

Metamatrix

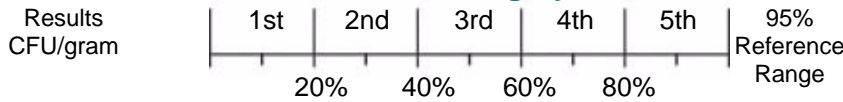
3425 Corporate Way
 Duluth, GA 30096

2100 Gastrointestinal Function Profile

Methodology: DNA Analysis, GC/MS, Microscopic, Colorimetric, Automated Chemistry, ELISA

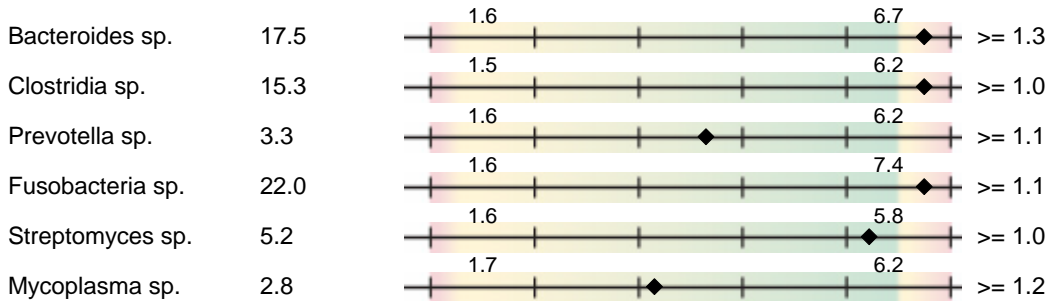
Percentile Ranking by Quintile

Consistency = Formed/Normal

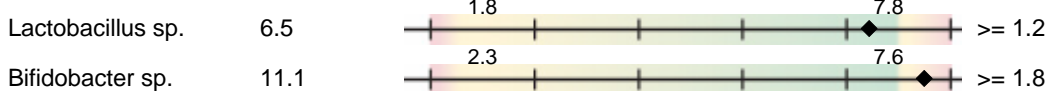


Predominant Bacteria (E+007) E+007

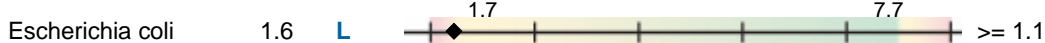
Obligate anaerobes



Facultative anaerobes



Obligate aerobes



Opportunistic Bacteria

No clinically significant amounts.

Units and Reference Ranges

Organisms are detected by DNA analysis. One colony forming unit (CFU) is equivalent to one bacterium. Each genome detected represents one cell, or one CFU. Results are expressed in scientific notation, so an organism reported as 2.5 E7 CFU/gram is read as 25 million colony forming units per gram of feces. The cutoff for significance of Opportunistic Bacteria has been set at 1.0E+ 005 (100,000). These are levels above which clinically significant growth may be present. Rather than reporting semi-quantitative +1 to +4 levels, the new methodology provides full quantitative analysis.

Predominant Bacteria play major roles in health. They provide colonization resistance against potentially pathogenic organisms, aid in digestion and absorption, produce vitamins and SCFA's, and stimulate the GI immune system. DNA probes allow detection of multiple species (sp.) within a genus, so the genera that are reported cover many species.

Opportunistic Bacteria may cause symptoms and be associated with disease. They can affect digestion and absorption, nutrient production, pH and immune state. Antibiotic sensitivity tests will be performed on all opportunistic bacteria found, although clinical history is usually considered to determine treatment since the organisms are not generally considered to be pathogens.

These test results are not for the diagnosis of disease. They are intended to provide nutritional guidelines to qualified healthcare professionals with full knowledge of patient history and concerns to assist in their design of an appropriate healthcare program.

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Pathogenic Bacteria		95% Reference Range
Helicobacter pylori	<0.01	<=1.0E+005
Campylobacter sp.	<0.01	<=1.0E+005
E.H.E. coli	1.2E+005 H	<=1.0E+005
Clostridium difficile	<0.01	<=1.0E+005

Yeast/Fungi		
Candida sp.	+2 => 1000 pg DNA/g specimen	Neg

Yeast/Fungi

Yeast overgrowth has been linked to many chronic conditions, in part because of antigenic responses in some patients to even low rates of yeast growth. Potential symptoms include diarrhea, headache, bloating, atopic dermatitis and fatigue. Positives are reported as +1, +2, +3 or +4 indicating >100, >1000, >10000 or >100000 pg DNA/g.

Parasites		
Cryptosporidium sp.	Positive	Neg
Dientamoeba fragilis	Positive	Neg

Parasites

Parasite infections are a major cause of non-viral diarrhea. Symptoms may include constipation, gas, bloating, increased allergy response, colitis, nausea and distention.

Adiposity Index			
Firmicutes	59		<= 80
Bacteroidetes	41		>= 20

The **Adiposity Index** is derived by using DI probes that detect multiple genera of the phyla Firmicutes and Bacteroidetes. Abnormalities of these phyla may be associated with increased caloric extraction from food.

Drug Resistance Genes			
aacA, aphD	Pos	gyrB, ParE	Neg
mecA	Pos	PBP1a, 2B	Neg
vanA, B, and C	Neg		

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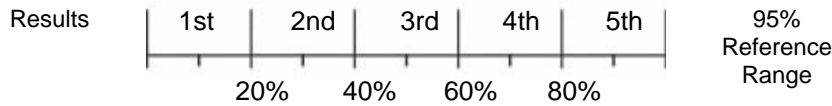
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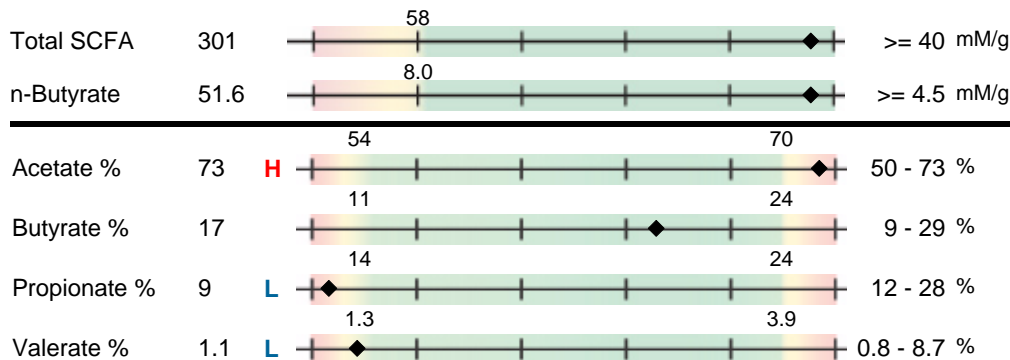
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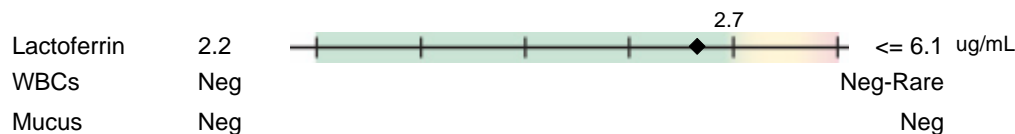
Beneficial SCFA



Beneficial SCFA

Short chain fatty acids (SCFA) are produced by bacterial fermentation of dietary polysaccharides and fiber. The product, N-butyrate, is taken up and used to sustain the normal activity of colonic epithelial cells. Butyrate has been shown to lower the risk of colitis and colorectal cancer. A healthy balance of GI microbes depends on production of SCFA by or specie to allow the normal growth of another on in a complex cross-feeding network.

Inflammation



Inflammation

Lactoferrin, an iron-binding glycoprotein, is released in IBD but not in non-inflammatory IBS. High levels are found in Crohn's, UC or infection. WBC's are elevated in general inflammation/infection. Mucus is often visualized in acute GI inflammation.

Immunology



Immunology

High fecal sIgA indicates immune system reactions to the presence of antigens from bacteria, yeast or other microbes. Low sIgA can result from stress or malnutrition. Anti-gliadin sIgA is a screening marker for gluten sensitivity.

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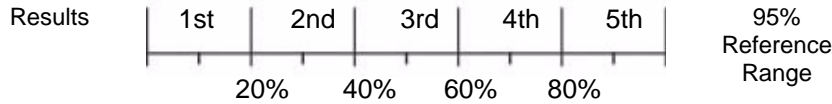
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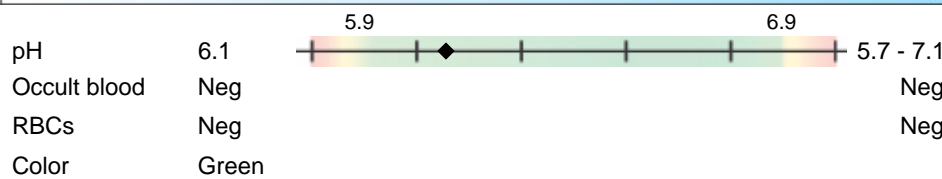
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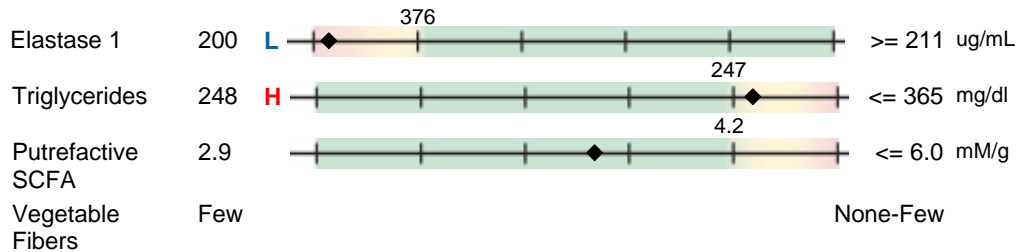
Additional Tests



Additional Tests

pH is influenced by numerous factors, but is strongly related to the bacterial release of pH-lowering organic acids and pH-raising ammonia. Positive **occult blood** can signify GI tract bleeding, as can elevated **RBCs**. **Color** (other than brown) abnormalities can be due to upper GI bleeding, or bile duct blockage, steatorrhea or antibiotic use.

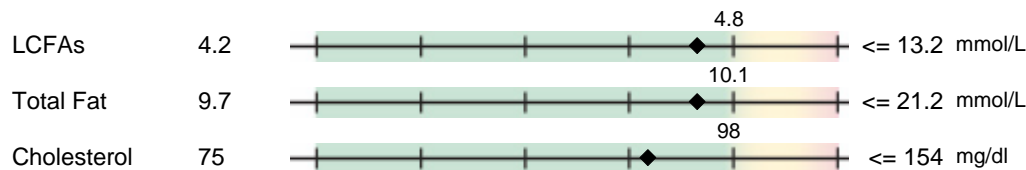
Digestion



Digestion

Pancreatic elastase 1 levels below the reference limits are strongly correlated with pancreatic insufficiency. High triglycerides signify fat maldigestion. Putrefactive SCFA are a result of bacterial fermentation of undigested protein. High numbers of vegetable fibers indicate maldigestion.

Absorption



Absorption

High **LCFA** indicates fat malabsorption due to pancreatic or biliary insufficiency, or acute bacterial infection that produces intestinal cell destruction. High total fat usually signals malabsorption, as does elevated fecal cholesterol. High total fat usually signals malabsorption, as does elevated fecal cholesterol.

UC** = Unable to Calculate

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Microbial Sensitivity Profile

Bacterial Sensitivities

No Sensitivity Needed

Bacterial growth suppression is measured in a liquid growth medium where fungal growth is suppressed and specific antibacterial agents are introduced before incubation. In contrast to the old isolation and culture techniques, such universal culturing more closely approximates the actions of antibacterials in the complex milieu of the colon.

Agents marked as "**Sensitive**" cause effective bacterial growth suppression. Those antibacterial agents are candidates for suppressing the growth of bacteria in the patient's colon. The results apply to all organisms reported under "Opportunistic Bacteria".

Agents indicated as "**Resistant**" have low effectiveness. If all tested agents are resistant, synergistic mixtures of antibacterial agents may be effective.

Sensitivities are not performed on "**Pathogens**" or "**Parasites**" because they do not grow in culture under normal laboratory conditions. Standard protocols are generally used for treatment of pathogens and parasites.

For Botanical sensitivity testing the active ingredients are tested and an example of the available source is shown.

Microbial Sensitivity Profile

Fungal Sensitivities

Pharmaceuticals

Amphotericin	S	
Fluconazole	S	
Itraconazole	S	
Ketoconazole		R
Nystatin		R

Botanicals

5-Hydroxy-1,4-naphthoquinone	S	
Black Walnut		
Alliin	S	
Garlic		
Arbutin	S	
Uva Ursi		
Artemisinin	S	
Wormwood		
Berberine	S	
Goldenseal		
Caprylic acid		R
Octanoic acid		
Carvacrol		R
Oregano		
Oleuropein	S	
Olive Leaf		
Quinic acid	S	
Cats Claw		
Thymol	S	
Oil of Thyme		
Undecylenic acid		R
Undecylenic acid		

Fungal growth suppression is measured in a liquid growth medium where bacterial growth is suppressed and specific antifungal agents are introduced before incubation. Growth inhibition is measured after incubation. In contrast to the older isolation and culture techniques, such universal culturing more closely approximates the actions of antifungals in the complex milieu of the colon.

Agents marked as "**Sensitive**" cause effective fungal growth suppression. Those antifungal agent are candidates for suppressing the growth of fungi and yeasts in the patient's colon. The results apply to all organisms reported under "Mycology".

Agents indicated as "**Resistant**" have low effectiveness and can increase the risk of inducing drug resistant organisms. If all tested agents are resistant, synergistic mixtures of antifungal agents may be effective.

Sensitivities are not performed on "**Pathogens**" or "**Parasites**" because they do not grow in culture under normal laboratory conditions. Standard protocols are generally used for treatment of pathogens and parasites.

For Botanical sensitivity testing the active ingredients are tested and an example of the available source is shown.