Comprehensive Digestive Stool Analysis

Genova Diagnostics ®
Innovative Testing for Optimal Health

Patient: SAMPLE PATIENT
DOB: April 25, 1980
Sex: M
MRN:

Order Number:
Completed: November 28, 2007
Received: November 21, 2007
Collected: November 15, 2007
Route Number: A080461

Digestion

		Reference Range
Chymotrypsin	4.3	0.9-26.8 U/g
Putrefactive SCFAs (Total*)	5.1	1.3-8.6 micromol/g

* Total values equal the sum of all measurable parts.

	Inside	Outside	Reference Range
Meat Fibers ◆	None		None
Vegetable Fibers	Few		None - Few

Absorption

		Reference Range
Triglycerides	0.6	0.2-3.3 mg/g
Long Chain Fatty Acids	22.9	1.3-23.7 mg/g
Cholesterol	1.2	0.2-3.5 mg/g
Phospholipids	3.8	0.2-8.8 mg/g
Fecal Fat (Total*)	28.5	2.6-32.4 mg/g

* Total values equal the sum of all measurable parts.

Metabolic Markers

		Reference Range
Beneficial SCFAs (Total*)	53.3	>= 13.6 micromol/g
n-Butyrate	10.5	>= 2.5 micromol/g
Beta-Glucuronidase	1,327	337-4,433 U/g
pH ◆	6.9	6.1-7.9

* Total values equal the sum of all measurable parts.

SCFA distribution

		Reference Range
Acetate %	62.1	44.5-72.4 %
Propionate %	18.3	<= 32.1 %
n-Butyrate %	19.7	10.8-33.5 %

Immunology

	Inside	Outside	Reference Range
Fecal Lactoferrin ◆	Negative		Negative

Macroscopic

	Inside	Outside	Reference Range
Color	Brown		Brown
Mucus	Negative		Negative
Occult blood ◆	Negative		Negative

Microbiology

Bacteriology

Beneficial Bacteria

Lactobacillus species		3+
Escherichia coli	*NG	
Bifidobacterium		2+

Additional Bacteria

alpha haemolytic Streptococcus	NP		4+
gamma haemolytic Streptococcus	NP		4+
Bacillus species	NP	1+	
Citrobacter freundii	PP		4+
Enterobacter cloacae	PP		4+

Mycology

Candida albicans	NP	1+
Candida parapsilosis	NP	1+
Hansenula anomala	NP	1+
Rhodotorula species	NP	2+

*NG	NP	PP	P
*NG			
No Growth	Non-Pathogen	Possible Pathogen	Pathogen

CDS02 RMS 451 Rev 9

Additional Tests (if indicated)

	In Range	Out of Range
Campylobacter specific antigen ◆	Negative	
Shiga-like Toxin E. coli ◆	Negative	

Commentary

Lab Comments
SENSI'S: All yeast, add'l bacteria

Please note that Genova Diagnostics recently upgraded the automated bacterial identification and susceptibility system to the Vitek 2 system to provide faster and definitive identification of bacteria. As a result the following minor changes to antibiotic sensitivities reported for specific bacteria will be effective July 2007:
· Staphylococcus aureus   susceptibility reports will no longer include Erythromycin.
· Streptococcus agalactiae   susceptibility reports will no longer report Cefazolin (an I.V./I.M. antibiotic), Nitrofurantoin (not a drug of choice for the sites tested), or Erythromycin.

The performance characteristics of all assays have been verified by Genova Diagnostics, Inc.   Unless otherwise noted with ◆ as cleared by the U.S. Food and Drug Administration, assays are For Research Use Only.

Commentary is provided to the practitioner for educational purposes, and should not be interpreted as diagnostic or treatment recommendations. Diagnosis and treatment decisions are the responsibility of the practitioner.

The Reference Range   is a statistical interval representing 95% or 2 Standard Deviations (2 S.D.) of the reference population.

One Standard Deviation (1 S.D.) is a statistical interval representing 68% of the reference population. Values between 1 and 2 S.D. are not necessarily abnormal. Clinical correlation is suggested. (See example below)

Analyte	Result within Ref Range, but outside 1-SD 9.8 Reference Range	2.3 - 12.2 U/g
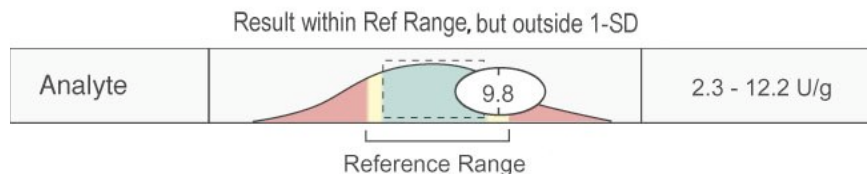
Commentary

Human microflora is influenced by environmental factors and the competitive ecosystem of the organisms in the GI tract. Pathological significance should be based upon clinical symptoms and reproducibility of bacterial recovery.

Triglycerides constitute the major component of dietary fat and are normally broken down by pancreatic lipase into glycerol and free fatty acids. Triglycerides are within the reference range, indicating adequate fat digestion or a lack of dietary fat.

Chymotrypsin is within the reference range. Chymotrypsin is a key pancreatic enzyme that catalyzes protein digestion. Thus, the fecal level is a measure of proteolytic activity and a marker for pancreatic enzyme output as a whole. A value within the reference range suggests normal enzyme production. Levels are also influenced by transit time, such that faster transit results in higher fecal levels.

Valerate, iso-valerate and iso-butyrate are "putrefactive" short chain fatty acids, produced when anaerobic bacteria ferment undigested protein. Levels within the reference range suggest adequate protein digestion.

Long chain fatty acids (LCFAs) are within the reference range, suggesting adequate absorption of fats by the mucosa of the small intestine or a lack of dietary fat.

Cholesterol is within the reference range, suggesting adequate absorption of cholesterol by the small intestine or low dietary intake.

Phospholipids are normal. 50% of phospholipids are derived from bile, with 25% coming from mucosal desquamation and 25% from dietary sources. Nearly 85% of intestinal phospholipids are absorbed. Normal levels of fecal phospholipids indicate average dietary fat intake and adequate digestion/ absorption.

Total fecal fats are within the reference range. The total fecal fat is calculated as the sum of fecal triglycerides, phospholipids, cholesterol and long chain fatty acids.

Beneficial (Total) short chain fatty acids (SCFAs) are acetate, propionate and n-butyrate. They are the end products of anaerobic microbial fermentation of dietary fiber. Levels thus reflect the concentration of intestinal flora as well as soluble fiber in the diet. These beneficial SCFAs are crucial to the health of the intestine, serving as sources of fuel for the cells and the rest of the body. They also help to regulate the fluid balance in the colon.

n-Butyrate is the most important of the beneficial SCFAs, and is the primary energy source for colonic epithelial cells. Adequate amounts are necessary for the healthy metabolism of the colonic mucosa, and have been shown to have protective effects against colorectal cancers.

Beta-glucuronidase is within the reference range. This is an inducible enzyme, produced by E. coli and anaerobes Bacteroides, and Clostridia. Its activity reverses the detoxication of compounds processed in the hepatic Phase II glucuronidation pathway (including many pharmaceuticals, carcinogens, bile acids, and estrogen).

Fecal pH is within the reference range. The pH of the stool is a reflection of several factors in the GI tract, such as gastric acid, pancreatic bicarbonate, short chain fatty acids, ammonia, bile, organic acids, and acids produced by beneficial flora. Proper levels enhance colonization by beneficial flora, deter possible pathogens, promote normal digestive processes, and promote SCFA production.

The SCFA Distribution reflects the relative proportions of the beneficial SCFAs (n-butyrate, propionate, and acetate), thus providing an indirect measure of balance among the anaerobic organisms in the colon.

Sufficient amounts of Lactobacilli appear to be present in the stool. However, Bifidobacteria and E. coli were found in lower than optimal levels. E. coli has been noted at less than ample amounts in dysbiosis, and often rebounds when intestinal imbalances are corrected. The "friendly bacteria", Lactobacilli and Bifidobacteria, are important for gastrointestinal function, as they are involved in vitamin synthesis, natural antibiotic production, immune defense, digestion, detoxification of pro-carcinogens and a host of other activities. Reestablishing healthy levels of Bifidobacteria may be desirable. Supplementation with Lactobacilli might be considered in selected cases where the organisms are in the low range of normal. Ideally, levels of Lactobacillus and E. coli should be 2+ or greater.   Bifidobacteria being a predominate anaerobe should be recovered at levels of 4+.

Commentary

Citrobacter freundii has occasionally been implicated in diarrheal disease. This organism is commonly found in the environment and may be spread by person-to person contact. Isolated from water, fish, animals and food. Citrobacter freundii is considered an opportunistic pathogen, and therefore can be found in the gut as part of normal flora.

There is no detection of fecal lactoferrin. This indicates no active intestinal inflammation. However, non-inflammatory diarrhea caused by irritable bowel syndrome, small intestinal viral infections, non-invasive parasitic infections, or other etiologies may still be present even in the absence of lactoferrin.

A 2+ quantity of yeast represents a small increase from normal. Due to the heterogeneity of fecal material, it may occur in normal stools. It could, however, reflect a condition of yeast overgrowth.