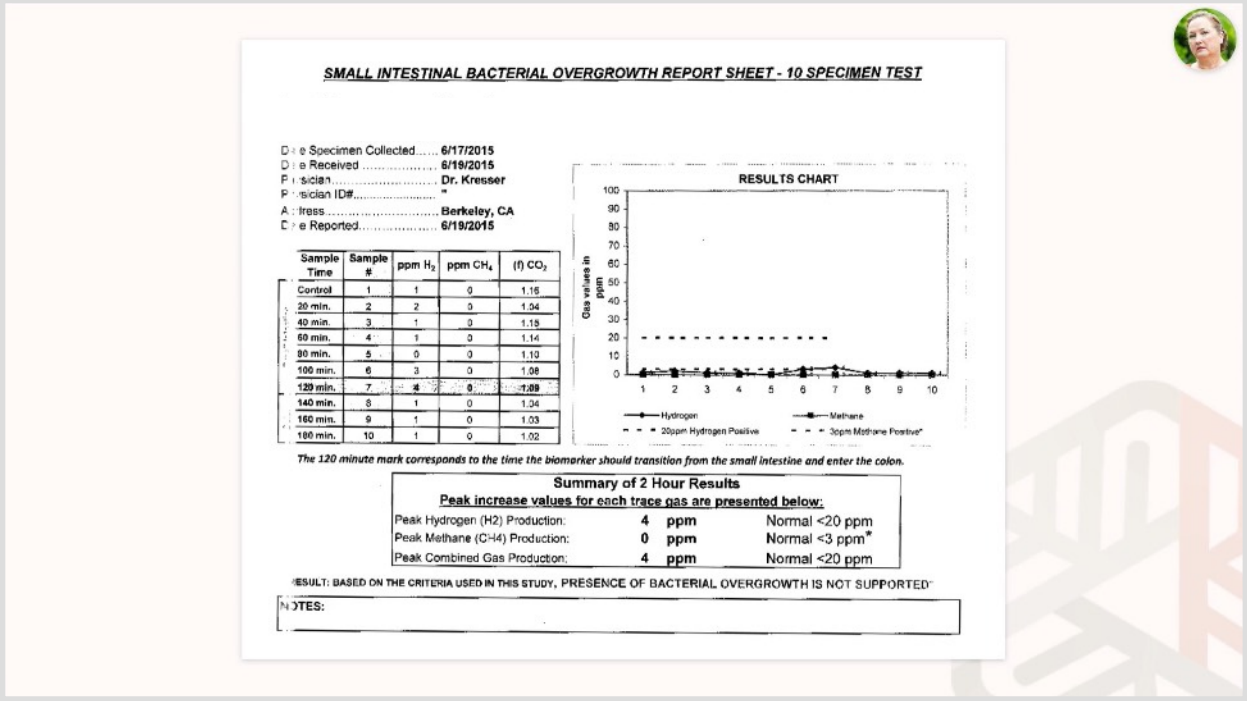
KRESSER INSTITUTE
FOR FUNCTIONAL AND EVOLUTIONARY MEDICINE

Gut Case Studies - Part 1

In this unit we're going to do full case studies for the gut, including all gut tests run for a particular patient and the treatment we prescribed. I want to mention that I'm presenting cases and patients that I've treated over the years, and some of the treatment plans recommended may differ from what we have recently discussed in the curriculum. I am regularly adjusting my treatment plans and recommendations so that they are current with research, new products on the market, and updated standards of care. Throughout the presentation you'll see treatment plans that were recommended during the time that the patient was seen, and we will give you a summary of changes to these protocols at the end of this presentation.

CASE #1: 60-YEAR-OLD FEMALE

So, the first patient is a 60-year-old female, and just as a reminder, the pictures aren't of the actual patient, they're just to add a little life to these slides, and that's true throughout this presentation. This patient's chief complaint was bloating, indigestion, diarrhea, hypothyroidism, and weight gain. She had a history of antibiotics and a vegetarian diet and had gained 15 pounds in the past year, mostly of abdominal fat.



SMALL INTESTINAL BACTERIAL OVERGROWTH REPORT SHEET - 10 SPECIMEN TEST

Date Specimen Collected..... 6/17/2015
Date Received..... 6/19/2015
Physician..... Dr. Kresser
Physician ID#..... "
Address..... Berkeley, CA
Date Reported..... 6/19/2015

Sample Time	Sample #	ppm H_2	ppm CH_4	(f) CO_2
Control	1	1	0	1.16
20 min.	2	2	0	1.04
40 min.	3	1	0	1.15
60 min.	4	1	0	1.14
80 min.	5	0	0	1.10
100 min.	6	3	0	1.08
120 min.	7	4	0	1.09
140 min.	8	1	0	1.04
160 min.	9	1	0	1.03
180 min.	10	1	0	1.02

RESULTS CHART

Gas values in ppm

Hydrogen — Methane
20ppm Hydrogen Positive — 3ppm Methane Positive*

The 120 minute mark corresponds to the time the biomarker should transition from the small intestine and enter the colon.

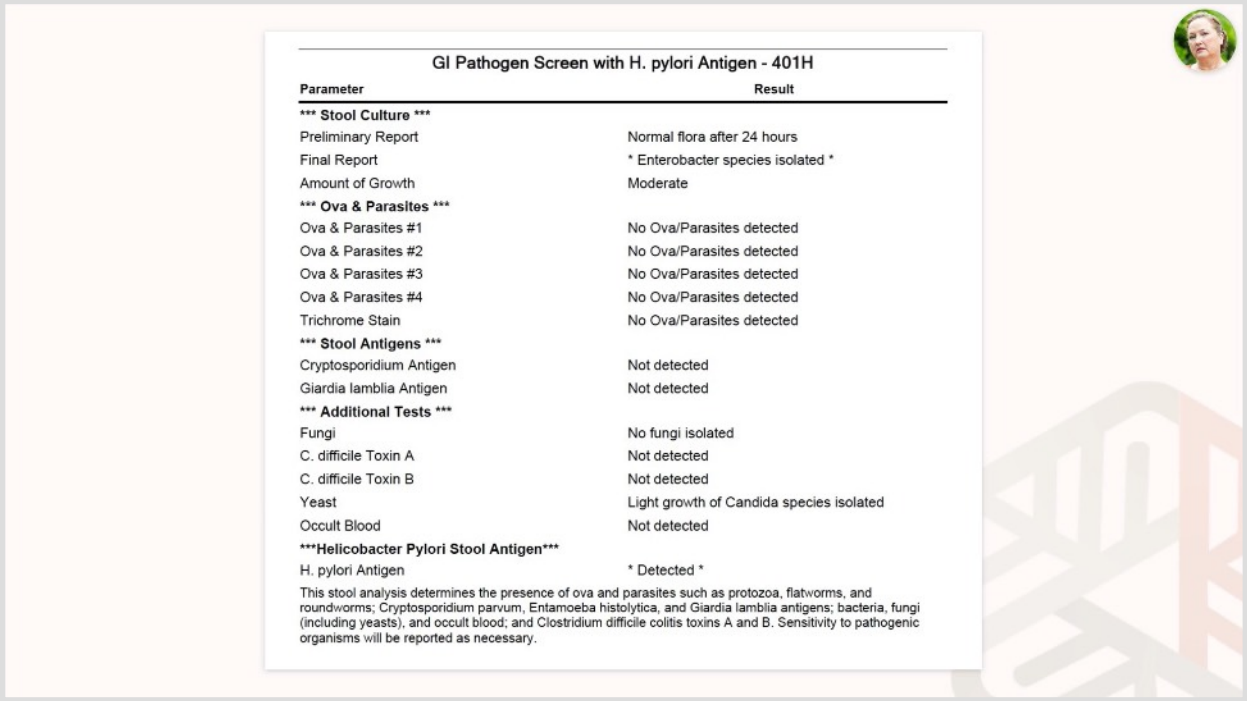
Summary of 2 Hour Results
Peak increase values for each trace gas are presented below:

Peak Hydrogen (H2) Production:	4 ppm	Normal <20 ppm
Peak Methane (CH4) Production:	0 ppm	Normal <3 ppm*
Peak Combined Gas Production:	4 ppm	Normal <20 ppm

RESULT: BASED ON THE CRITERIA USED IN THIS STUDY, PRESENCE OF BACTERIAL OVERGROWTH IS NOT SUPPORTED"

NOTES:

So let's start with the SIBO results. Commonwealth marked the test results as negative, but the hydrogen was very low, even in the colon, and we talked about this pattern before, where you see all zeroes across the board or very low hydrogen results and zeroes for methane, and there is a possibility that it could be hydrogen sulfide overproduction in these cases.

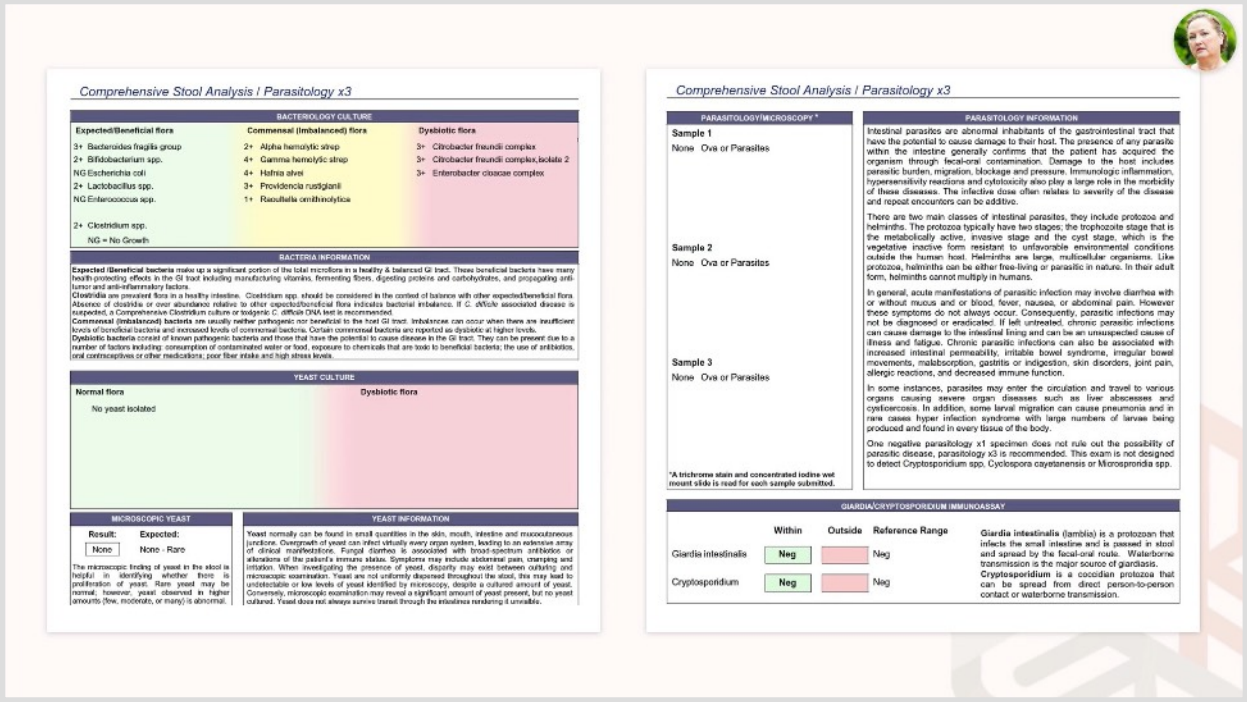


GI Pathogen Screen with H. pylori Antigen - 401H

Parameter	Result
***** Stool Culture *****	
Preliminary Report	Normal flora after 24 hours
Final Report	* Enterobacter species isolated *
Amount of Growth	Moderate
***** Ova & Parasites *****	
Ova & Parasites #1	No Ova/Parasites detected
Ova & Parasites #2	No Ova/Parasites detected
Ova & Parasites #3	No Ova/Parasites detected
Ova & Parasites #4	No Ova/Parasites detected
Trichrome Stain	No Ova/Parasites detected
***** Stool Antigens *****	
Cryptosporidium Antigen	Not detected
Giardia lamblia Antigen	Not detected
***** Additional Tests *****	
Fungi	No fungi isolated
C. difficile Toxin A	Not detected
C. difficile Toxin B	Not detected
Yeast	Light growth of Candida species isolated
Occult Blood	Not detected
*****Helicobacter Pylori Stool Antigen*****	
H. pylori Antigen	* Detected *

This stool analysis determines the presence of ova and parasites such as protozoa, flatworms, and roundworms; Cryptosporidium parvum, Entamoeba histolytica, and Giardia lamblia antigens; bacteria, fungi (including yeasts), and occult blood; and Clostridium difficile colitis toxins A and B. Sensitivity to pathogenic organisms will be reported as necessary.

So here are her BioHealth stool test results. They did detect H. pylori and there's also a light growth of candida. They mention a moderate growth of Enterobacter species, and we talked about this before—it's not really possible with this BioHealth test to determine whether this is normal or pathogenic growth.



Comprehensive Stool Analysis / Parasitology x3

BACTERIOLOGY CULTURE

Expected/Beneficial flora	Commensal (Imbalanced) flora	Dysbiotic flora
3+ Bacteroides fragilis group	2+ Alpha hemolytic strep	3+ Citrobacter freundii complex
2+ Bifidobacterium spp.	4+ Gamma hemolytic strep	3+ Citrobacter freundii complex,isolate 2
NG Escherichia coli	4+ Hafnia alvei	3+ Enterobacter cloacae complex
2+ Lactobacillus spp.	3+ Providencia rustigianii	
NG Enterococcus spp.	1+ Raoultella ornithinolytica	
2+ Clostridium spp.		
NG = No Growth		

BACTERIA INFORMATION

Expected /Beneficial bacteria make up a significant portion of the total microflora in a healthy & balanced GI tract. These beneficial bacteria have many health-promoting effects in the GI tract including manufacturing vitamins, fermenting fibers, digesting proteins and carbohydrates, and propagating anti-tumor and anti-inflammatory factors.
Clostridia are prevalent flora in a healthy intestine. Clostridium spp. should be considered in the context of balance with other expected/beneficial flora. Absence of clostridia or over abundance relative to other expected/beneficial flora indicates bacterial imbalance. If *C. difficile* associated disease is suspected, a Comprehensive Clostridium culture or toxigenic *C. difficile* DNA test is recommended.
Commensal (imbalanced) bacteria are usually neither pathogenic nor beneficial to the host GI tract. Imbalances can occur when there are insufficient levels of beneficial bacteria and increased levels of commensal bacteria. Certain commensal bacteria are reported as dysbiotic at higher levels.
Dysbiotic bacteria consist of known pathogenic bacteria and those that have the potential to cause disease in the GI tract. They can be present due to a number of factors including: consumption of contaminated water or food, exposure to chemicals that are toxic to beneficial bacteria; the use of antibiotics, oral contraceptives or other medications; poor fiber intake and high stress levels.

YEAST CULTURE

Normal flora	Dysbiotic flora
No yeast isolated	

MICROSCOPIC YEAST

Result:	Expected:
None	None - Rare

The microscopic finding of yeast in the stool is helpful in identifying whether there is proliferation of yeast. Rare yeast may be normal; however, yeast observed in higher amounts (few, moderate, or many) is abnormal.

YEAST INFORMATION

Yeast normally can be found in small quantities in the skin, mouth, intestine and mucocutaneous junctions. Overgrowth of yeast can infect virtually every organ system, leading to an extensive array of clinical manifestations. Fungal diarrhea is associated with broad-spectrum antibiotics or alterations of the patient's immune status. Symptoms may include abdominal pain, cramping and irritation. When investigating the presence of yeast, disparity may exist between culturing and microscopic examination. Yeast are not uniformly dispersed throughout the stool, this may lead to undetectable or low levels of yeast identified by microscopy, despite a cultured amount of yeast. Conversely, microscopic examination may reveal a significant amount of yeast present, but no yeast cultured. Yeast does not always survive transit through the intestines rendering it unviable.

Comprehensive Stool Analysis / Parasitology x3

PARASITOLOGY/MICROSCOPY *

Sample 1
None Ova or Parasites

Sample 2
None Ova or Parasites

Sample 3
None Ova or Parasites

*A trichrome stain and concentrated iodine wet mount slide is read for each sample submitted.

PARASITOLOGY INFORMATION

Intestinal parasites are abnormal inhabitants of the gastrointestinal tract that have the potential to cause damage to their host. The presence of any parasite within the intestine generally confirms that the patient has acquired the organism through fecal-oral contamination. Damage to the host includes parasitic burden, migration, blockage and pressure. Immunologic inflammation, hypersensitivity reactions and cytotoxicity also play a large role in the morbidity of these diseases. The infective dose often relates to severity of the disease and repeat encounters can be additive.

There are two main classes of intestinal parasites, they include protozoa and helminths. The protozoa typically have two stages; the trophozoite stage that is the metabolically active, invasive stage and the cyst stage, which is the vegetative inactive form resistant to unfavorable environmental conditions outside the human host. Helminths are large, multicellular organisms. Like protozoa, helminths can be either free-living or parasitic in nature. In their adult form, helminths cannot multiply in humans.

In general, acute manifestations of parasitic infection may involve diarrhea with or without mucus and or blood, fever, nausea, or abdominal pain. However these symptoms do not always occur. Consequently, parasitic infections may not be diagnosed or eradicated. If left untreated, chronic parasitic infections can cause damage to the intestinal lining and can be an unsuspected cause of illness and fatigue. Chronic parasitic infections can also be associated with increased intestinal permeability, irritable bowel syndrome, irregular bowel movements, malabsorption, gastritis or indigestion, skin disorders, joint pain, allergic reactions, and decreased immune function.

In some instances, parasites may enter the circulation and travel to various organs causing severe organ diseases such as liver abscesses and cysticercosis. In addition, some larval migration can cause pneumonia and in rare cases hyper infection syndrome with large numbers of larvae being produced and found in every tissue of the body.

One negative parasitology x1 specimen does not rule out the possibility of parasitic disease, parasitology x3 is recommended. This exam is not designed to detect Cryptosporidium spp, Cyclospora cayetanensis or Microsporidia spp.

GIARDIA/CRYPTOSPORIDIUM IMMUNOASSAY

	Within	Outside	Reference Range
Giardia intestinalis	Neg		Neg
Cryptosporidium	Neg		Neg

Giardia intestinalis (lamblia) is a protozoan that infects the small intestine and is passed in stool and spread by the fecal-oral route. Waterborne transmission is the major source of giardiasis.
Cryptosporidium is a coccidian protozoa that can be spread from direct person-to-person contact or waterborne transmission.

The Doctor's Data stool test results show significant presence of dysbiotic flora as well as commensal imbalance flora. Interestingly enough, they didn't catch the yeast overgrowth on this, whereas they had on the BioHealth test.

Comprehensive Stool Analysis / Parasitology x3

DIGESTION / ABSORPTION

	Within	Outside	Reference Range	
Elastase	461		> 200 µg/mL	
Fat Stain	Few		None - Mod	
Muscle fibers	None		None - Rare	
Vegetable fibers	Few		None - Few	
Carbohydrates	Neg		Neg	

Elastase findings can be used for the diagnosis or the exclusion of exocrine pancreatic insufficiency. Correlations between low levels and chronic pancreatitis and cancer have been reported. **Fat Stain:** Microscopic determination of fecal fat using Sudan IV staining is a qualitative procedure utilized to assess fat absorption and to detect steatorrhea. **Muscle fibers** in the stool are an indicator of incomplete digestion. Bloating, flatulence, feelings of "fullness" may be associated with increase in muscle fibers. **Vegetable fibers** in the stool may be indicative of inadequate chewing, or eating "on the run". **Carbohydrates:** The presence of reducing substances in stool specimens can indicate carbohydrate malabsorption.

INFLAMMATION

	Within	Outside	Reference Range	
Lactoferrin	< 0.5		< 7.3 µg/mL	
Calprotectin*	< 10		<= 50 µg/g	
Lysozyme*	232		<= 600 ng/mL	
White Blood Cells	None		None - Rare	
Mucus	Neg		Neg	

Lactoferrin and **Calprotectin** are reliable markers for differentiating organic inflammation (IBD) from function symptoms (IBS) and for management of IBD. Monitoring levels of fecal lactoferrin and calprotectin can play an essential role in determining the effectiveness of therapy, are good predictors of IBD remission, and can indicate a low risk of relapse. **Lysozyme*** is an enzyme secreted at the site of inflammation in the GI tract and elevated levels have been identified in IBD patients. **White Blood Cells** (WBC) and **Mucus** in the stool can occur with bacterial and parasitic infections, with mucosal irritation, and inflammatory bowel diseases such as Crohn's disease or ulcerative colitis.

IMMUNOLOGY

	Within	Outside	Reference Range	
Secretory IgA*		282	51 - 204 mg/dL	

Secretory IgA* (sIgA) is secreted by mucosal tissue and represents the first line of defense of the GI mucosa and is central to the normal function of the GI tract as an immune barrier. Elevated levels of sIgA have been associated with an upregulated immune response.

Comprehensive Stool Analysis / Parasitology x3

SHORT CHAIN FATTY ACIDS

	Within	Outside	Reference Range	
% Acetate	73		40 - 75 %	
% Propionate	9.5		9 - 29 %	
% Butyrate	18		9 - 37 %	
% Valerate		0.2	0.5 - 7 %	
Butyrate	1.9		0.8 - 4.8 mg/mL	
Total SCFA's	11		4 - 18 mg/mL	

Short chain fatty acids (SCFAs): SCFAs are the end product of the bacterial fermentation process of dietary fiber by beneficial flora in the gut and play an important role in the health of the GI as well as protecting against intestinal dysbiosis. Lactobacilli and bifidobacteria produce large amounts of short chain fatty acids, which decrease the pH of the intestines and therefore make the environment unsuitable for pathogens, including bacteria and yeast. Studies have shown that SCFAs have numerous implications in maintaining gut physiology. SCFAs decrease inflammation, stimulate healing, and contribute to normal cell metabolism and differentiation. Levels of Butyrate and Total SCFA in mg/mL are important for assessing overall SCFA production, and are reflective of beneficial flora levels and/or adequate fiber intake.

INTESTINAL HEALTH MARKERS

	Within	Outside	Reference Range	
Red Blood Cells	None		None - Rare	
pH		5.5	6 - 7.8	
Occult Blood	Neg		Neg	

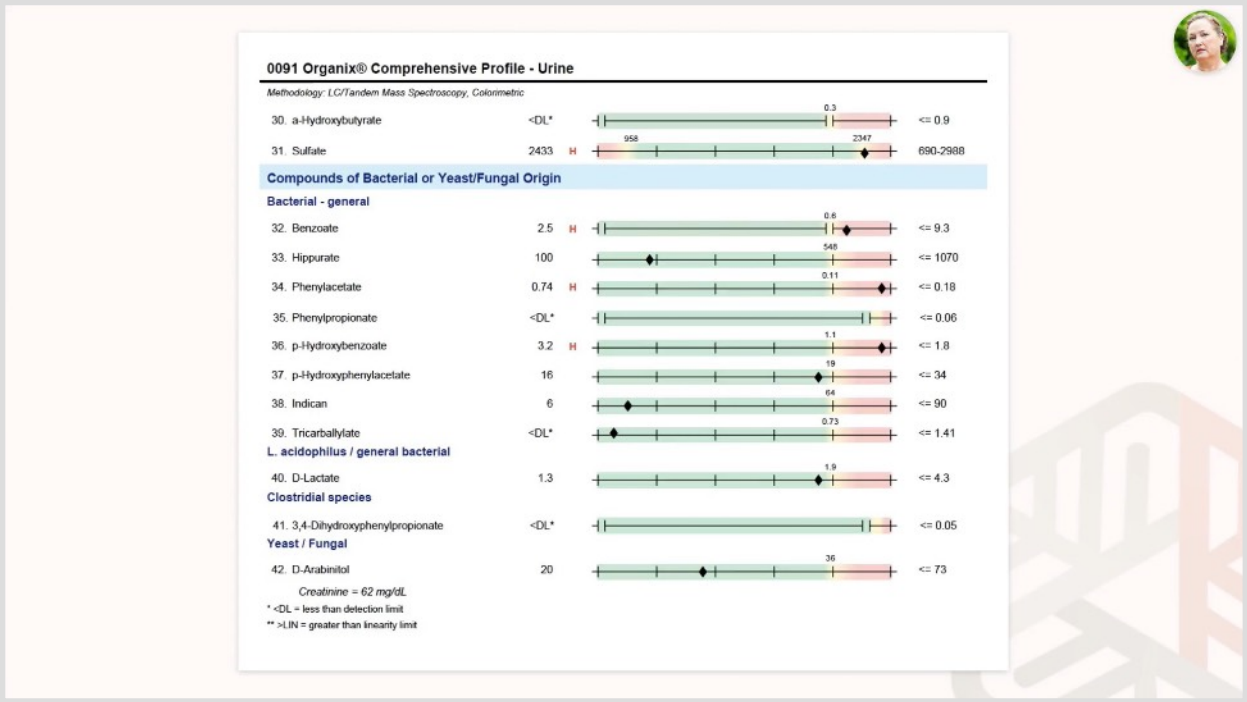
Red Blood Cells (RBC) in the stool may be associated with a parasitic or bacterial infection, or an inflammatory bowel condition such as ulcerative colitis. Colorectal cancer, anal fistulas, and hemorrhoids should also be ruled out.
pH: Fecal pH is largely dependent on the fermentation of fiber by the beneficial flora of the gut.
Occult blood: A positive occult blood indicates the presence of free hemoglobin found in the stool, which is released when red blood cells are lysed.

MACROSCOPIC APPEARANCE

	Appearance	Expected	
Color	Brown	Brown	

Color: Stool is normally brown because of pigments formed by bacteria acting on bile introduced into the digestive system from the liver. While certain conditions can cause changes in stool color, many changes are harmless and are caused by pigments in foods

As you can see, not a lot going on in the digestion, absorption, or inflammation categories; her secretory IgA was elevated, her percent of valerate short-chain fatty acid was low, and the intestinal pH was low, which is common in fungal overgrowth conditions.



0091 Organix® Comprehensive Profile - Urine

Methodology: LC/Tandem Mass Spectroscopy, Colorimetric

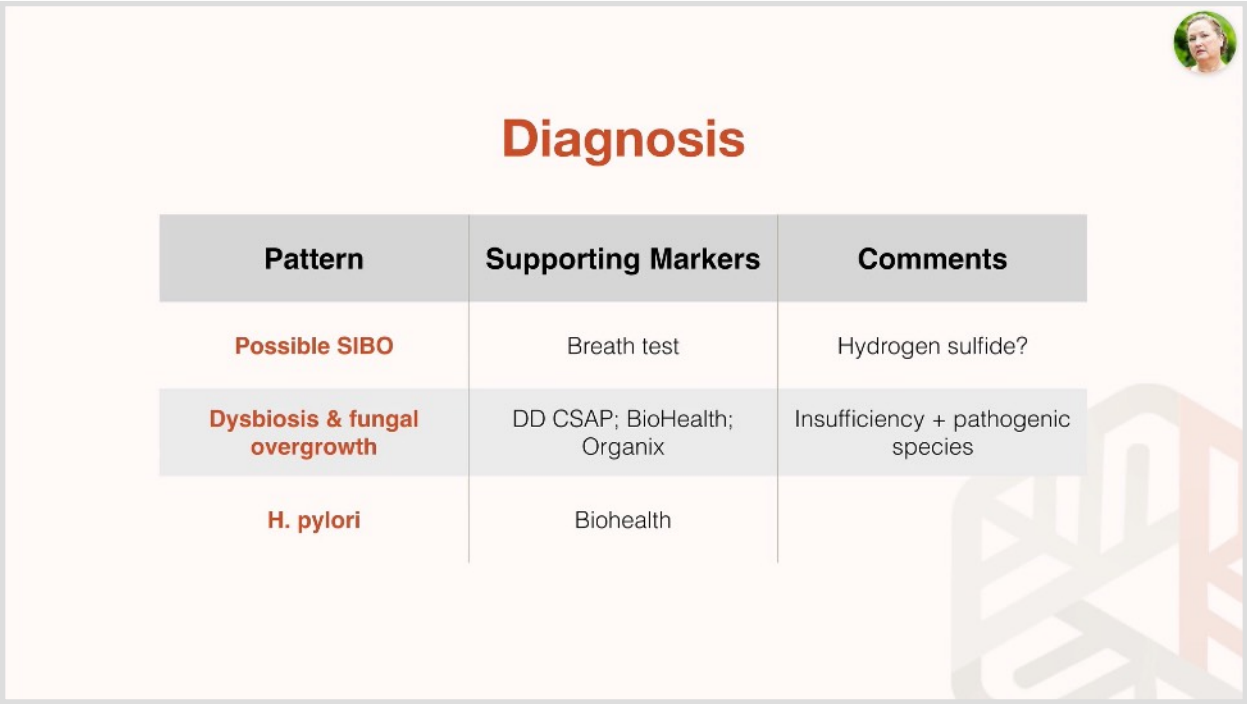
30. a-Hydroxybutyrate	<DL*		<= 0.9
31. Sulfate	2433	H	690-2988
Compounds of Bacterial or Yeast/Fungal Origin			
Bacterial - general			
32. Benzoate	2.5	H	<= 9.3
33. Hippurate	100		<= 1070
34. Phenylacetate	0.74	H	<= 0.18
35. Phenylpropionate	<DL*		<= 0.06
36. p-Hydroxybenzoate	3.2	H	<= 1.8
37. p-Hydroxyphenylacetate	16		<= 34
38. Indican	6		<= 90
39. Tricarballylate	<DL*		<= 1.41
L. acidophilus / general bacterial			
40. D-Lactate	1.3		<= 4.3
Clostridial species			
41. 3,4-Dihydroxyphenylpropionate	<DL*		<= 0.05
Yeast / Fungal			
42. D-Arabinitol	20		<= 73

Creatinine = 62 mg/dL

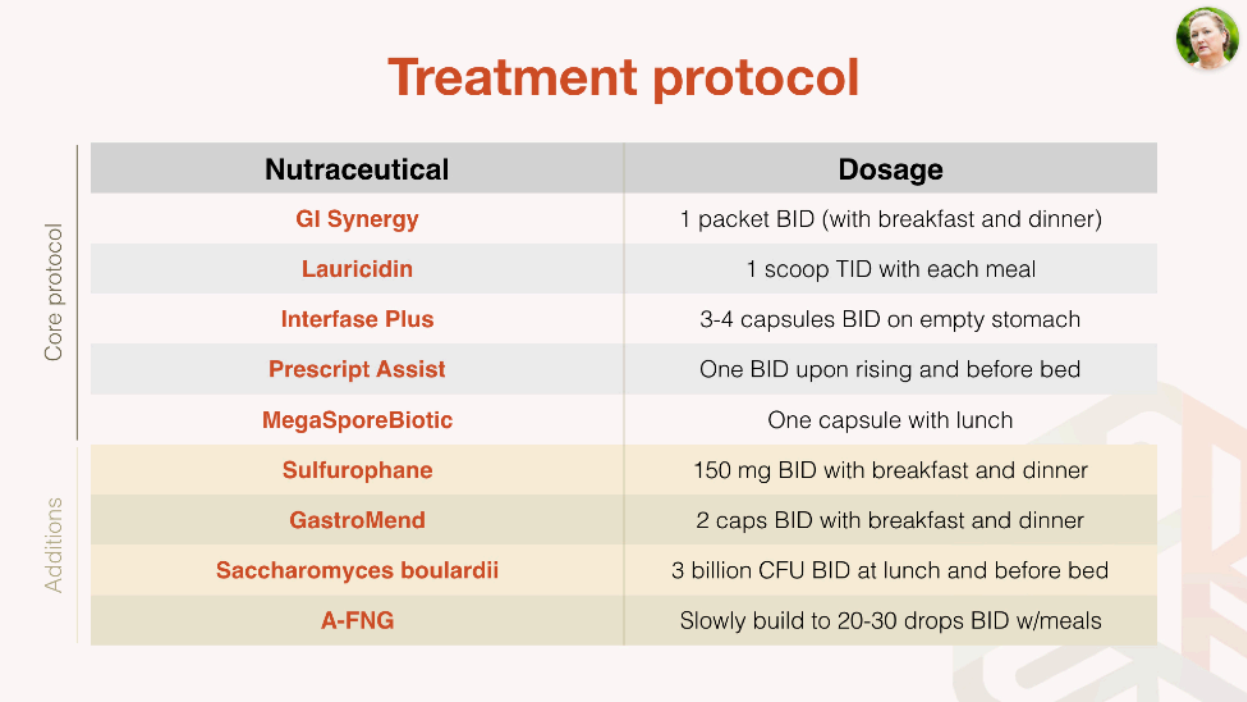
* <DL = less than detection limit

** >LIN = greater than linearity limit

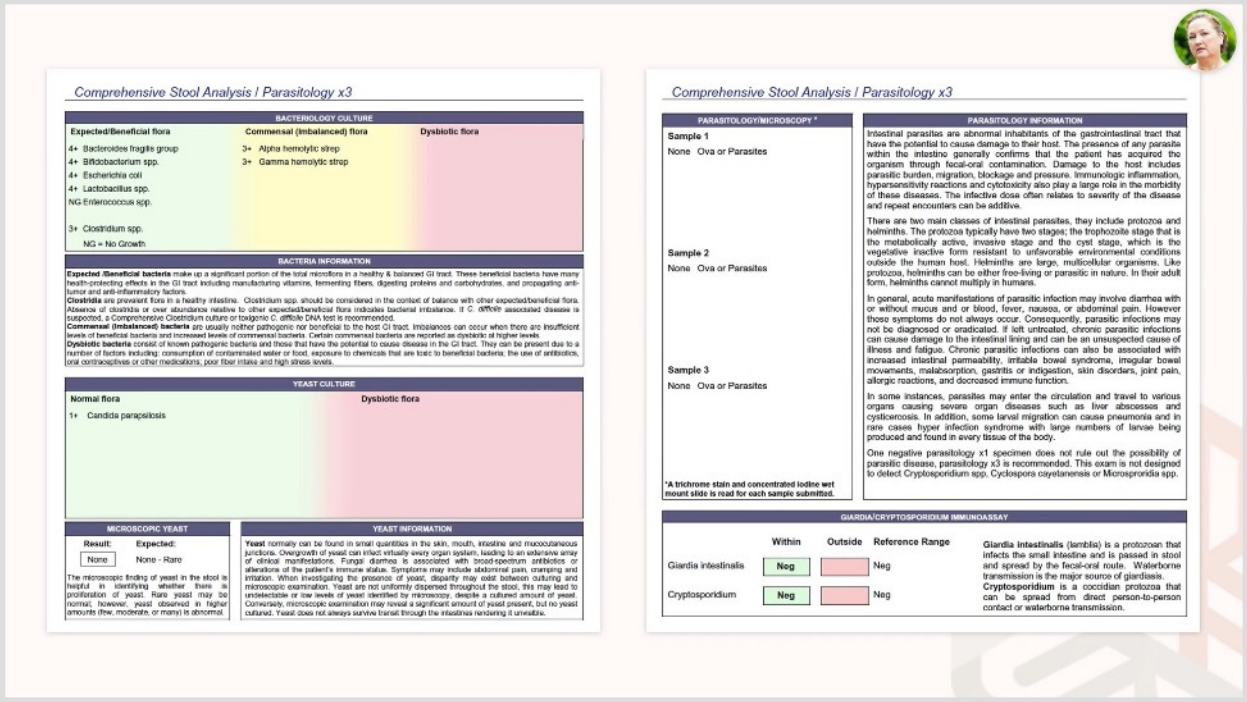
Here's her urine organic acids test. Benzoate is high-normal, not out of the reference range. I think we talked about this in the testing section, but high often means high-normal. Phenylacetate was also in the elevated range, in this case it was out of the reference range, and elevations in phenylacetate can cause cognitive, behavioral, and neurological problems; it wasn't a primary complaint that the patient mentioned, but she did have some of that. And then there's p-hydroxybenzoate, that was elevated, and that's a sign of microbial overgrowth.



The diagnosis for this patient: possible SIBO, hydrogen sulfide production based on the Commonwealth breath test; then dysbiosis and fungal overgrowth from the BioHealth stool test, the Doctor's Data stool test, and the organic acids urine test; and then H. pylori was present on the BioHealth test.



Here's the treatment that I used for this patient: botanical antimicrobial protocol with some additions for H. pylori and fungal overgrowth, sulfurophane and GastroMend for H. pylori, Saccharomyces boulardii and A-FNG for fungal overgrowth. This patient had a history of gut issues including H. pylori, so we decided to do this protocol for 60 days before retesting.



Comprehensive Stool Analysis / Parasitology x3

BACTERIOLOGY CULTURE

Expected/Beneficial flora	Commensal (Imbalanced) flora	Dysbiotic flora
4+ Bacteroides fragilis group	3+ Alpha hemolytic strep	
4+ Bifidobacterium spp.	3+ Gamma hemolytic strep	
4+ Escherichia coli		
4+ Lactobacillus spp.		
NG Enterococcus spp.		
3+ Clostridium spp.		
NG = No Growth		

BACTERIA INFORMATION

Expected /Beneficial bacteria make up a significant portion of the total microflora in a healthy & balanced GI tract. These beneficial bacteria have many health-protecting effects in the GI tract including manufacturing vitamins, fermenting fibers, digesting proteins and carbohydrates, and propagating anti-tumor and anti-inflammatory factors.
Clostridia are prevalent flora in a healthy intestine. Clostridium spp. should be considered in the context of balance with other expected/beneficial flora. Absence of clostridia or over abundance relative to other expected/beneficial flora indicates bacterial imbalance. If *C. difficile* associated disease is suspected, a Comprehensive Clostridium culture or toxigenic *C. difficile* DNA test is recommended.
Commensal (Imbalanced) bacteria are usually neither pathogenic nor beneficial to the host GI tract. Imbalances can occur when there are insufficient levels of beneficial bacteria and increased levels of commensal bacteria. Certain commensal bacteria are reported as dysbiotic at higher levels.
Dysbiotic bacteria consist of known pathogenic bacteria and those that have the potential to cause disease in the GI tract. They can be present due to a number of factors including: consumption of contaminated water or food, exposure to chemicals that are toxic to beneficial bacteria, the use of antibiotics, oral contraceptives or other medications, poor fiber intake and high stress levels.

YEAST CULTURE

Normal flora	Dysbiotic flora
1+ Candida parapsilosis	

MICROSCOPIC YEAST

Result:	Expected:
None	None - Rare

The microscopic finding of yeast in the stool is helpful in identifying whether there is proliferation of yeast. Rare yeast may be normal; however, yeast observed in higher amounts (few, moderate, or many) is abnormal.

YEAST INFORMATION

Yeast normally can be found in small quantities in the skin, mouth, intestine and mucocutaneous junctions. Overgrowth of yeast can infect virtually every organ system, leading to an extensive array of clinical manifestations. Fungal diarrhea is associated with broad-spectrum antibiotics or alterations of the patient's immune status. Symptoms may include abdominal pain, cramping and irritation. When investigating the presence of yeast, disparity may exist between culturing and microscopic examination. Yeast are not uniformly dispersed throughout the stool, this may lead to undetectable or low levels of yeast identified by microscopy, despite a cultured amount of yeast. Conversely, microscopic examination may reveal a significant amount of yeast present, but no yeast cultured. Yeast does not always survive transit through the intestines rendering it unviable.

Comprehensive Stool Analysis / Parasitology x3

PARASITOLOGY/MICROSCOPY *

Sample 1
None Ova or Parasites

Sample 2
None Ova or Parasites

Sample 3
None Ova or Parasites

***A trichrome stain and concentrated iodine wet mount slide is read for each sample submitted.**

PARASITOLOGY INFORMATION

Intestinal parasites are abnormal inhabitants of the gastrointestinal tract that have the potential to cause damage to their host. The presence of any parasite within the intestine generally confirms that the patient has acquired the organism through fecal-oral contamination. Damage to the host includes parasitic burden, migration, blockage and pressure. Immunologic inflammation, hypersensitivity reactions and cytotoxicity also play a large role in the morbidity of these diseases. The infective dose often relates to severity of the disease and repeat encounters can be additive.

There are two main classes of intestinal parasites, they include protozoa and helminths. The protozoa typically have two stages; the trophozoite stage that is the metabolically active, invasive stage and the cyst stage, which is the vegetative inactive form resistant to unfavorable environmental conditions outside the human host. Helminths are large, multicellular organisms. Like protozoa, helminths can be either free-living or parasitic in nature. In their adult form, helminths cannot multiply in humans.

In general, acute manifestations of parasitic infection may involve diarrhea with or without mucus and or blood, fever, nausea, or abdominal pain. However those symptoms do not always occur. Consequently, parasitic infections may not be diagnosed or eradicated. If left untreated, chronic parasitic infections can cause damage to the intestinal lining and can be an unsuspected cause of illness and fatigue. Chronic parasitic infections can also be associated with increased intestinal permeability, irritable bowel syndrome, irregular bowel movements, malabsorption, gastritis or indigestion, skin disorders, joint pain, allergic reactions, and decreased immune function.

In some instances, parasites may enter the circulation and travel to various organs causing severe organ diseases such as liver abscesses and cysticercosis. In addition, some larval migration can cause pneumonia and in rare cases hyper infection syndrome with large numbers of larvae being produced and found in every tissue of the body.

One negative parasitology x1 specimen does not rule out the possibility of parasitic disease, parasitology x3 is recommended. This exam is not designed to detect Cryptosporidium spp, Cyclospora cayetanensis or Microsporidia spp.

GIARDIA/CRYPTOSPORIDIUM IMMUNOASSAY

	Within	Outside	Reference Range
Giardia intestinalis	Neg		Neg
Cryptosporidium	Neg		Neg

Giardia intestinalis (lamblia) is a protozoan that infects the small intestine and is passed in stool and spread by the fecal-oral route. Waterborne transmission is the major source of giardiasis.
Cryptosporidium is a coccidian protozoa that can be spread from direct person-to-person contact or waterborne transmission.

Here are the retest results: big improvement, as you can see, in dysbiosis, no fungal overgrowth, there was normal candida, 1+ for candida, but that's not, as I've mentioned, a problem—we all have some yeast in our digestive tract—no parasites.

DIGESTION /ABSORPTION

	Within	Outside	Reference Range
Elastase	> 500		> 200 µg/mL
Fat Stain	Few		None - Mod
Muscle fibers	None		None - Rare
Vegetable fibers	Rare		None - Few
Carbohydrates	Neg		Neg

Elastase findings can be used for the diagnosis or the exclusion of exocrine pancreatic insufficiency. Correlations between low levels and chronic pancreatitis and cancer have been reported. **Fat Stain:** Microscopic determination of fecal fat using Sudan IV staining is a qualitative procedure utilized to assess fat absorption and to detect steatorrhea. **Muscle fibers** in the stool are an indicator of incomplete digestion. Bloating, flatulence, feelings of "fullness" may be associated with increase in muscle fibers. **Vegetable fibers** in the stool may be indicative of inadequate chewing, or eating "on the run". **Carbohydrates:** The presence of reducing substances in stool specimens can indicate carbohydrate malabsorption.

INFLAMMATION

	Within	Outside	Reference Range
Lactoferrin	3.9		< 7.3 µg/mL
Calprotectin*	39		<= 50 µg/g
Lysozyme*	82		<= 600 ng/mL
White Blood Cells	None		None - Rare
Mucus	Neg		Neg

Lactoferrin and **Calprotectin** are reliable markers for differentiating organic inflammation (IBD) from function symptoms (IBS) and for management of IBD. Monitoring levels of fecal lactoferrin and calprotectin can play an essential role in determining the effectiveness of therapy, are good predictors of IBD remission, and can indicate a low risk of relapse. **Lysozyme*** is an enzyme secreted at the site of inflammation in the GI tract and elevated levels have been identified in IBD patients. **White Blood Cells** (WBC) and **Mucus** in the stool can occur with bacterial and parasitic infections, with mucosal irritation, and inflammatory bowel diseases such as Crohn's disease or ulcerative colitis.

IMMUNOLOGY

	Within	Outside	Reference Range
Secretory IgA*		33.0	51 - 204 mg/dL

Secretory IgA* (sIgA) is secreted by mucosal tissue and represents the first line of defense of the GI mucosa and is central to the normal function of the GI tract as an immune barrier. Elevated levels of sIgA have been associated with an upregulated immune response.

SHORT CHAIN FATTY ACIDS

	Within	Outside	Reference Range
% Acetate	69		40 - 75 %
% Propionate	17		9 - 29 %
% Butyrate	12		9 - 37 %
% Valerate	2.8		0.5 - 7 %
Butyrate	0.82		0.8 - 4.8 mg/mL
Total SCFA's	6.8		4 - 18 mg/mL

Short chain fatty acids (SCFAs): SCFAs are the end product of the bacterial fermentation process of dietary fiber by beneficial flora in the gut and play an important role in the health of the GI as well as protecting against intestinal dysbiosis. Lactobacilli and bifidobacteria produce large amounts of short chain fatty acids, which decrease the pH of the intestines and therefore make the environment unsuitable for pathogens, including bacteria and yeast. Studies have shown that SCFAs have numerous implications in maintaining gut physiology. SCFAs decrease inflammation, stimulate healing, and contribute to normal cell metabolism and differentiation. Levels of **Butyrate** and **Total SCFA** in mg/mL are important for assessing overall SCFA production, and are reflective of beneficial flora levels and/or adequate fiber intake.

INTESTINAL HEALTH MARKERS

	Within	Outside	Reference Range
Red Blood Cells	None		None - Rare
pH	7.2		6 - 7.8
Occult Blood	Neg		Neg

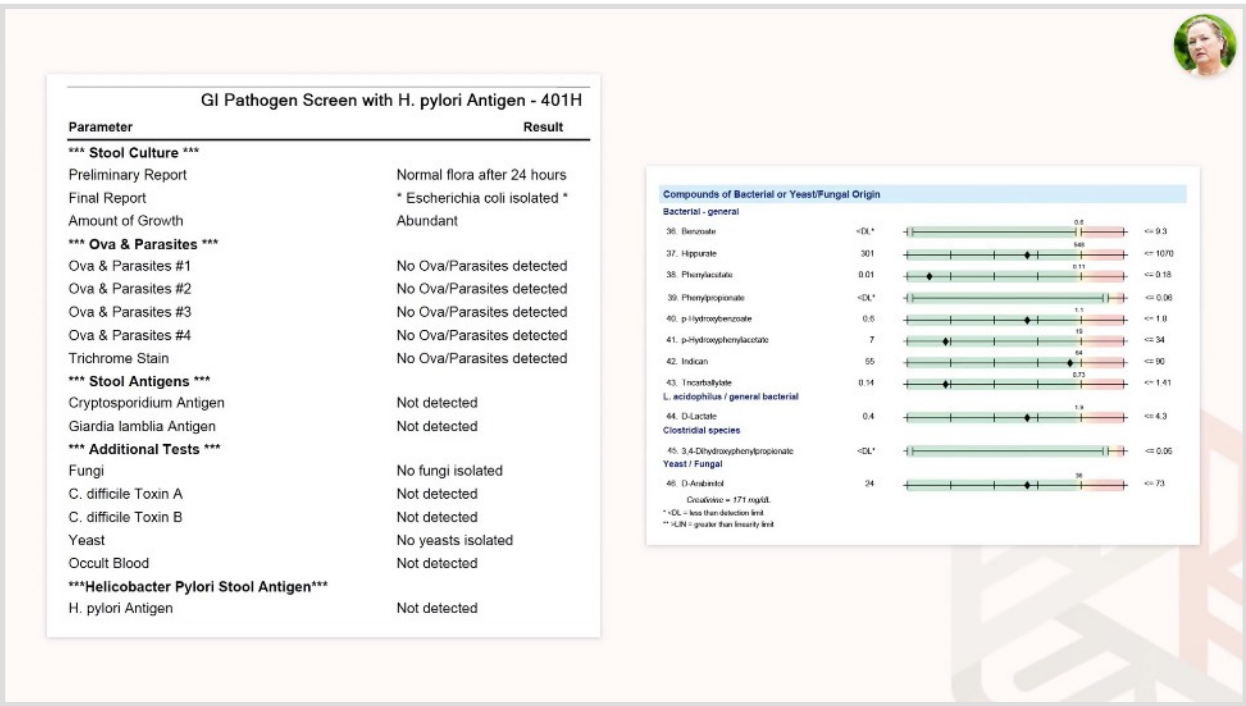
Red Blood Cells (RBC) in the stool may be associated with a parasitic or bacterial infection, or an inflammatory bowel condition such as ulcerative colitis. Colorectal cancer, anal fistulas, and hemorrhoids should also be ruled out.
pH: Fecal pH is largely dependent on the fermentation of fiber by the beneficial flora of the gut.
Occult blood: A positive occult blood indicates the presence of free hemoglobin found in the stool, which is released when red blood cells are lysed.

MACROSCOPIC APPEARANCE

	Appearance	Expected
Color	Brown	Brown
Consistency	Soft	Formed/Soft

Color: Stool is normally brown because of pigments formed by bacteria acting on bile introduced into the digestive system from the liver. While certain conditions can cause changes in stool color, many changes are harmless and are caused by pigments in foods or dietary supplements. **Consistency:** Stool normally contains about 75% water and ideally should be formed and soft. Stool consistency can vary based upon transit time and water absorption.

Short-chain fatty acids normalized; this time, her sIgA went down from being high, now it's a little bit low, but we would expect that to normalize over time, and then her fecal pH was normal.



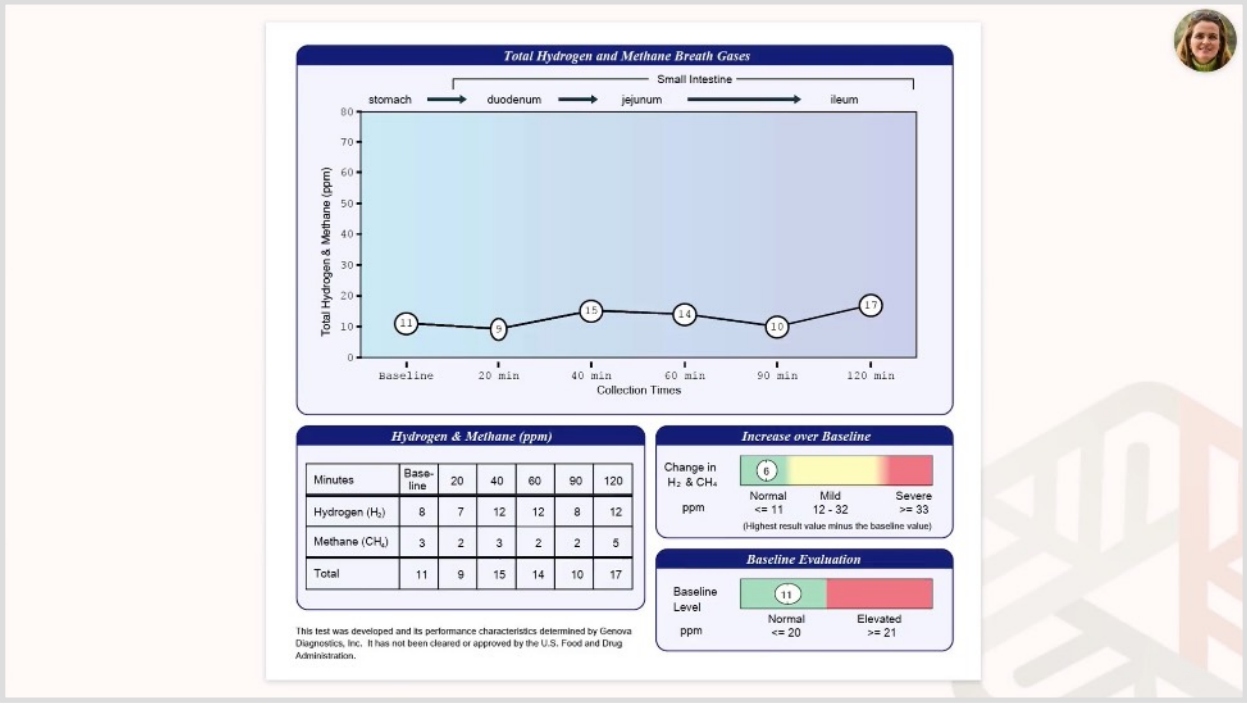
GI Pathogen Screen with H. pylori Antigen - 401H

Parameter	Result
***** Stool Culture *****	
Preliminary Report	Normal flora after 24 hours
Final Report	* Escherichia coli isolated *
Amount of Growth	Abundant
***** Ova & Parasites *****	
Ova & Parasites #1	No Ova/Parasites detected
Ova & Parasites #2	No Ova/Parasites detected
Ova & Parasites #3	No Ova/Parasites detected
Ova & Parasites #4	No Ova/Parasites detected
Trichrome Stain	No Ova/Parasites detected
***** Stool Antigens *****	
Cryptosporidium Antigen	Not detected
Giardia lamblia Antigen	Not detected
***** Additional Tests *****	
Fungi	No fungi isolated
C. difficile Toxin A	Not detected
C. difficile Toxin B	Not detected
Yeast	No yeasts isolated
Occult Blood	Not detected
*****Helicobacter Pylori Stool Antigen*****	
H. pylori Antigen	Not detected

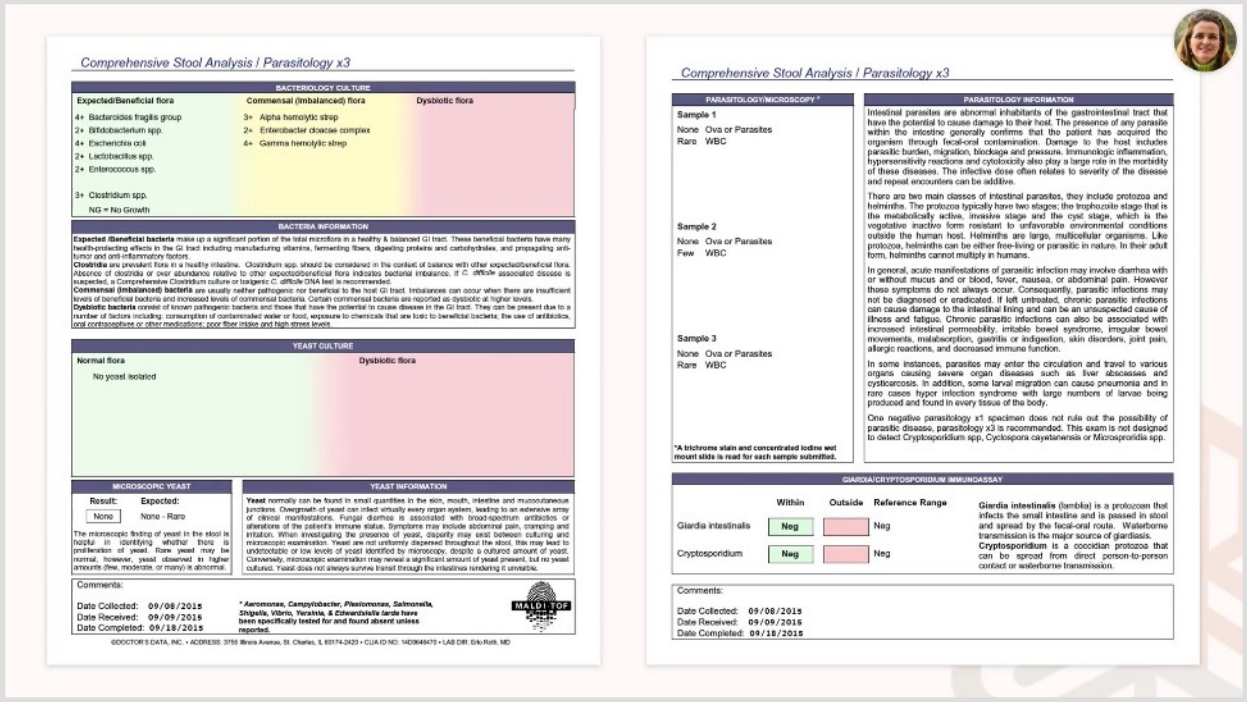
H. pylori was gone on the follow-up BioHealth, and the organics panel was now normal. Her symptoms improved significantly, digestion was almost completely normal, thyroid problems were better, and lost about nine pounds just with the antimicrobial treatment, which you'll see occur.

CASE #2: 38-YEAR-OLD FEMALE

All right, next case, 38-year-old female, chief complaints of Hashimoto's, insomnia, gas, bloating, constipation, so-called adrenal fatigue—you'll often see patients write that on their forms; we're going to be talking a lot more about that in the HPA axis unit to come—and then histamine intolerance symptoms. She had self-diagnosed with SIBO based on internet research and took some herbs for it. You'll also find that this happens. Patients will come in and tell you that they have SIBO even though they haven't had a test for it, just on the basis of what they've read. Hashimoto's onset was just after her first child was born, which is the most common time for that to happen in women, and she was progressively needing more and more thyroid medication in order to feel well, and she was on amitriptyline for sleep.



So we'll start with the SIBO result. It was pretty normal. If you use Dr. Pimentel's criteria of above three parts per million for methane at any point in the test, she would be positive for methane, but I'm a little uncertain about that criteria. I think more research needs to be done, and regardless, this is a very borderline result. I didn't think that SIBO was likely to be driving the pathology, especially based on the other test results we're about to see.



Comprehensive Stool Analysis / Parasitology x3

BACTERIOLOGY CULTURE

Expected/Beneficial flora	Commensal (Imbalanced) flora	Dysbiotic flora
4+ Bacteroides fragilis group	3+ Alpha hemolytic strep	
2+ Bifidobacterium spp.	2+ Enterobacter cloacae complex	
4+ Escherichia coli	4+ Gamma hemolytic strep	
2+ Lactobacillus spp.		
2+ Enterococcus spp.		
3+ Clostridium spp.		
NG = No Growth		

BACTERIA INFORMATION

Expected /Beneficial bacteria make up a significant portion of the total microflora in a healthy & balanced GI tract. These beneficial bacteria have many health-protecting effects in the GI tract including manufacturing vitamins, fermenting fibers, digesting proteins and carbohydrates, and propagating anti-tumor and anti-inflammatory factors.
Clostridia are prevalent flora in a healthy intestine. Clostridium spp. should be considered in the context of balance with other expected/beneficial flora. Absence of clostridia or over abundance relative to other expected/beneficial flora indicates bacterial imbalance. If *C. difficile* associated disease is suspected, a Comprehensive Clostridium culture or toxigenic *C. difficile* DNA test is recommended.
Commensal (imbalanced) bacteria are usually neither pathogenic nor beneficial to the host GI tract. Imbalances can occur when there are insufficient levels of beneficial bacteria and increased levels of commensal bacteria. Certain commensal bacteria are reported as dysbiotic at higher levels.
Dysbiotic bacteria consist of known pathogenic bacteria and those that have the potential to cause disease in the GI tract. They can be present due to a number of factors including: consumption of contaminated water or food, exposure to chemicals that are toxic to beneficial bacteria, the use of antibiotics, oral contraceptives or other medications; poor fiber intake and high stress levels.

YEAST CULTURE

Normal flora	Dysbiotic flora
No yeast isolated	

MICROSCOPIC YEAST

Result: None — Expected: None - Rare

The microscopic finding of yeast in the stool is helpful in identifying whether there is proliferation of yeast. Rare yeast may be normal, however, yeast observed in higher amounts (few, moderate, or many) is abnormal.

YEAST INFORMATION

Yeast normally can be found in small quantities in the skin, mouth, intestine and mucocutaneous junctions. Overgrowth of yeast can infect virtually every organ system, leading to an extensive array of clinical manifestations. Fungal diarrhea is associated with broad-spectrum antibiotics or alterations of the patient's immune status. Symptoms may include abdominal pain, cramping and irritation. When investigating the presence of yeast, disparity may exist between culturing and microscopic examination. Yeast are not uniformly dispersed throughout the stool, this may lead to undetectable or low levels of yeast identified by microscopy, despite a cultured amount of yeast. Conversely, microscopic examination may reveal a significant amount of yeast present, but no yeast cultured. Yeast does not always survive transit through the intestines rendering it unviable.

Comments:

Date Collected: 09/08/2015
Date Received: 09/09/2015
Date Completed: 09/18/2015

* ***Aeromonas, Campylobacter, Plesiomonas, Salmonella, Shigella, Vibrio, Yersinia, & Edwardsiella tarda* have been specifically tested for and found absent unless reported.**

MALDI TOF

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Comprehensive Stool Analysis / Parasitology x3

PARASITOLOGY/MICROSCOPY *

Sample 1
None Ova or Parasites
Rare WBC

Sample 2
None Ova or Parasites
Few WBC

Sample 3
None Ova or Parasites
Rare WBC

*A trichrome stain and concentrated iodine wet mount slide is read for each sample submitted.

PARASITOLOGY INFORMATION

Intestinal parasites are abnormal inhabitants of the gastrointestinal tract that have the potential to cause damage to their host. The presence of any parasite within the intestine generally confirms that the patient has acquired the organism through fecal-oral contamination. Damage to the host includes parasitic burden, migration, blockage and pressure. Immunologic inflammation, hypersensitivity reactions and cytotoxicity also play a large role in the morbidity of these diseases. The infective dose often relates to severity of the disease and repeat encounters can be additive.

There are two main classes of intestinal parasites, they include protozoa and helminths. The protozoa typically have two stages; the trophozoite stage that is the metabolically active, invasive stage and the cyst stage, which is the vegetative inactive form resistant to unfavorable environmental conditions outside the human host. Helminths are large, multicellular organisms. Like protozoa, helminths can be either free-living or parasitic in nature. In their adult form, helminths cannot multiply in humans.

In general, acute manifestations of parasitic infection may involve diarrhea with or without mucus and or blood, fever, nausea, or abdominal pain. However those symptoms do not always occur. Consequently, parasitic infections may not be diagnosed or eradicated. If left untreated, chronic parasitic infections can cause damage to the intestinal lining and can be an unsuspected cause of illness and fatigue. Chronic parasitic infections can also be associated with increased intestinal permeability, irritable bowel syndrome, irregular bowel movements, malabsorption, gastritis or indigestion, skin disorders, joint pain, allergic reactions, and decreased immune function.

In some instances, parasites may enter the circulation and travel to various organs causing severe organ diseases such as liver abscesses and cysticercosis. In addition, some larval migration can cause pneumonia and in rare cases hyper infection syndrome with large numbers of larvae being produced and found in every tissue of the body.

One negative parasitology x1 specimen does not rule out the possibility of parasitic disease, parasitology x3 is recommended. This exam is not designed to detect Cryptosporidium spp, Cyclospora cayetanensis or Microsporidia spp.

GIARDIA/CRYPTOSPORIDIUM IMMUNOASSAY

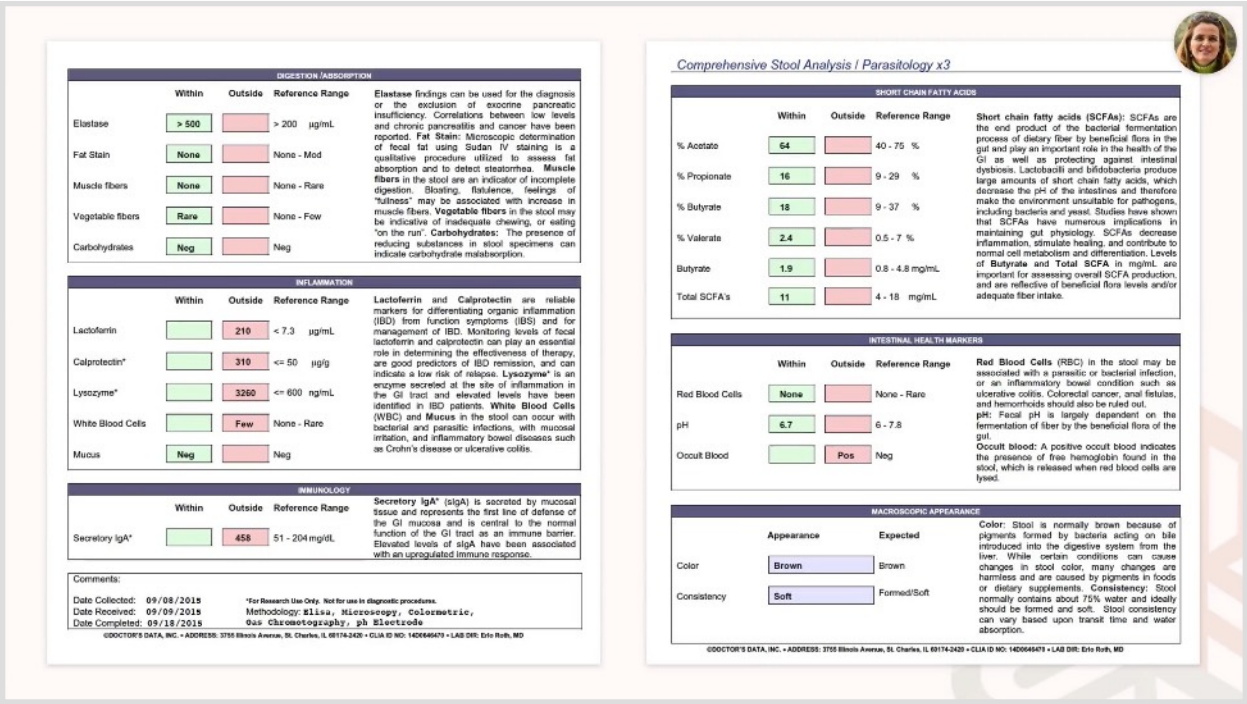
	Within	Outside	Reference Range
Giardia intestinalis	Neg		Neg
Cryptosporidium	Neg		Neg

Giardia intestinalis (lamblia) is a protozoan that infects the small intestine and is passed in stool and spread by the fecal-oral route. Waterborne transmission is the major source of giardiasis. **Cryptosporidium** is a coccidian protozoa that can be spread from direct person-to-person contact or waterborne transmission.

Comments:

Date Collected: 09/08/2015
Date Received: 09/09/2015
Date Completed: 09/18/2015

Pretty good levels of beneficial bacteria in the Doctor's Data stool test, some commensal imbalance flora and Bifidobacteria and Lactobacillus, which are arguably two of the more important species, should comprise about 30 trillion of the 100 trillion microorganisms. They could be a little higher, but overall looks pretty good, and no yeast or parasites detected on the second page there.



DIGESTION /ABSORPTION

	Within	Outside	Reference Range
Elastase	> 500		> 200 µg/mL
Fat Stain	None		None - Mod
Muscle fibers	None		None - Rare
Vegetable fibers	Rare		None - Few
Carbohydrates	Neg		Neg

Elastase findings can be used for the diagnosis or the exclusion of exocrine pancreatic insufficiency. Correlations between low levels and chronic pancreatitis and cancer have been reported. **Fat Stain:** Microscopic determination of fecal fat using Sudan IV staining is a qualitative procedure utilized to assess fat absorption and to detect steatorrhea. **Muscle fibers** in the stool are an indicator of incomplete digestion. Bloating, flatulence, feelings of "fullness" may be associated with increase in muscle fibers. **Vegetable fibers** in the stool may be indicative of inadequate chewing, or eating "on the run". **Carbohydrates:** The presence of reducing substances in stool specimens can indicate carbohydrate malabsorption.

INFLAMMATION

	Within	Outside	Reference Range
Lactoferrin		210	< 7.3 µg/mL
Calprotectin*		310	<= 50 µg/g
Lysozyme*		3260	<= 600 ng/mL
White Blood Cells		Few	None - Rare
Mucus	Neg		Neg

Lactoferrin and **Calprotectin** are reliable markers for differentiating organic inflammation (IBD) from function symptoms (IBS) and for management of IBD. Monitoring levels of fecal lactoferrin and calprotectin can play an essential role in determining the effectiveness of therapy, are good predictors of IBD remission, and can indicate a low risk of relapse. **Lysozyme*** is an enzyme secreted at the site of inflammation in the GI tract and elevated levels have been identified in IBD patients. **White Blood Cells** (WBC) and **Mucus** in the stool can occur with bacterial and parasitic infections, with mucosal irritation, and inflammatory bowel diseases such as Crohn's disease or ulcerative colitis.

IMMUNOLOGY

	Within	Outside	Reference Range
Secretory IgA*		458	51 - 204 mg/dL

Secretory IgA* (sIgA) is secreted by mucosal tissue and represents the first line of defense of the GI mucosa and is central to the normal function of the GI tract as an immune barrier. Elevated levels of sIgA have been associated with an upregulated immune response.

Comments:

Date Collected: 09/08/2015
Date Received: 09/09/2015
Date Completed: 09/18/2015

*For Research Use Only. Not for use in diagnostic procedures.
Methodology: Elisa, Microscopy, Colorimetric, Gas Chromotography, ph Electrode

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Comprehensive Stool Analysis / Parasitology x3

SHORT CHAIN FATTY ACIDS

	Within	Outside	Reference Range
% Acetate	64		40 - 75 %
% Propionate	16		9 - 29 %
% Butyrate	18		9 - 37 %
% Valerate	2.4		0.5 - 7 %
Butyrate	1.9		0.8 - 4.8 mg/mL
Total SCFA's	11		4 - 18 mg/mL

Short chain fatty acids (SCFAs): SCFAs are the end product of the bacterial fermentation process of dietary fiber by beneficial flora in the gut and play an important role in the health of the GI as well as protecting against intestinal dysbiosis. Lactobacilli and bifidobacteria produce large amounts of short chain fatty acids, which decrease the pH of the intestines and therefore make the environment unsuitable for pathogens, including bacteria and yeast. Studies have shown that SCFAs have numerous implications in maintaining gut physiology. SCFAs decrease inflammation, stimulate healing, and contribute to normal cell metabolism and differentiation. **Levels** of **Butyrate** and **Total SCFA** in mg/mL are important for assessing overall SCFA production, and are reflective of beneficial flora levels and/or adequate fiber intake.

INTESTINAL HEALTH MARKERS

	Within	Outside	Reference Range
Red Blood Cells	None		None - Rare
pH	6.7		6 - 7.8
Occult Blood		Pos	Neg

Red Blood Cells (RBC) in the stool may be associated with a parasitic or bacterial infection, or an inflammatory bowel condition such as ulcerative colitis. Colorectal cancer, anal fistulas, and hemorrhoids should also be ruled out.
pH: Fecal pH is largely dependent on the fermentation of fiber by the beneficial flora of the gut.
Occult blood: A positive occult blood indicates the presence of free hemoglobin found in the stool, which is released when red blood cells are lysed.

MACROSCOPIC APPEARANCE

	Appearance	Expected
Color	Brown	Brown
Consistency	Soft	Formed/Soft

Color: Stool is normally brown because of pigments formed by bacteria acting on bile introduced into the digestive system from the liver. While certain conditions can cause changes in stool color, many changes are harmless and are caused by pigments in foods or dietary supplements. **Consistency:** Stool normally contains about 75% water and ideally should be formed and soft. Stool consistency can vary based upon transit time and water absorption.

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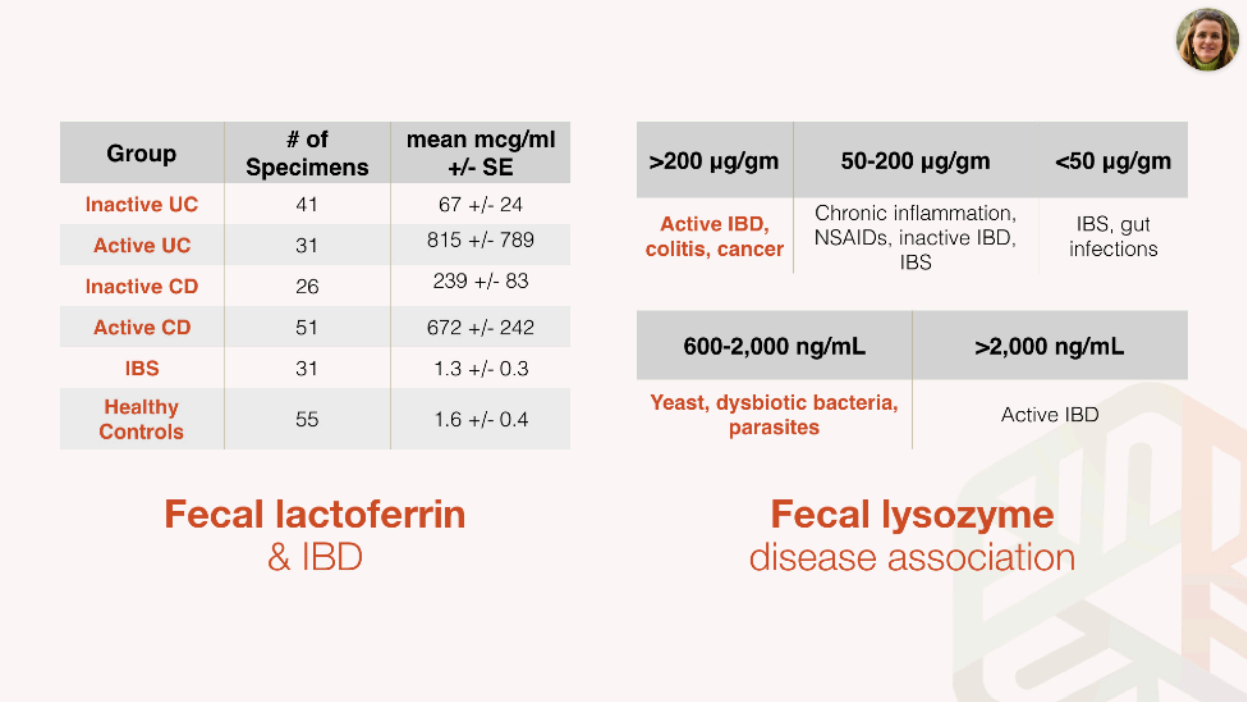
But check this out: her fecal lactoferrin, calprotectin, and lysozyme were very high, particularly lactoferrin and calprotectin, and then her sIgA was high, and she had a positive for blood in the stool, occult blood, so right away when you see these numbers you should be thinking about inflammatory bowel disease because they're above the range that you would expect with just dysbiosis or gut infections.



Group	# of Specimens	mean mcg/ml +/- SE
Inactive UC	41	67 +/- 24
Active UC	31	815 +/- 789
Inactive CD	26	239 +/- 83
Active CD	51	672 +/- 242
IBS	31	1.3 +/- 0.3
Healthy Controls	55	1.6 +/- 0.4

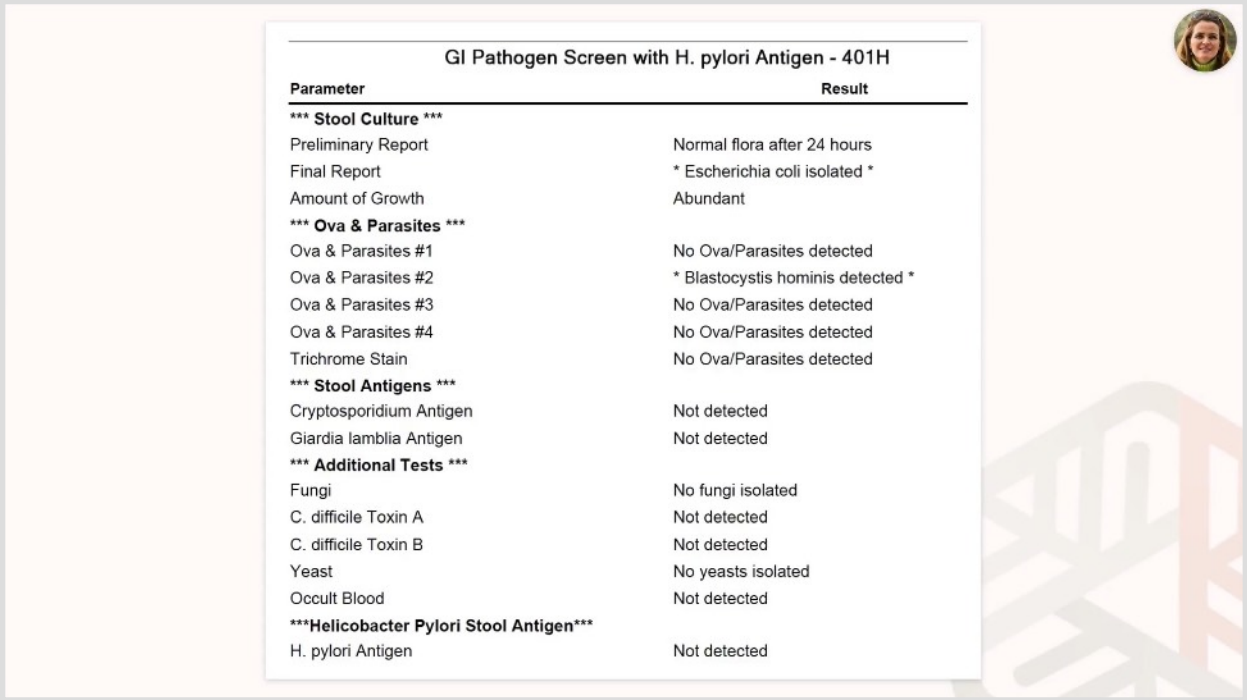
Fecal lactoferrin
& IBD

>200 µg/gm	50-200 µg/gm	<50 µg/gm
Active IBD, colitis, cancer	Chronic inflammation, NSAIDs, inactive IBD, IBS	IBS, gut infections

600-2,000 ng/mL	>2,000 ng/mL
Yeast, dysbiotic bacteria, parasites	Active IBD

Fecal lysozyme
disease association

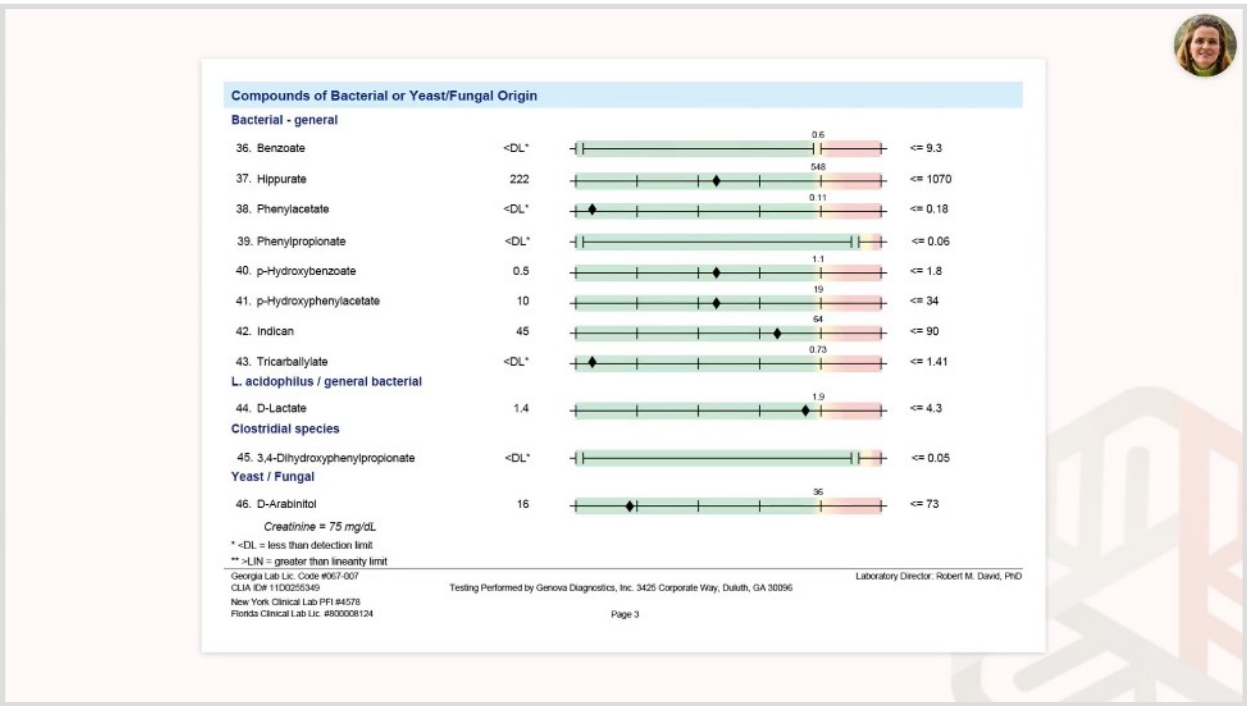
Lactoferrin of 210 puts her in the inactive ulcerative colitis or inactive Crohn's disease range, and remember, these are just loose guides; you can't make any diagnoses based on these ranges. Calprotectin of 310, though, puts her firmly in the active IBD range, and then lysozyme of 3,260 puts her in the active IBD range.



GI Pathogen Screen with H. pylori Antigen - 401H

Parameter	Result
*** **Stool Culture** ***	
Preliminary Report	Normal flora after 24 hours
Final Report	* Escherichia coli isolated *
Amount of Growth	Abundant
*** **Ova & Parasites** ***	
Ova & Parasites #1	No Ova/Parasites detected
Ova & Parasites #2	* Blastocystis hominis detected *
Ova & Parasites #3	No Ova/Parasites detected
Ova & Parasites #4	No Ova/Parasites detected
Trichrome Stain	No Ova/Parasites detected
*** **Stool Antigens** ***	
Cryptosporidium Antigen	Not detected
Giardia lamblia Antigen	Not detected
*** **Additional Tests** ***	
Fungi	No fungi isolated
C. difficile Toxin A	Not detected
C. difficile Toxin B	Not detected
Yeast	No yeasts isolated
Occult Blood	Not detected
Helicobacter Pylori Stool Antigen	
H. pylori Antigen	Not detected

She also had Blastocystis hominis on the BioHealth stool test, unclear how much of a problem this is, especially given the really elevated markers of gut inflammation.



Compounds of Bacterial or Yeast/Fungal Origin

Bacterial - general			
36. Benzoate	<DL*	0.6	<= 9.3
37. Hippurate	222	548	<= 1070
38. Phenylacetate	<DL*	0.11	<= 0.18
39. Phenylpropionate	<DL*		<= 0.06
40. p-Hydroxybenzoate	0.5	1.1	<= 1.8
41. p-Hydroxyphenylacetate	10	19	<= 34
42. Indican	45	64	<= 90
43. Tricarballylate	<DL*	0.73	<= 1.41
L. acidophilus / general bacterial			
44. D-Lactate	1.4	1.9	<= 4.3
Clostridial species			
45. 3,4-Dihydroxyphenylpropionate	<DL*		<= 0.05
Yeast / Fungal			
46. D-Arabinitol	16	36	<= 73

Creatinine = 75 mg/dL

* <DL = less than detection limit
** >LIN = greater than linearity limit

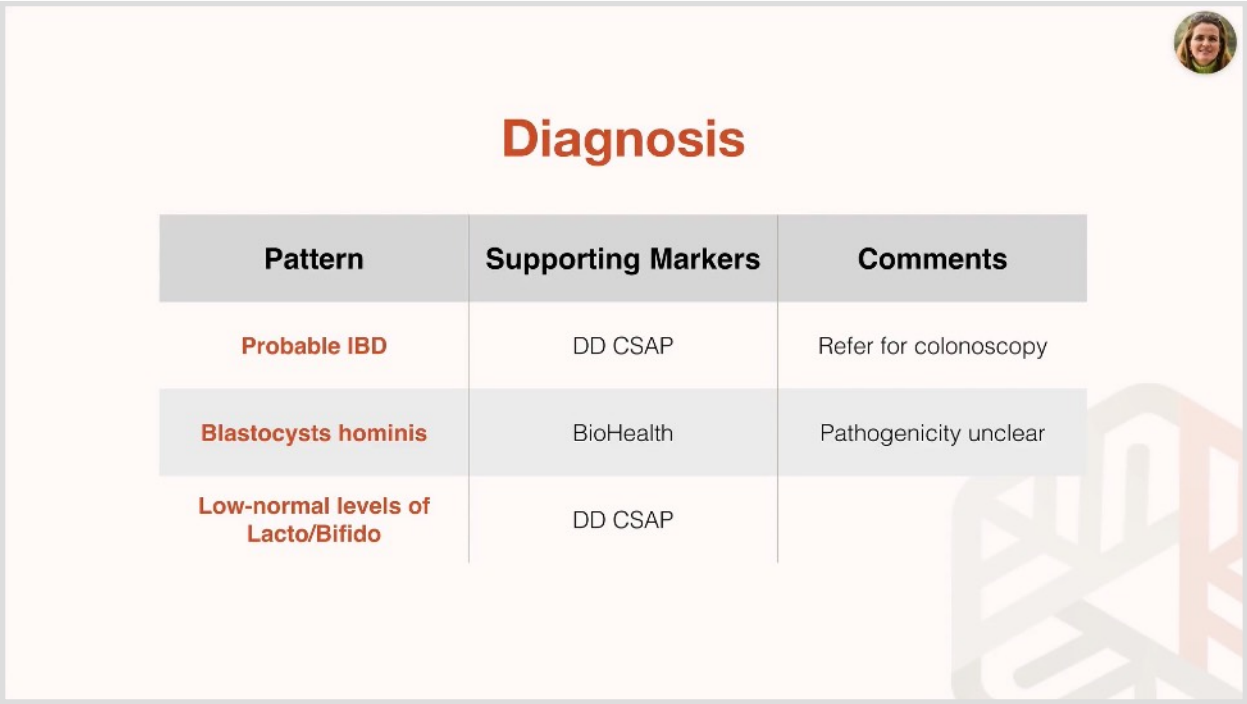
Georgia Lab Lic. Code #067-007
CLIA ID# 11D0255349
New York Clinical Lab PFI #4578
Florida Clinical Lab Lic. #800008124

Testing Performed by Genova Diagnostics, Inc. 3425 Corporate Way, Duluth, GA 30096

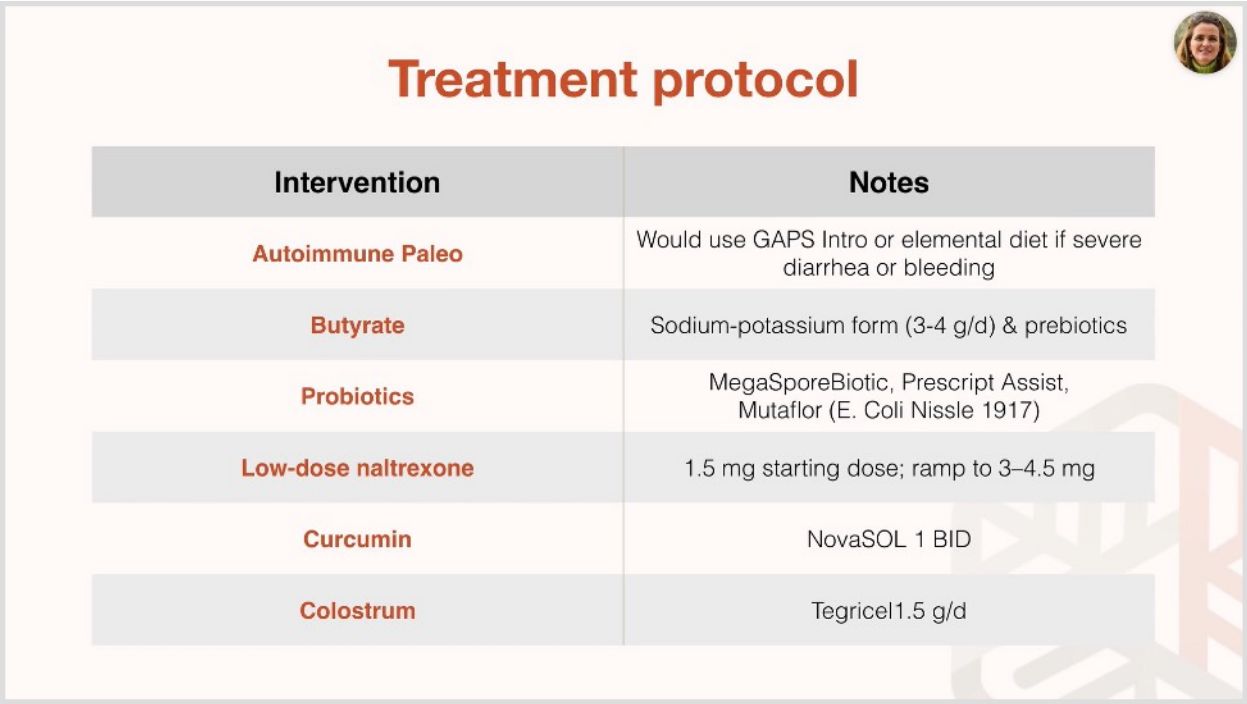
Laboratory Director: Robert M. David, PhD

Page 3

Nothing to speak of on the organic acids test.



So we referred her to a GI gastroenterologist for a colonoscopy directly. I skipped the blood panel in this case because the numbers were so high that I was relatively certain she had IBD, and sure enough, she did have terminal ileitis with Crohn's disease. There's an important thing to pay attention to here: she didn't have the typical Crohn's disease symptoms that most people think of —bloody diarrhea, multiple bowel movements throughout the day—and in fact she had a tendency toward constipation, and that is not uncommon, actually, when the disease is primarily in the small intestine as it was for her, so don't let lack of bloody diarrhea or frequent loose stools turn you off to the idea of IBD, because it can definitely be present even without that. Just the pattern here that we see, probable IBD from those markers on the Doctor's Data, Blastocystis hominis from BioHealth, although the pathogenicity of that is unclear given her other issues, and low-normal levels of Lactobacillus and Bifidobacterium.



So in this case, the focus of the treatment became IBD and regulating the immune system. She also had Hashimoto's, and no one had really addressed the autoimmune component. You'll find—and the research shows this—that unfortunately when someone has one autoimmune condition, they're more likely to have another, so we're seeing this with Crohn's and Hashimoto's. Her physicians in the past just gave her thyroid hormone, which explains why she just continued to need more and more thyroid hormone, because the autoimmune dysfunction was progressing and making her thyroid gland function more and more poorly. So I treated her as if she was in an active flare of IBD, which two out of three of the fecal markers as well as a colonoscopy did suggest, and she did have significant symptomology, so we used autoimmune Paleo. If she had severe diarrhea or bleeding, I probably would have used GAPS intro or an elemental diet, but with constipation those can actually make it worse in some cases. I used butyrate, sodium-potassium form, three to four grams per day. Particular probiotics which can be helpful for IBD like Mutaflor, E. coli Nissle and Prescript-Assist and MegaSporeBiotic. Low-dose naltrexone, she got through her physician and started at one and a half milligrams and slowly ramped up to … I think she ended up on three milligrams, although four and a half is the upper end. Did curcumin, I believe I used NovaSOL for her, but you can also use liposomal curcumin or other bioavailable forms of curcumin. Colostrum, the Tegricel variety, 1.5 grams per day.

Comprehensive Stool Analysis / Parasitology x3

DIGESTION / ABSORPTION

	Within	Outside	Reference Range
Elastase	> 500		> 200 µg/mL
Fat Stain	Few		None - Mod
Muscle fibers	None		None - Rare
Vegetable fibers	Rare		None - Few
Carbohydrates	Neg		Neg

Elastase findings can be used for the diagnosis or the exclusion of exocrine pancreatic insufficiency. Correlations between low levels and chronic pancreatitis and cancer have been reported. **Fat Stain:** Microscopic determination of fecal fat using Sudan IV staining is a qualitative procedure utilized to assess fat absorption and to detect steatorrhea. **Muscle fibers** in the stool are an indicator of incomplete digestion. Bloating, flatulence, feelings of "fullness" may be associated with increase in muscle fibers. **Vegetable fibers** in the stool may be indicative of inadequate chewing, or eating "on the run". **Carbohydrates:** The presence of reducing substances in stool specimens can indicate carbohydrate malabsorption.

INFLAMMATION

	Within	Outside	Reference Range
Lactoferrin	< 0.5		< 7.3 µg/mL
Calprotectin*	< 10		<= 50 µg/g
Lysozyme*	122		<= 600 ng/mL
White Blood Cells	None		None - Rare
Mucus	Neg		Neg

Lactoferrin and **Calprotectin** are reliable markers for differentiating organic inflammation (IBD) from function symptoms (IBS) and for management of IBD. Monitoring levels of fecal lactoferrin and calprotectin can play an essential role in determining the effectiveness of therapy, are good predictors of IBD remission, and can indicate a low risk of relapse. **Lysozyme*** is an enzyme secreted at the site of inflammation in the GI tract and elevated levels have been identified in IBD patients. **White Blood Cells** (WBC) and **Mucus** in the stool can occur with bacterial and parasitic infections, with mucosal irritation, and inflammatory bowel diseases such as Crohn's disease or ulcerative colitis.

IMMUNOLOGY

	Within	Outside	Reference Range
Secretory IgA*		295	51 - 204 mg/dL

Secretory IgA* (sIgA) is secreted by mucosal tissue and represents the first line of defense of the GI mucosa and is central to the normal function of the GI tract as an immune barrier. Elevated levels of sIgA have been associated with an upregulated immune response.

Comments:

Date Collected: 09/27/2015
Date Received: 09/30/2015
Date Completed: 10/08/2015

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Methodology: Elisa, Microscopy, Colormetric, Gas Chromotography, ph Electrode

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At six-month follow-up, lactoferrin, calprotectin and lysozyme all normalized. Now, keep in mind that in some cases, you'll never see them go completely normal. They can sometimes fall into the inactive range and still be a little bit elevated, which isn't unexpected with people with IBD, but in her case, they did go back into the normal range. sIgA is still elevated; I've found this is often the last marker to improve and can take a long time to improve. Patient had really big improvements in GI function, also had to reduce the dose of her thyroid meds because she started to feel hyperthyroid, and this can happen when you improve immune function. The dose they were on before, when their immune system was really overactive and suppressing thyroid function, becomes too much when their immune system isn't attacking the thyroid gland as much, and their thyroid restores some ability to produce thyroid hormone. And then her histamine tolerance symptoms decreased and energy levels improved. I didn't end up treating Blasto in her case because I thought IBD was the primary contributor and most of her symptoms had resolved, but we could certainly consider doing that if she continues to have problems in the future and it doesn't look like they're related to IBD.