

PATIENT:		TEST REF:
TEST NUMBER:	COLLECTED:	PRACTITIONER: ADDRESS:
PATIENT NUMBER:	RECEIVED:	
GENDER:	TESTED:	
AGE		
DATE OF BIRTH:		

TEST NAME: CDSA (G)

Comprehensive Digestive Stool Analysis

Digestion

Chymotrypsin		Reference Range 0.9-26.8 U/g
Putrefactive SCFAs (Total*)		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	None		None - Few

Absorption

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

* Total values equal the sum of all measurable parts.

Metabolic Markers

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

* Total values equal the sum of all measurable parts.

SCFA distribution

Acetate %		44.5-72.4 %
Propionate %		<= 32.1 %
n-Butyrate %		10.8-33.5 %

Immunology

	Inside	Outside	Reference Range
Fecal Lactoferrin ♦	Negative		Negative

Macroscopic

Color	Brown		Brown
Mucus	Negative		Negative
Occult blood ♦	Negative		Negative

Microbiology

Bacteriology

Beneficial Bacteria

Lactobacillus species	<NG	
Escherichia coli		(4+)
Bifidobacterium		(4+)

Additional Bacteria

alpha haemolytic Streptococcus	NP	(4+)
gamma haemolytic Streptococcus	NP	(4+)
Bacillus species	NP	(1+)

Mycology

*NG *NG

*NG

*NG

No Growth

NP

Non-Pathogen

PP

Possible Pathogen

P

Pathogen

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Additional Tests (if indicated)

Empty box for additional tests.

Commentary

Methodology: MALDI-TOF MS, Automated and Manual Biochemical Methods, Vitek 2® System Microbial identification and Antibiotic susceptibility, Automated Chemistry, GC-FID, Microscopic Evaluation, ELISA, Ion Selective Electrode, Immunoassay, GCMS

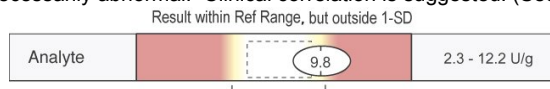
<dl = Unable to determine results due to less than detectable levels of analyte.

The performance characteristics of all assays have been verified by Genova Diagnostics, Inc. Unless otherwise noted with ♦, the assay has not been cleared by the U.S. Food and Drug Administration.

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)



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 are at below detectable levels (<dl) in the stool. Triglycerides constitute the major component of dietary fat and are normally broken down by pancreatic lipase into glycerol and free fatty acids. Non-elevated levels indicate 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.

Nordic Laboratories Aps

Nygade 6, 3.sal • 1164 Copenhagen K • Denmark
Tel: +45 33 75 10 00

UK Office:

11 Old Factory Buildings • Stonegate • E. Sussex TN5 7DU • UK
Tel: +44 (0)1580 201 687

www.nordic-labs.com
info@nordic-labs.com

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Commentary

Long chain fatty acids (LCFAs) are broken down by pancreatic lipase from dietary triglycerides and are normally readily absorbed by the intestinal mucosa. Elevated levels in the stool suggest fat malabsorption in the small bowel, possibly resulting from bile salt insufficiency, excessive dietary fat, or inflammation within the intestinal mucosa.

Cholesterol is increased in the stool. Elevated levels may reflect fat malabsorption (rule out bile salt insufficiency or intestinal inflammation in the small intestine), dietary cholesterol and/or fiber, pancreatic insufficiency, or increased intestinal epithelial cell turnover.

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.

The total fecal fats are calculated as the sum of fecal triglycerides, phospholipids, cholesterol and long chain fatty acids (LCFAs). Elevated levels reflect pancreatic insufficiency (expect elevated triglycerides), malabsorption (expect elevated long chain fatty acids or cholesterol), or both.

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 below 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. Beside the possible influences listed here, an acidic pH may also result from malabsorption of sugars in the intestine.

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 Bifidobacteria and E. coli appear to be present in the stool, however Lactobacilli is below optimal levels. Ample amounts of E. coli have been associated with a balanced gut flora. 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. Ideally, levels of Lactobacillus and E. coli should be 2+ or greater. Bifidobacteria being a predominate anaerobe should be recovered at levels of 4+.

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.