Comprehensive Digestive Stool Analysis

Genova Diagnostics Europe

Genova Diagnostics

SAMPLE REPORT

Completed: November 2010
Received: October 2010
Collected: October 2010
Route Number:7

Digestion

		Reference Range
Chymotrypsin	4.2	0.9-26.8 U/g
Putrefactive SCFAs (Total*)	0.8	1.3-8.6 micromol/g

* Total values equal the sum of all measurable parts.

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

Absorption

		Reference Range
Triglycerides	0.9	0.2-3.3 mg/g
Long Chain Fatty Acids	42.7	1.3-23.7 mg/g
Cholesterol	1.7	0.2-3.5 mg/g
Phospholipids	1.8	0.2-8.8 mg/g
Fecal Fat (Total*)	47.1	2.6-32.4 mg/g

* Total values equal the sum of all measurable parts.

Metabolic Markers

		Reference Range
Beneficial SCFAs (Total*)	13.8	>= 13.6 micromol/g
n-Butyrate	2.2	>= 2.5 micromol/g
Beta-Glucuronidase	774	337-4,433 U/g
pH ◆	6.5	6.1-7.9

* Total values equal the sum of all measurable parts.

SCFA distribution

		Reference Range
Acetate %	64.5	44.5-72.4 %
Propionate %	19.3	<= 32.1 %
n-Butyrate %	15.9	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	3+

Additional Bacteria

alpha haemolytic Streptococcus	NP	2+
Streptococcus agalactiae gp B	NP	4+
Coag. negative Staphylococcus	NP	1+
Citrobacter braakii	PP	4+
Kluyvera cryocrescens	NP	1+

Mycology

Candida albicans	NP	1+
Saccharomyces cerevisiae	NP	1+

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

Additional Tests (if indicated)

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

Commentary

Lab Comments

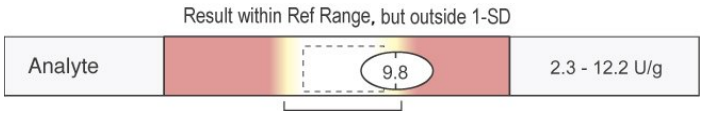
SENSI'S: All yeast, add'l bacteria

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)



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.

Commentary

Valerate, iso-valerate and iso-butyrate are "putrefactive" short chain fatty acids produced when anaerobic bacteria ferment undigested protein. While low levels of Short Chain Fatty Acids are statistically significant, the clinical relevance is doubtful. Low Putrefactive SCFAs appear to be a variant of normal.

Elevated amounts of meat and/or vegetable fibers were seen in the stool. High concentrations of these fibers are normally absent from the feces. Increased amounts are indirect indicators of maldigestion due to hydrochloric acid/pepsin insufficiency, pancreatic enzyme insufficiency, or inadequate mastication of food.

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 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.

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. Low levels of n-butyrate are associated with a higher risk of colon cancer and ulcerative colitis.

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 E. coli appear to be present in the stool. However, Lactobacilli and Bifidobacteria were found in lower than 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.

Bacterial Sensitivity

SAMPLE REPORT

Prescriptive Agents

CITROBACTER BRAAKII

	S	I	R
Amox./Clavulanic Acid			R
Ampicillin			R
Cephalothin			R
Ciprofloxacin	S		
Tetracycline	S		
Trimethoprim/Sulfa	S		

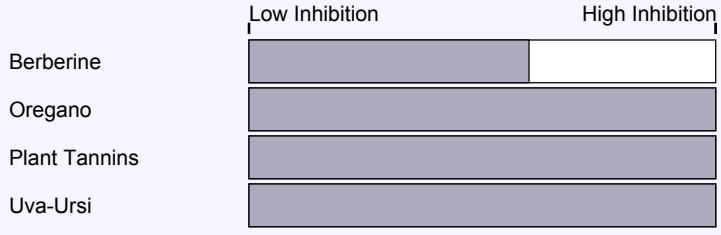
S Indicates susceptibility to prescriptive agents

I Indicates intermediate susceptibility to prescriptive agents

R Indicates resistance to prescriptive agents

Natural Agents

CITROBACTER BRAAKII



Prescriptive Agents:
Microbial testing has been performed in vitro to determine antibiotic sensitivity and resistance at standard dosages. Prudent use of antimicrobials requires knowledge of appropriate blood or tissue levels of those agents. Antibiotics that appear in the "S" (susceptible) column are more effective at inhibiting the growth of this organism. Antibiotics that appear in the "I" (intermediate) column are partially effective at inhibiting the growth of this organism. Antibiotics that appear in the "R" (resistant) column allow continued growth of the organism in vitro and are usually less effective clinically. Inappropriate use of antibacterials often results in the emergence of resistance.

Natural Agents:
In this assay, "inhibition" is defined as the reduction level on organism growth as a direct result of inhibition by a natural substance. The level of inhibition is an indicator of how effective the natural substance was at limiting the growth of an organism in an in vitro environment. High inhibition indicates a greater ability by the natural substance to limit growth, while Low Inhibition a lesser ability to limit growth. These natural products should be considered investigational in nature and not be viewed as standard clinical treatment substances.

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63 Zillicoa Street
Asheville, NC 28801-1074

Yeast Sensitivity

SAMPLE REPORT

Azole Antifungals

CANDIDA ALBICANS

	S	I	R
Fluconazole	<=0.125		
Itraconazole	=0.25		
Ketoconazole	=0.125		

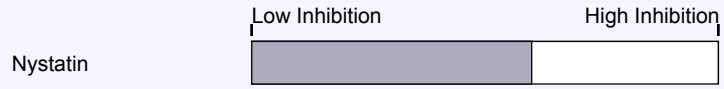
S Indicates susceptibility to prescriptive agents

I Indicates intermediate susceptibility to prescriptive agents

R Indicates resistance to prescriptive agents

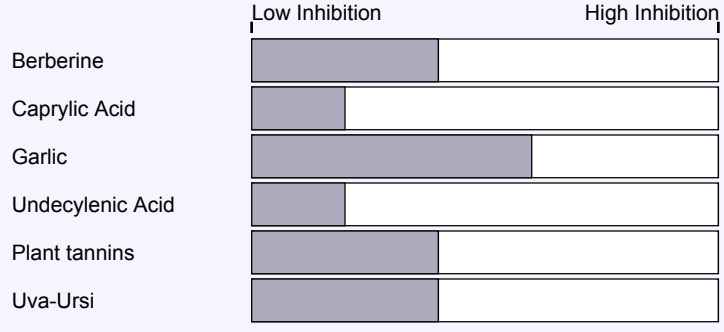
Non-absorbed Antifungals

CANDIDA ALBICANS



Natural Antifungals

CANDIDA ALBICANS



Azole Antifungals:
Microbial testing has been performed in vitro to determine antifungal sensitivity and resistance at standard dosages. Prudent use of antimicrobials requires knowledge of appropriate blood or tissue levels of those agents. Antifungals that appear in the "S" (susceptible) column are more effective at inhibiting the growth of this organism. Antifungals that appear in the "I" (intermediate) column are partially effective at inhibiting the growth of this organism. Antifungals that appear in the "R" (resistant) column allow continued growth of the organism in vitro and are usually less effective clinically. Inappropriate use of antifungals often results in the emergence of resistance.

Nystatin and Natural Antifungals:
In this assay, "inhibition" is defined as the reduction level on organism growth as a direct result of inhibition by a natural substance. The level of inhibition is an indicator of how effective the natural substance was at limiting the growth of an organism in an in vitro environment. High Inhibition indicates a greater ability by the natural substance to limit growth, while Low Inhibition a lesser ability to limit growth. In accordance with laboratory guidelines for reporting sensitivities, results for Nystatin are now being reported with natural antifungals in this category.

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Asheville, NC 28801-1074

Yeast Sensitivity

SAMPLE REPORT

Azole Antifungals

SACCHAROMYCES CEREVISIAE

	S	I	R
Fluconazole	=4.0		
Itraconazole			=2
Ketoconazole	=0.5		

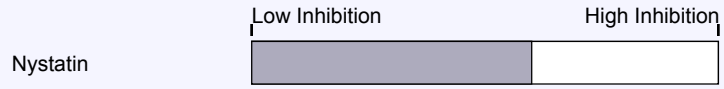
S Indicates susceptibility to prescriptive agents

I Indicates intermediate susceptibility to prescriptive agents

R Indicates resistance to prescriptive agents

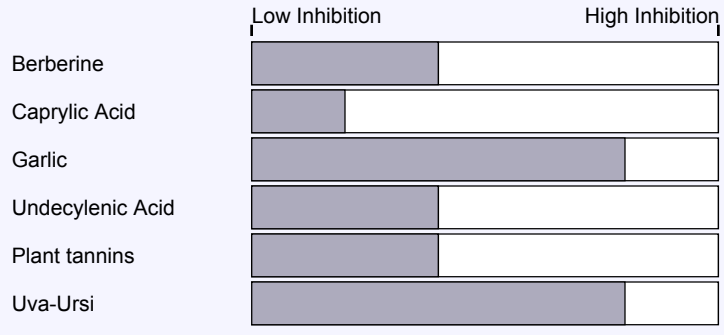
Non-absorbed Antifungals

SACCHAROMYCES CEREVISIAE



Natural Antifungals

SACCHAROMYCES CEREVISIAE



Azole Antifungals:
Microbial testing has been performed in vitro to determine antifungal sensitivity and resistance at standard dosages. Prudent use of antimicrobials requires knowledge of appropriate blood or tissue levels of those agents. Antifungals that appear in the "S" (susceptible) column are more effective at inhibiting the growth of this organism. Antifungals that appear in the "I" (intermediate) column are partially effective at inhibiting the growth of this organism. Antifungals that appear in the "R" (resistant) column allow continued growth of the organism in vitro and are usually less effective clinically. Inappropriate use of antifungals often results in the emergence of resistance.

Nystatin and Natural Antifungals:
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