup>2</sup> org/g	
Streptococcus species	25.3 *H	< 1.0	x10 <sup>3</sup> org/g	
Methanobacteriaceae	5.05 *H	< 5.00	x10 <sup>9</sup> org/g	
Desulfovibrio piger	130.1 *H	0.0 - 18.0	x10 <sup>7</sup> org/g	
Oxalobacter formigenes	378.8	> 15.0	x10 <sup>7</sup> org/g	

**Potential Autoimmune Triggers**

Citrobacter species.	<dl	< 5.0	x10 <sup>5</sup> org/g	
Citrobacter freundii.	<dl	< 5.0	x10 <sup>5</sup> org/g	
Klebsiella species	<dl	< 5.0	x10 <sup>3</sup> org/g	
Klebsiella pneumoniae.	<dl	< 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	2.77	< 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.	<dl	< 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	10.0	1.6 - 250.0	x10 <sup>9</sup> CFU/g	●
Bifidobacterium species	3272.1	> 6.7	x10 <sup>7</sup> CFU/g	●
Bifidobacterium longum	170.9	> 5.2	x10 <sup>6</sup> CFU/g	●
Enterococcus species	201.8	1.9 - 2000.0	x10 <sup>5</sup> CFU/g	●
Escherichia species	617.6	3.7 - 3800.0	x10 <sup>6</sup> CFU/g	●
Lactobacillus species	3.9 *L	8.6 - 6200.0	x10 <sup>5</sup> CFU/g	●
Lactobacillus Rhamnosus	1.2 *L	8.3 - 885.0	x10 <sup>4</sup> CFU/g	●
Clostridium species	51.0 *H	5.0 - 50.0	x10 <sup>6</sup> CFU/g	●
Enterobacter species	126.0 *H	1.0 - 50.0	x10 <sup>6</sup> CFU/g	●
Akkermansia muciniphila	27.73	0.01 - 50.00	x10 <sup>3</sup> CFU/g	●
Faecalibacterium prausnitzii	104.0	1.0 - 500000	x10 <sup>3</sup> CFU/g	●

Short Chain Fatty Acids	Result	Range	Units	
Short Chain Fatty Acids, Beneficial	23.1	> 13.6	umol/g	●
Butyrate	8.2 *L	10.8 - 33.5	%	●
Acetate	73.4 *H	44.5 - 72.4	%	●
Propionate	16.2	0.0 - 32.0	%	●
Valerate	2.2	0.5 - 7.0	%	●



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**MICHAEL MAGNUS BAMFORTH**  
**01-Sep-1987**      **Male**

110 ROBSONS ROAD  
KEIRAVILLE NSW 2500

LAB ID : 3821464  
UR NO. : 6608382  
Collection Date : 08-Jun-2022  
Received Date:10-Jun-2022



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## Pathogen Summary:

### Macroscopy Comment

BROWN coloured stool is considered normal in appearance.

### Metabolism Comment

In a healthy gut Short Chain Fatty Acids are exhibited in the following proportions;  
Butyrate, Acetate, Propionate ( 16% : 60% : 24% )

#### LOW BUTYRATE LEVEL:

Butyrate is a short chain fatty acid that is extremely important for gut health. It is the main fuel source for gut cells, which helps keep the gut cell barrier intact, can reduce inflammation, and helps control appetite. Low levels of butyrate production have been observed in individuals with inflammatory bowel diseases, insufficient fibre intake, slow transit time, recent antibiotic therapy. Low butyrate may also be associated with an increased risk of colon cancer & constipation.

Consuming foods high in resistant starch has been shown to increase butyrate levels.

#### ELEVATED ACETATE LEVEL:

Acetate is the most abundant short chain fatty acid produced in the gut. It plays an important role in fat metabolism, glucose metabolism and the immune system. Several bacterial species can also convert acetate to butyrate. The consumption of fruits, vegetables, legumes and fibre are associated with increased short chain fatty acids, including acetate.

#### 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.

### 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.

#### beta GLUCURONIDASE ELEVATED:

Suspect increased activation and enterohepatic recirculation of toxins, hormones, and various drugs within the body. Increased burden on glucuronidation pathway is associated with increased risk of colorectal, prostate and breast cancers.

#### Treatment:

Consider Calcium-D-glucarate which may assist with lowering B-glucuronidase levels. It is also suggested to introduce a low-calorie/vegetarian diet for 4 weeks which may also be beneficial with lowering faecal B-glucuronidase levels.



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## Parasites/Worms Comment

### ELEVATED BLASTOCYSTIS HOMINIS LEVEL:

Significant copies per gene of *Blastocystis hominis* have been detected in this stool sample. The role of *B. hominis* in terms of colonisation and disease is still considered controversial. When this organism is present in the absence of any other parasites, enteric organisms or viruses, it may be considered the etiological agent of disease. Symptoms can include diarrhoea, cramps, nausea, fever, vomiting and abdominal pain. *B. hominis* has been associated with irritable bowel syndrome, infective arthritis and intestinal obstruction.

#### Treatment:

Metronidazole (Flagyl) is considered the most effective drug. Iodoquinol and paromomycin are also effective medications. Recommended therapy can also eliminate *G. lamblia*, *E. histolytica* and *D. fragilis*, all of which may be concomitant undetected pathogens and part of patient symptomology.

Using a combination of herbs that contain berberine (e.g. Golden seal, *Coptis chinensis*, Barberry, Oregon grape and Phellodendron) is desirable for the treatment of certain organisms. It is important to investigate the percentage of berberine contained in the dry weight extract of the berberine containing herb and then dose accordingly for the therapeutic dose of berberine.

Total therapeutic dose of berberine: 200mg four times daily.

#### Further Investigation:

PCR stool analysis should be considered in 4 weeks' time to ensure infection has cleared.

## Opportunistic Bacteria Comment

### 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 oxalate 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.



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## Potential Autoimmune Comments

### 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.

## 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.

## Normal Bacterial Flora Comment

### LOW LACTOBACILLUS SPECIES LEVEL:

Lactate-producing bacteria in the Firmicutes phylum.

Low levels may be due to low carbohydrate intake or high salt intake, and may also indicate reduced mucosal health.

### LOW LACTOBACILLUS RHAMNOSUS LEVEL:

Lactobacillus Rhamnosus is a bacteria in the Firmicutes phylum. Lactobacillus rhamnosus is one of the most widely used probiotic strains. Various health effects are well documented including the prevention and treatment of gastro-intestinal infections and diarrhea, and stimulation of immune responses. Low levels may be linked to poor digestive health, diarrhea and IBS symptoms.

### ELEVATED CLOSTRIDIUM SPECIES LEVEL:

Organism of the Firmicutes phylum. The Clostridium genus is diverse and consists of both pathogens and normal commensals that perform a wide variety of functions (beneficial and potentially harmful).

High levels may result from reduced digestive capacity or constipation.

### ELEVATED ENTEROBACTER SPECIES LEVEL:

Organism of the Proteobacteria phylum. Closely related to E. coli (in the same taxonomic family).

High levels may indicate increased intestinal inflammatory activity.





# 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, Saccharomyces 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	Saccharomyces boulardii, lauric acid
		INTESTINAL BARRIER REPAIR	L-Glutamine, aloe vera, liquorice, marshmallow root, okra, quercetin, slippery elm, zinc carnosine, Saccharomyces boulardii, omega 3 essential fatty acids, B vitamins
		SUPPORT CONSIDERATION	Sleep, diet, exercise, and stress management