Diagnostic Solutions laboratory
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# GI-MAP ™ DNA Stool Analysis

**Patient:** **Ella Nielson**
Collected: 6/20/2022
DOB: 10/21/1988

**Accession: 20220627-0515**
Received: 6/27/2022
Completed: 7/8/2022

**Ordered By Amy Phillips, ND**

## Pathogens

| Bacterial Pathogens | Result | Normal |
|---|---|---|
| *Campylobacter* | **<dl** | <1.00e3 |
| *C. difficile*, Toxin A | **<dl** | <1.00e3 |
| *C. difficile*, Toxin B | **<dl** | <1.00e3 |
| *Enterohemorrhagic E. coli* | **<dl** | <1.00e3 |
| *E. coli* O157 | **<dl** | <1.00e3 |
| *Enteroinvasive E. coli/Shigella* | **<dl** | <1.00e2 |
| *Enterotoxigenic E. coli LT/ST* | **<dl** | <1.00e3 |
| Shiga-like Toxin *E. coli* stx1 | **<dl** | <1.00e3 |
| Shiga-like Toxin *E. coli* stx2 | **<dl** | <1.00e3 |
| *Salmonella* | **<dl** | <1.00e4 |
| *Vibrio cholerae* | **<dl** | <1.00e5 |
| *Yersinia enterocolitica* | **<dl** | <1.00e5 |

| Parasitic Pathogens | Result | Normal |
|---|---|---|
| *Cryptosporidium* | **<dl** | <1.00e6 |
| *Entamoeba histolytica* | **<dl** | <1.00e4 |
| *Giardia* | **1.02e3** | <5.00e3 |

| Viral Pathogens | Result | Normal |
|---|---|---|
| *Adenovirus* 40/41 | **<dl** | <1.00e10 |
| *Norovirus GI/II* | **<dl** | <1.00e7 |

The assays were developed and the perfomance characteristics determined by Diagnostic Solutions Laboratory.

CLIA# 11D-2097795
Medical Director - Diane Farhi, MD

## H. pylori

| | Result | | Normal |
|---|---|---|---|
| *Helicobacter pylori* | **<dl** | | <1.0e3 |
| Virulence Factor, babA | **N/A** | | Negative |
| Virulence Factor, cagA | **N/A** | | Negative |
| Virulence Factor, dupA | **N/A** | | Negative |
| Virulence Factor, iceA | **N/A** | | Negative |
| Virulence Factor, oipA | **N/A** | | Negative |
| Virulence Factor, vacA | **N/A** | | Negative |
| Virulence Factor, virB | **N/A** | | Negative |
| Virulence Factor, virD | **N/A** | | Negative |

## Normal Bacterial Flora

| | Result | | Normal |
|---|---|---|---|
| *Bacteroides fragilis* | **3.53e9** | | 1.60e9 - 2.50e11 |
| *Bifidobacterium spp.* | **4.32e9** | | >6.70e7 |
| *Enterococcus spp.* | **3.19e6** | | 1.9e5 - 2.00e8 |
| *Escherichia spp.* | **1.91e7** | | 3.70e6 - 3.80e9 |
| *Lactobacillus spp.* | **1.25e6** | | 8.6e5 - 6.20e8 |
| *Clostridia (class)* | **4.19e6** | **Low** | 5.00e6 - 5.00e7 |
| *Enterobacter spp.* | **4.92e5** | **Low** | 1.00e6 - 5.00e7 |
| *Akkermansia muciniphila* | **3.62e6** | **High** | 1.00e1 - 5.00e4 |
| *Faecalibacterium prausnitzii* | **4.01e2** | **Low** | 1.00e3 - 5.00e8 |

| **Phyla Microbiota** | Result | | Normal |
|---|---|---|---|
| *Bacteroidetes* | **4.71e10** | **Low** | 8.61e11 - 3.31e12 |
| *Firmicutes* | **1.01e10** | **Low** | 5.70e10 - 3.04e11 |
| *Firmicutes:Bacteroidetes Ratio* | **0.22** | | <1.00 |

LOW LEVELS;
Clostridia class: Prominent and diverse group of bacteria in the microbiome of the large intestine. Important producers of short-chain fatty acids, including butyrate. Promote a healthy mucosal barrier, influence immune balance, and protect against many gastrointestinal pathogens. Low levels often associated with inflammatory and autoimmune conditions.

Enterobacter spp: Gram-negative genus in the Proteobacteria phylum. Closely related to E. coli (in the same taxonomic family). Low levels may indicate reduced mucosal health.

Faecalibacterium prausnitzii: Widely recognized as an important keystone species in the Clostridia class, as well as a major butyrate producer. Promotes anti-inflammatory processes and mucosal homeostasis. Reduced levels have been associated with a wide range of chronic inflammatory and autoimmune diseases

HIGH LEVELS:
Akkermansia muciniphila: Keystone species and primary mucus degrader. Generates mucus-derived sugars and metabolic products that support the growth and energy needs of other gut microbes. Promotes mucosal health and mucus production.

## Opportunistic Bacteria

| Additional Dysbiotic/Overgrowth Bacteria | Result | | Normal |
|---|---|---|---|
| *Bacillus spp.* | **2.95e5** | **High** | <1.50e5 |
| *Enterococcus faecalis* | **1.64e4** | **High** | <1.00e4 |
| *Enterococcus faecium* | **1.51e4** | **High** | <1.00e4 |
| *Morganella spp.* | **6.32e4** | **High** | <1.00e3 |
| *Pseudomonas spp.* | **1.66e8** | **High** | <1.00e4 |
| *Pseudomonas aeruginosa* | **1.84e6** | **High** | <5.00e2 |
| *Staphylococcus spp.* | **<dl** | | <1.00e4 |
| *Staphylococcus aureus* | **6.00e1** | | <5.00e2 |
| *Streptococcus spp.* | **3.42e3** | **High** | <1.00e3 |
| *Methanobacteriaceae* (family) | **7.80e8** | | <5.00e9 |

| Potential Autoimmune Triggers | Result | Normal |
|---|---|---|
| *Citrobacter spp.* | **<dl** | <5.00e6 |
| *Citrobacter freundii* | **<dl** | <5.00e5 |
| *Klebsiella spp.* | **<dl** | <5.00e3 |
| *Klebsiella pneumoniae* | **1.69e2** | <5.00e4 |
| *M. avium subsp. paratuberculosis* | **<dl** | <5.00e3 |
| *Prevotella spp.* | **2.45e6** | <1.00e8 |
| *Proteus spp.* | **<dl** | <5.00e4 |
| *Proteus mirabilis* | **<dl** | <1.00e3 |
| *Fusobacterium spp.* | **2.25e5** | <1.00e8 |

## Fungi/Yeast

| | Result | Normal |
|---|---|---|
| *Candida spp.* | **<dl** | <5.00e3 |
| *Candida albicans* | **<dl** | <5.00e2 |
| *Geotrichum spp.* | **<dl** | <3.00e2 |
| *Microsporidium spp.* | **<dl** | <5.00e3 |
| *Rhodotorula spp.* | **<dl** | <1.00e3 |

## Viruses

| | Result | Normal |
|---|---|---|
| *Cytomegalovirus* | **<dl** | <1.00e5 |
| *Epstein Barr Virus* | **<dl** | <1.00e7 |

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## Parasites

| Protozoa | Result | | Normal |
|---|---|---|---|
| *Blastocystis hominis* | **<dl** | | <2.00e3 |
| *Chilomastix mesnili* | **<dl** | | <1.00e5 |
| *Cyclospora spp.* | **<dl** | | <5.00e4 |
| *Dientamoeba fragilis* | **6.80e4** | | <1.00e5 |
| *Endolimax nana* | **1.09e3** | | <1.00e4 |
| *Entamoeba coli* | **<dl** | | <5.00e6 |
| *Pentatrichomonas hominis* | **<dl** | | <1.00e2 |

| Worms | Result | | Normal |
|---|---|---|---|
| *Ancylostoma duodenale* | **Not Detected** | | Not Detected |
| *Ascaris lumbricoides* | **Not Detected** | | Not Detected |
| *Necator americanus* | **Not Detected** | | Not Detected |
| *Trichuris trichiura* | **Not Detected** | | Not Detected |
| *Taenia spp.* | **Not Detected** | | Not Detected |

## Intestinal Health

| Digestion | Result | | Normal |
|---|---|---|---|
| Steatocrit | **<dl** | | <15 % |
| Elastase-1 | **>750** | | >200 ug/g |

| GI Markers | Result | | Normal |
|---|---|---|---|
| b-Glucuronidase | **1293** | | <2486 U/mL |
| Occult Blood - FIT | **0** | | <10 ug/g |

| Immune Response | Result | | Normal |
|---|---|---|---|
| Secretory IgA | **210** | **Low** | 510 - 2010 ug/g |
| Anti-gliadin IgA | **26** | | 0 - 157 U/L |

| Inflammation | Result | | Normal |
|---|---|---|---|
| Calprotectin | **620** | **High** | <173 ug/g |

| Add-on Test | Result | | Normal |
|---|---|---|---|
| Zonulin | **95.0** | | <107 ng/g |

SIgA – Immunoglobulin A is the primary immunoglobulin in the intestinal mucosa. It represents a “first line of defense” in response to antigens and pathogens in the GI and respiratory tracts. In addition to protecting against pathogens, SIgA plays a major role in helping to maintain balance in the microbiome and protecting against exposure to food-derived antigens. Low Fecal SIgA – The gut immune system is suppressed which may be due to underlying causes, such as chronic dysbiosis, antigen exposure, chronic stress, immunocompromised patient, or even protein malnutrition.

Calprotectin – Fecal calprotectin is the most studied marker of gastrointestinal inflammation. High calprotectin indicates neutrophil infiltration to the gut mucosa. Calprotectin is the gold standard marker for the diagnosis and monitoring of inflammatory bowel disease. It is used to differentiate IBD from irritable bowel syndrome.
• Possible Causes of Elevated Calprotectin include: » Intestinal infections and proinflammatory dysbiosis » Food allergens, toxins and certain drugs (e.g., non-steroidal anti-inflammatory drugs [NSAIDs]) » Inflammatory bowel disease » Polyps» Diverticulitis » Colorectal cancer

## Antibiotic Resistance Genes, phenotypes

| Helicobacter | | Result | | | Expected Result |
|---|---|---|---|---|---|
| **Amoxicillin** | | **N/A** | | | Negative |
| A926G | N/A | AGA926-928TTC | N/A | | |
| **Clarithromycin** | | **N/A** | | | Negative |
| A2142G | N/A | A2142C | N/A | A2143G | N/A |
| **Fluoroquinolones** | | **N/A** | | | Negative |
| gyrA N87K | N/A | gyrA D91N | N/A | gyrA D91G | N/A |
| gyrB S479N | N/A | gyrB R484K | N/A | | |
| **Tetracycline** | | **N/A** | | | Negative |
| PBP1A S414R | N/A | PBP1A T556S | N/A | PBP1A N562Y | N/A |

OPPORTUNISTIC BACTERIA:
Bacillus spp.: Common group of gram-positive bacteria in the Firmicutes phylum. Some strains are used as probiotics. High levels may result from reduced digestive function, SIBO, or constipation.

Enterococcus faecalis & Enterococcus faecium: Gram-positive species in the Firmicutes phylum. High levels may result from reduced stomach acid, PPI use, compromised digestive function, SIBO or constipation. High natural resistance to some antibiotics, which may result in overgrowth.

Morganella spp.: Gram-negative group in the Proteobacteria phylum. May produce histamine. High levels may indicate increased intestinal inflammatory activity. High levels may cause diarrhea, and may also be associated with SIBO

Pseudomonas spp. & Pseudomonas aeroginosa: Gram-negative bacteria in the Proteobacteria phylum. High levels may indicate increased intestinal inflammatory activity and may cause abdominal cramping and loose stools. Some strains of P. aeroginosa may produce toxins that can damage cells.

Streptococcus spp.:Gram-positive bacteria in the Firmicutes phylum. Streptococcus spp. colonize skin and mucous membranes throughout the body; 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