NutriPATH
Integrative Pathology Services
P: 1300 688 522
E: info@nutripath.com.au
A: PO Box 442 Ashburton VIC 3142

MARIA NICOLI

Date of Birth : 20-Sep-1987
Sex : F
Collected : 18/May/2021
Received: 19-May-2021
PO BOX 3163
CAROLINE SPRINGS VIC 3023
Lab id : **3741109** UR#: 6584542

-.REINE DUBOIS

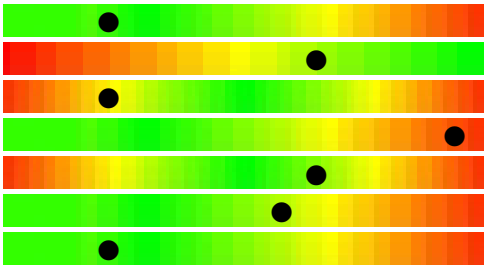
THE HEALTH LODGE
78 BANGALOW ROAD
BYRON BAY NSW 2481

COMPLETE MICROBIOME MAPPING

General Macroscopic Description

	Result	Range	Markers
Stool Colour	Brown		**Colour** - Brown is the colour of normal stool. Other colours may indicate abnormal GIT conditions.
Stool Form	Semi-formed		**Form** -A formed stool is considered normal. Variations to this may indicate abnormal GIT conditions.
Mucous	NEG	< +	**Mucous** - Mucous production may indcate the presence of an infection, inflammation or malignancy.
Occult Blood	NEG	< +	**Blood (Macro)**- 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	563.0	510.0 - 2010.0	ug/g
Faecal Zonulin	*133.5* *H	0.0 - 107.0	ng/g
Faecal B-Glucuronidase	3241.9	337.0 - 4433.0	U/g
Steatocrit	9.0	0.0 - 15.0	%
anti-Gliadin IgA	<20	0.0 - 157.0	units/L



Microbiome Mapping Summary

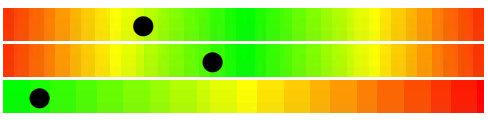
Parasites & Worms

Bacteria & Viruses

Fungi and Yeasts

Key Phyla Microbiota

Bacteroidetes	12.60	8.61 - 33.10	x10^11 org/g
Firmicutes	14.50	5.70 - 30.40	x10^10 org/g
Firmicutes:Bacteroidetes Ratio	0.12	< 1.00	RATIO



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Parasites and Worms.	Result	Range	Units
Parasitic Organisms			
Cryptosporidium.	<dl	< 1.0	x10^6 org/g
Entamoeba histolytica.	<dl	< 1.0	x10^4 org/g
Giardia lamblia.	<dl	< 5.0	x10^3 org/g
Blastocystis hominis.	<dl	< 2.0	x10^3 org/g
Dientamoeba fragilis.	<dl	< 1.0	x10^5 org/g
Endolimax nana	<dl	< 1.0	x10^4 org/g
Entamoeba coli.	<dl	< 5.0	x10^6 org/g
Pentatrichomonas hominis	<dl	< 1.0	x10^2 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
Bacillus species.	<dl	< 1.5	x10^5 org/g
Enterococcus faecalis	<dl	< 1.0	x10^4 org/g
Enterococcus faecium	<dl	< 1.0	x10^4 org/g
Morganella species	<dl	< 1.0	x10^3 org/g
Pseudomonas species	<dl	< 1.0	x10^4 org/g
Pseudomonas aeruginosa.	<dl	< 5.0	x10^2 org/g
Staphylococcus species	<dl	< 1.0	x10^4 org/g
Staphylococcus aureus	<dl	< 5.0	x10^2 org/g
Streptococcus species	0.9	< 1.0	x10^3 org/g
Methanobacteriaceae	0.40	< 5.00	x10^9 org/g
Desulfovibrio piger	<dl	0.0 - 18.0	x10^7 org/g
Oxalobacter formigenes	20.0	> 15.0	x10^7 org/g
Potential Autoimmune Triggers			
Citrobacter species.	<dl	< 5.0	x10^5 org/g
Citrobacter freundii.	3.5	< 5.0	x10^5 org/g
Klebsiella species	<dl	< 5.0	x10^3 org/g
Klebsiella pneumoniae.	<dl	< 5.0	x10^4 org/g
Prevotella copri	<dl	< 1.0	x10^7 org/g
Proteus species	<dl	< 5.0	x10^4 org/g
Proteus mirabilis.	<dl	< 1.0	x10^3 org/g
Fusobacterium species	<dl	< 10.00	x10^7 org/g

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

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

Normal Bacterial GUT Flora	Result	Range	Units
Bacteroides fragilis	51.3	1.6 - 250.0	x10^9 CFU/g
Bifidobacterium species	*4.2* *L	> 6.7	x10^7 CFU/g
Bifidobacterium longum	*1.3* *L	> 5.2	x10^6 CFU/g
Enterococcus species	2.5	1.9 - 2000.0	x10^5 CFU/g
Escherichia species	73.7	3.7 - 3800.0	x10^6 CFU/g
Lactobacillus species	24.5	8.6 - 6200.0	x10^5 CFU/g
Lactobacillus Rhamnosus	19.5	8.3 - 885.0	x10^4 CFU/g
Clostridium species	9.1	5.0 - 50.0	x10^6 CFU/g
Enterobacter species	2.0	1.0 - 50.0	x10^6 CFU/g
Akkermansia muciniphila	*<dl* *L	0.01 - 50.00	x10^3 CFU/g
Faecalibacterium prausnitzii	814.1	1.0 - 500000	x10^3 CFU/g

Short Chain Fatty Acids	Result	Range	Units
Short Chain Fatty Acids, Beneficial	76.1	> 13.6	umol/g
Butyrate	*9.1* *L	10.8 - 33.5	%
Acetate	71.3	44.5 - 72.4	%
Propionate	17.0	0.0 - 32.0	%
Valerate	2.6	0.5 - 7.0	%

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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.

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 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

Opportunistic Bacteria Comment

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 Delsulfovibrio 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:
Oxolate 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

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kidney stones. Oxolobacter 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

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.

Normal Bacterial Flora Comment

LOW BIFIDOBACTERIUM LEVEL:
Organism of the Actinobacteria phylum.
Low levels may result from low fiber intake or reduced mucosal health. Thrives on a wide variety of prebiotic fibers.

LOW BIFIDOBACTERIUM LONGUM LEVEL:
Bifidobacterium longum is one of the well-established probiotic strains with numerous profound health benefits in humans. Supplementing with Bifidobacterium longum has been effective in alleviating gastrointestinal, immunological and infectious diseases. Increasingly, evidence is accumulating which shows beneficial effects of supplementation with bifidobacteria for the improvement of human health conditions ranging from protection against infection to different extra- and intra-intestinal positive effects. Moreover, bifidobacteria have been associated with the production of a number of potentially health promoting metabolites including short chain fatty acids.

LOW AKKERMANSIA MUCINIPHILA LEVEL:
Akkermansia muciniphila is an organism that lives in the mucus lining of your gut and uses mucus as its primary energy source. This species plays an important role in regulating mucus turnover in the gut so that there is a good balance between mucus breakdown and mucus production. Akkermansia muciniphila promotes healthy intestinal barrier and modulates immune responses.

Low levels of Akkermansia muciniphila has been observed in individuals with IBS, high fat diets, obesity, and type 2 diabetes. Reducing intake of high fat foods may help increase levels of this bacteria.

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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