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Patient: Liam Urquhart

Collected: 10/21/2024

DOB: 5/15/2000

Accession: 20241029-0341

Received: 10/28/2024

Completed: 11/8/2024

Ordered by: Darren Sassall, ND



GI Microbial Assay Plus

DNA STOOL ANALYSIS BY QUANTITATIVE PCR

## YOUR PERSONALIZED REPORT

### PATHOGENS

The testing includes pathogens (bacterial, parasitic and viral) commonly known to cause gastroenteritis. Note that not all individuals with positive findings will present with symptoms. Many factors, including the health of the individual (such as immune health, digestive function, and microbiome balance), the transient nature of most pathogens, and the presence and expression of virulence factors, all contribute to pathogen virulence and individual symptoms.

| BACTERIAL PATHOGENS                             | Result | Reference |
|-------------------------------------------------|--------|-----------|
| <i>Campylobacter</i>                            | <dl    | < 1.00e3  |
| <i>C. difficile</i> Toxin A                     | <dl    | < 1.00e3  |
| <i>C. difficile</i> Toxin B                     | <dl    | < 1.00e3  |
| <i>Enterohemorrhagic E. coli</i>                | <dl    | < 1.00e3  |
| <i>E. coli</i> O157                             | <dl    | < 1.00e3  |
| Enteroinvasive <i>E. coli</i> / <i>Shigella</i> | <dl    | < 1.00e3  |
| Enterotoxigenic <i>E. coli</i> LT/ST            | <dl    | < 1.00e3  |
| Shiga-like Toxin <i>E. coli</i> stx1            | <dl    | < 1.00e3  |
| Shiga-like Toxin <i>E. coli</i> stx2            | <dl    | < 1.00e3  |
| <i>Salmonella</i>                               | <dl    | < 1.00e4  |
| <i>Vibrio cholerae</i>                          | <dl    | < 1.00e5  |
| <i>Yersinia enterocolitica</i>                  | <dl    | < 1.00e5  |
| PARASITIC PATHOGENS                             |        |           |
| <i>Cryptosporidium</i>                          | <dl    | < 1.00e6  |
| <i>Entamoeba histolytica</i>                    | <dl    | < 1.00e4  |
| <i>Giardia</i>                                  | <dl    | < 5.00e3  |
| VIRAL PATHOGENS                                 |        |           |
| Adenovirus 40/41                                | <dl    | < 1.00e10 |
| Norovirus GI/II                                 | <dl    | < 1.00e7  |

**KEY:** Results are reported as genome equivalents per gram of stool, which is a standard method for estimating the number of microbes measured per gram of stool, based on qPCR analysis of DNA samples.

Results are expressed in standard scientific notation. For example, a reported result of 3.5e7 is equivalent to  $3.5 \times 10^7$  microbes per gram, which equals 35,000,000 (35 million) microbes per gram of stool.

< dl represents results below detectable limit.

The assays were developed and/or the performance characteristics determined by Diagnostic Solutions Laboratory.

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

Patient: Urquhart , Liam

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## HELICOBACTER PYLORI

### H. PYLORI & VIRULENCE FACTORS

|                                   | Result | Reference |
|-----------------------------------|--------|-----------|
| <b><i>Helicobacter pylori</i></b> | 1.70e2 | < 1.00e3  |
| 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  |

## COMMENSAL/KEYSTONE BACTERIA

### COMMENSAL BACTERIA

|                                     | Result  |  | Reference      |
|-------------------------------------|---------|--|----------------|
| <i>Bacteroides fragilis</i>         | 1.66e11 |  | 1.6e9 - 2.5e11 |
| <i>Bifidobacterium</i> spp.         | 8.42e9  |  | > 6.7e7        |
| <i>Enterococcus</i> spp.            | 2.04e7  |  | 1.9e5 - 2.0e8  |
| <i>Escherichia</i> spp.             | 1.22e9  |  | 3.7e6 - 3.8e9  |
| <i>Lactobacillus</i> spp.           | 1.56e8  |  | 8.6e5 - 6.2e8  |
| <i>Enterobacter</i> spp.            | 1.66e7  |  | 1.0e6 - 5.0e7  |
| <i>Akkermansia muciniphila</i>      | 3.01e4  |  | 1.0e1 - 8.2e6  |
| <i>Faecalibacterium prausnitzii</i> | <dl L   |  | 1.0e3 - 5.0e8  |
| <i>Roseburia</i> spp.               | 1.90e9  |  | 5.0e7 - 2.0e10 |

### BACTERIAL PHyla

|                                       |           |  |                 |
|---------------------------------------|-----------|--|-----------------|
| <i>Bacteroidetes</i>                  | 3.77e12 H |  | 8.6e11 - 3.3e12 |
| <i>Firmicutes</i>                     | 9.67e10   |  | 5.7e10 - 3.0e11 |
| <i>Firmicutes:Bacteroidetes</i> Ratio | 0.03      |  | < 1.0           |

Def. inflam / mucous memb homeostasis  
low levels = dysimmune & inflam Δ.

dominant enteric  
Acid  
= imbalanced  
microbes



### OPPORTUNISTIC/OVERGROWTH MICROBES

#### DYSBIOTIC & OVERGROWTH BACTERIA

|                               | Result        | Reference |
|-------------------------------|---------------|-----------|
| <i>Bacillus</i> spp.          | 8.43e5        | < 1.76e6  |
| <i>Enterococcus faecalis</i>  | <dl           | < 1.00e4  |
| <i>Enterococcus faecium</i>   | <dl           | < 1.00e4  |
| <i>Morganella</i> spp.        | <dl           | < 1.00e3  |
| <i>Pseudomonas</i> spp.       | <dl           | < 1.00e4  |
| <i>Pseudomonas aeruginosa</i> | <dl           | < 5.00e2  |
| <i>Staphylococcus</i> spp.    | <dl           | < 1.00e4  |
| <i>Staphylococcus aureus</i>  | 2.13e2        | < 5.00e2  |
| <i>Streptococcus</i> spp.     | 4.39e3 High ↑ | < 1.00e3  |

↓ stomach acid  
↓ dig capacity  
↑ inflammation

#### COMMENSAL OVERGROWTH MICROBES

|                                     |        |          |
|-------------------------------------|--------|----------|
| <i>Desulfovibrio</i> spp.           | 2.71e8 | < 7.98e8 |
| <i>Methanobacteriaceae</i> (family) | 2.84e7 | < 3.38e8 |

#### INFLAMMATORY & AUTOIMMUNE-RELATED BACTERIA

|                                                |     |          |
|------------------------------------------------|-----|----------|
| <i>Citrobacter</i> spp.                        | <dl | < 5.00e6 |
| <i>Citrobacter freundii</i>                    | <dl | < 5.00e5 |
| <i>Klebsiella</i> spp.                         | <dl | < 5.00e3 |
| <i>Klebsiella pneumoniae</i>                   | <dl | < 5.00e4 |
| <i>M. avium</i> subsp. <i>paratuberculosis</i> | <dl | < 5.00e3 |
| <i>Proteus</i> spp.                            | <dl | < 5.00e4 |
| <i>Proteus mirabilis</i>                       | <dl | < 1.00e3 |

#### COMMENSAL INFLAMMATORY & AUTOIMMUNE-RELATED BACTERIA

|                           |        |          |
|---------------------------|--------|----------|
| <i>Enterobacter</i> spp.  | 1.66e7 | < 5.00e7 |
| <i>Escherichia</i> spp.   | 1.22e9 | < 3.80e9 |
| <i>Fusobacterium</i> spp. | 2.58e6 | < 1.00e8 |
| <i>Prevotella</i> spp.    | 5.14e7 | < 1.00e8 |

### FUNGI/YEAST

#### FUNGI/YEAST

|                            | Result        | Reference |
|----------------------------|---------------|-----------|
| <i>Candida</i> spp.        | 3.93e4 High ↑ | < 5.00e3  |
| <i>Candida albicans</i>    | <dl           | < 5.00e2  |
| <i>Geotrichum</i> spp.     | <dl           | < 3.00e2  |
| <i>Microsporidium</i> spp. | <dl           | < 5.00e3  |
| <i>Rhodotorula</i> spp.    | <dl           | < 1.00e3  |

antibiotic use?  
high sugar intake?  
↓ acid  
↓ immune

### VIRUSES

#### VIRUSES

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

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## PARASITES

## PROTOZOA

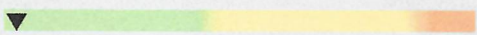
|                                 | Result | Reference |
|---------------------------------|--------|-----------|
| <i>Blastocystis hominis</i>     | <dl    | < 2.00e3  |
| <i>Chilomastix mesnili</i>      | <dl    | < 1.00e5  |
| <i>Cyclospora</i> spp.          | <dl    | < 5.00e4  |
| <i>Dientamoeba fragilis</i>     | <dl    | < 1.00e5  |
| <i>Endolimax nana</i>           | <dl    | < 1.00e4  |
| <i>Entamoeba coli</i>           | <dl    | < 5.00e6  |
| <i>Pentatrichomonas hominis</i> | <dl    | < 1.00e2  |

## WORMS

|                              |              |              |
|------------------------------|--------------|--------------|
| <i>Ancylostoma duodenale</i> | Not Detected | Not Detected |
| <i>Ascaris lumbricoides</i>  | Not Detected | Not Detected |
| <i>Necator americanus</i>    | Not Detected | Not Detected |
| <i>Trichuris trichiura</i>   | Not Detected | Not Detected |
| <i>Taenia</i> spp.           | Not Detected | Not Detected |

## INTESTINAL HEALTH MARKERS

## DIGESTION

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

## GI MARKERS

|                    |                                                                                          |             |
|--------------------|------------------------------------------------------------------------------------------|-------------|
| β-Glucuronidase    | 414  | < 2486 U/mL |
| Occult Blood - FIT | <dl  | < 10 ug/g   |

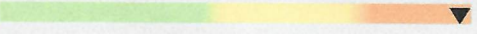
## IMMUNE RESPONSE

|                                          |                                                                                           |                 |
|------------------------------------------|-------------------------------------------------------------------------------------------|-----------------|
| Secretory IgA                            | 792   | 510 - 2010 ug/g |
| Anti-gliadin IgA                         | 44    | < 175 U/L       |
| Eosinophil Activation Protein (EDN, EPX) | 0.52  | < 2.34 ug/g     |

## INFLAMMATION

|              |                                                                                         |            |
|--------------|-----------------------------------------------------------------------------------------|------------|
| Calprotectin | 15  | < 173 ug/g |
|--------------|-----------------------------------------------------------------------------------------|------------|

## ADD-ON TESTS

|         |                                                                                              |            |
|---------|----------------------------------------------------------------------------------------------|------------|
| Zonulin | 444.5 H  | < 175 ng/g |
|---------|----------------------------------------------------------------------------------------------|------------|

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## H. PYLORI ANTIBIOTIC RESISTANCE GENES

|                                                     | Result | Reference |
|-----------------------------------------------------|--------|-----------|
| <b>Amoxicillin</b>                                  | N/A    | Negative  |
| <i>Genes associated with amoxicillin resistance</i> |        |           |
| PBP1A S414R                                         | N/A    |           |
| PBP1A T556S                                         | N/A    |           |
| PBP1A N562Y                                         | N/A    |           |

|                                                        | Result | Reference |
|--------------------------------------------------------|--------|-----------|
| <b>Clarithromycin</b>                                  | N/A    | Negative  |
| <i>Genes associated with clarithromycin resistance</i> |        |           |
| A2142C                                                 | N/A    |           |
| A2142G                                                 | N/A    |           |
| A2143G                                                 | N/A    |           |

|                                                         | Result | Reference |
|---------------------------------------------------------|--------|-----------|
| <b>Fluoroquinolones</b>                                 | N/A    | Negative  |
| <i>Genes associated with fluoroquinolone resistance</i> |        |           |
| gyrA N87K                                               | N/A    |           |
| gyrA D91N                                               | N/A    |           |
| gyrA D91G                                               | N/A    |           |
| gyrB S479N                                              | N/A    |           |
| gyrB R484K                                              | N/A    |           |

|                                                      | Result | Reference |
|------------------------------------------------------|--------|-----------|
| <b>Tetracycline</b>                                  | N/A    | Negative  |
| <i>Genes associated with tetracycline resistance</i> |        |           |
| A926G                                                | N/A    |           |
| AGA926-928TTC                                        | N/A    |           |