



# Comprehensive Digestive Stool Analysis 2.0



**Genova Diagnostics®**  
Europe

Improving Healthcare for Chronic Disease

Parkgate House  
356 West Barnes Lane  
New Malden, Surrey KT3 6NB

63 Zillicoa Street  
Asheville, NC 28801 USA

Patient: **MARIUSZ SMYKLA**  
DOB: December 27, 1987  
Sex: M  
MRN: B000003222

**Order Number: F6120715**  
Completed: December 21, 2012  
Received: December 12, 2012  
Collected: December 10, 2012  
Route Number: A157759

Sarah Myhill Ltd  
Sarah Myhill  
Upper Weston  
Llangunllo  
Knighton, Powys LD7 1SL  
Great Britain and Northern Ireland

## Digestion/Absorption

Analyte	Result	Reference Range
---------	--------	-----------------

1. Pancreatic Elastase 1 ♦		>= 201 mcg/g
2. Putrefactive SCFAs (Total*)		1.3-8.6 micromol/g

\*Total values equal the sum of all measurable parts.

### Digestion/Absorption

Digestion encompasses the functional activities of: mastication, gastric acid production, pancreatic activity, bile production and brush border maintenance. Absorption depends on all of the above actions, as well as a healthy gut mucosal barrier.

## Gut Immunology

Analyte	Result	Reference Range
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3. Eosinophil Protein X		<= 7.0 mcg/g
4. Calprotectin ♦		<=50 mcg/g

### Gut Immunology

Eosinophil Protein X (EPX) reflects IgE-mediated inflammation and tissue damage and can be elevated in celiac disease, collagenous colitis, helminthic/parasitic infection, and IgE mediated food allergies. Elevated EPX requires further diagnostic testing to determine the cause. Calprotectin is a neutrophilic marker specific for inflammation in the gastrointestinal tract. It is elevated with infection, post-infectious IBS, and NSAID enteropathy. Fecal calprotectin can be used to differentiate IBD vs. IBS, to monitor treatment in IBD, and to determine which patients should be referred for endoscopy and/or colonoscopy. Levels between 50-120 should be repeated at 4-6 weeks and confirmed.

## Metabolic

Analyte	Result	Reference Range
---------	--------	-----------------

5. Beneficial SCFAs (Total*)		>= 13.6 micromol/g
6. n-Butyrate		>= 2.5 micromol/g
7. pH		6.1-7.9
8. Beta-glucuronidase		337-4,433 U/g

### Secondary Bile Acids

9. Lithocholic acid (LCA)		0.65-5.21 mg/g
10. Deoxycholic acid (DCA)		0.67-6.76 mg/g
11. LCA / DCA Ratio		0.39-2.07

\*Total values equal the sum of all measurable parts.

### Metabolic

Gut metabolism is representative of the bacterial milieu, primarily through the presence of commensal bacteria. Metabolic activities include: mucous production, vitamin synthesis and absorption, deconjugation of steroid hormones and bile acids, fat regulation, and SCFA metabolism. These metabolic activities require a normal population of commensal bacteria without active bacterial, viral, or parasitic infection.



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### Microbiology

## Bacteriology

#### 12. Beneficial Bacteria

Lactobacillus species	*NG	
Escherichia coli		(4+)
Bifidobacterium		(1+)

#### 13. Additional Bacteria

alpha haemolytic Streptococcus	NP	
gamma haemolytic Streptococcus	NP	(3+)
Morganella morganii	PP	(4+)
Proteus mirabilis	PP	(4+)

#### 14. Mycology

Candida albicans/dubliniensis	PP	(2+)
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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.

\*NG

\*NG

No Growth

NP

Non-Pathogen

PP

Potential Pathogen

P

Pathogen

### Microbiology

The Markers in this section reflect the bacteriological status of the gut.

**Beneficial bacteria** Beneficial flora controls potentially pathogenic organisms, influences nutrient production, removes toxins from the gut and stimulates the intestinal immune system (GALT). The composition of the colonic flora is affected by diet, transit time, stool pH, age, microbial interactions, colonic availability of nutrients, bile acids, sulfate and the ability of the microbes to metabolize these substrates. Ideally, levels of Lactobacilli and E. coli should be 2+ or greater. Bifidobacteria being a predominate anaerobe should be recovered at levels of 4+.

### Additional bacteria

**Non-pathogen:** Organisms that fall under this category are those that constitute normal, commensal flora, or have not been recognized as etiological agents of disease.

**Potential Pathogen:** Organisms that fall under this category are considered potential or opportunistic pathogens when present in heavy growth.

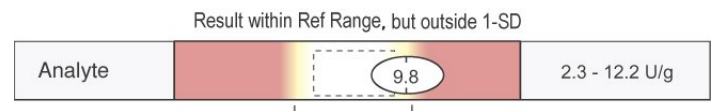
**Pathogen:** The organisms that fall under this category are well-recognized pathogens in clinical literature that have a clearly recognized mechanism of pathogenicity and are considered significant regardless of the quantity that appears in culture.

**Mycology:** Organisms that fall under this category constitute part of the normal colonic flora when present in small numbers. They may, however, become potential pathogens after disruption of the mucosal lining, which enables fungi to colonize and establish a local infection.

### Lab Comments

*SENSI'S: All yeast, add'l bacteria*

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)



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 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.

**Additional Tests**

	In Range	Out of Range
16. Shiga toxin E. coli ♦	Negative	
17. Campylobacter ♦	Negative	

**Shiga toxin E. coli**

Shiga toxin-producing Escherichia coli (STEC) is a group of bacterial strains that have been identified as worldwide causes of serious human gastrointestinal disease. The subgroup enterohemorrhagic E. coli includes over 100 different serotypes, with O157:H7 being the most significant, as it occurs in over 80% of all cases. The pathogen is transmitted primarily by food, in particular dairy and beef cattle.

**Campylobacter**

Campylobacter jejuni is the most frequent cause of bacterial-induced diarrhea. While transmission can occur via the fecal-oral route, infection is primarily associated with the ingestion of contaminated and poorly cooked foods of animal origin, notably, red meat and milk.

# Bacterial Sensitivity

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Prescriptive Agents			
MORGANELLA MORGANII			
	S	I	R
Ampicillin	<input type="text"/>	<input type="text"/>	<input type="text" value="R"/>
Amox./Clavulanic Acid	<input type="text"/>	<input type="text"/>	<input type="text" value="R"/>
Cephalothin	<input type="text"/>	<input type="text"/>	<input type="text" value="R"/>
Ciprofloxacin	<input type="text" value="S"/>	<input type="text"/>	<input type="text"/>
Tetracycline	<input type="text"/>	<input type="text"/>	<input type="text" value="R"/>
Trimethoprim/Sulfa	<input type="text" value="S"/>	<input type="text"/>	<input type="text"/>

**S** Indicates susceptibility to prescriptive agents  
**I** Indicates intermediate susceptibility to prescriptive agents  
**R** Indicates resistance to prescriptive agents

## 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.

Natural Agents	
MORGANELLA MORGANII	
	Low Inhibition      High Inhibition
Berberine	<div style="width: 50%; background-color: #cccccc;"></div>
Oregano	<div style="width: 50%; background-color: #cccccc;"></div>
Plant Tannins	<div style="width: 50%; background-color: #cccccc;"></div>
Uva-Ursi	<div style="width: 75%; background-color: #cccccc;"></div>



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Prescriptive Agents			
PROTEUS MIRABILIS	S	I	R
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Amox./Clavulanic Acid	<input type="text" value="S"/>	<input type="text"/>	<input type="text"/>
Cephalothin	<input type="text" value="S"/>	<input type="text"/>	<input type="text"/>
Ciprofloxacin	<input type="text" value="S"/>	<input type="text"/>	<input type="text"/>
Tetracycline	<input type="text"/>	<input type="text"/>	<input type="text" value="R"/>
Trimethoprim/Sulfa	<input type="text"/>	<input type="text"/>	<input type="text" value="R"/>

**S** Indicates susceptibility to prescriptive agents  
**I** Indicates intermediate susceptibility to prescriptive agents  
**R** Indicates resistance to prescriptive agents

## 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	
PROTEUS MIRABILIS	
	Low Inhibition   High Inhibition
Berberine	
Oregano	
Plant Tannins	
Uva-Ursi	

## 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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Azole Antifungals			
CANDIDA ALBICANS/DUBLINIENSIS			
	S	I	R
Fluconazole	<=0.125		
Itraconazole	<=0.06		
Ketoconazole	<=0.025		

**S** Indicates susceptibility to prescriptive agents  
**I** Indicates intermediate susceptibility to prescriptive agents  
**R** Indicates resistance to prescriptive agents






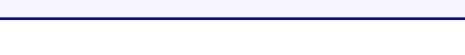
### Azole Antifungals:

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.

Non-absorbed Antifungals	
CANDIDA ALBICANS/DUBLINIENSIS	
	Low Inhibition High Inhibition
Nystatin	

### 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.

Natural Antifungals	
CANDIDA ALBICANS/DUBLINIENSIS	
	Low Inhibition High Inhibition
Berberine	
Caprylic Acid	
Garlic	
Undecylenic Acid	
Plant tannins	
Uva-Ursi	



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### Parasitology

#### Microscopic Exam Results:

No Ova or Parasites seen

#### Parasitology

Optimized Parasite Recovery (OPR) is a technique used by Genova Diagnostics Inc. that involves combining multiple stool specimens submitted from the same patient for intestinal parasite examination as compared to individual sample evaluation. Research demonstrates that this method increases parasite recovery.

Data from analysis shows that parasites are detected in 22% of samples submitted to Genova Diagnostics Inc. This implies that a significant portion of the population suffers from infection with parasites, many of whom experience minimal gastrointestinal symptoms.

#### PARASITOLOGY EIA TESTS:

	In Range	Out of Range
Cryptosporidium	Negative	
Giardia lamblia	Negative	
Entamoeba histolytica/dispar	Negative	