Metametrix
Clinical Laboratory
3425 Corporate Way
Duluth, GA 30096
770.446.5483 Fax:770.441.2237

Ordering Physician:
Palladium Health / Bioletics
Rick Cohen MD
2947 NW Shevlin Meadows
Bend, OR 97701

Accession Number:	**A1201270083**
Reference Number:	
Patient:	Ben G Greenfield
Age: 30	*Sex:* Male
Date of Birth:	12/20/1981
Date Collected:	1/25/12
Date Received:	1/27/12
Report Date:	2/9/12
Telephone:	(888) 371-1033
Fax:	
Reprinted:	
Comment:	

2100 Gastrointestinal Function Profile

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

Consistency = Formed/Normal

Percentile Ranking by Quintile

Results CFU/gram	1st	2nd	3rd	4th	5th	95% Reference Range
		20%	40%	60%	80%	

Predominant Bacteria (E+007)

E+007

Obligate anaerobes

	Results CFU/gram	95% Reference Range
Bacteroides sp.	2.9	1.6 – 6.7 (>= 1.3)
Clostridia sp.	2.3	1.5 – 6.2 (>= 1.0)
Prevotella sp.	3.3	1.6 – 6.2 (>= 1.1)
Fusobacteria sp.	11.1	1.6 – 7.4 (>= 1.1)
Streptomyces sp.	2.9	1.6 – 5.8 (>= 1.0)
Mycoplasma sp.	6.9	1.7 – 6.2 (>= 1.2)

Facultative anaerobes

	Results CFU/gram	95% Reference Range
Lactobacillus sp.	5.5	1.8 – 7.8 (>= 1.2)
Bifidobacter sp.	5.0	2.3 – 7.6 (>= 1.8)

Obligate aerobes

	Results CFU/gram	95% Reference Range
Escherichia coli	3.8	1.7 – 7.7 (>= 1.1)

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.

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Pathogenic Bacteria

		95% Reference Range
Helicobacter pylori	6.7E+005 **H**	<=1.0E+005
E.H.E. coli	<0.01	<=1.0E+005
Clostridium difficile	<0.01	<=1.0E+005
Campylobacter sp.	<0.01	<=1.0E+005

Yeast/Fungi

Expected Value

No clinically significant amounts.

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

Expected Value

Parasite present; taxonomy unavailable.	**Positive**	Neg

A taxonomy unavailable finding likely indicates an ingested protozoan and not a human parasite. It does not indicate treatment unless patient symptoms and other inflammatory markers are consistent with parasite infection.

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	74	<= 80
Bacteroidetes	26	>= 20

The **Adiposity Index** is derived by using DNA 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	Neg	PBP1a, 2B	Neg
vanA, B, and C	Neg		

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Beneficial SCFA							
Total SCFA	58	53					>= 35 mM/g
n-Butyrate	15.9	5.2					>= 3.9 mM/g
Acetate %	52	52				71	47 - 77 %
Butyrate %	27 H	10				25	7 - 30 %
Propionate %	18	13				25	10 - 29 %
Valerate %	3.0	1.0				3.6	0.4 - 4.6 %
Inflammation							
Lactoferrin	0.2					3.1	<= 6.3 ug/mL
WBCs	Neg						Neg-Rare
Mucus	Neg						Neg
Immunology							
Fecal sIgA	115	20				144	5 - 161 mg/dl
Anti-gliadin sIgA	2.7				6.4		<= 21.4 mg/dl

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 epithielial 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 one specie to allow the normal growth of another one in a complex cross-feeding network.

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

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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Additional Tests

			95% Reference Range
pH	6.1	5.9 – 6.9	5.7 - 7.1
RBCs	Neg		Neg
Color	Brown		

Digestion

			95% Reference Range
Elastase 1	297	L	>= 184 ug/g
Triglycerides	111		<= 181 mg/dL
Putrefactive SCFA	2.9		<= 7.4 mM/g
Vegetable Fibers	Few		None-Few

Absorption

			95% Reference Range
LCFAs	14.3	H	<= 15.1 mmol/L
Total Fat	17.1	H	<= 18.9 mmol/L
Cholesterol	62		<= 191 mg/dL

UC** = Unable to Calculate

Additional Tests

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

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

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.

Decisions involving diagnosis and treatment are the responsibility of the clinician.