

GI *fx* GI Effects Stool Profiles

Frequently Asked Questions

General

Why should I do stool testing?

Stools are teeming with bacteria, some beneficial, some neutral, and some that can be harmful. It is important to know what you have, especially if you have health problems. Health-enhancing intestinal bacteria serve to prevent the overgrowth of potentially harmful bacteria in the gut. Stool testing can also assess your body's ability to digest food, the pH, and the amount of mucus present.

Why do you need microflora in the gut?

Microflora of the large intestine completes digestion through fermentation, protects against pathogenic bacteria, manufactures vitamins and stimulates development of the immune system.

Why should I be so worried about my intestines?

The lumen, or the main channel, of the GI tract is exposed to virtually everything that enters the mouth, either purposefully or incidentally – food, fluids, air, drugs, alcohol, and all toxins and antigens within these. The lumen is also heavily populated with potentially pathogenic microorganisms. The gastrointestinal tract is a lymphoid organ and is a prominent part of the immune system. It is heavily laden with lymphocytes, macrophages and other cells that participate in immune responses. Microorganisms are kept at bay by an extensive immune system comprising the gut-associated lymphoid tissue (GALT). The number of lymphocytes in the GALT is roughly equivalent to those in the spleen. In addition to the GALT, lymph nodes that receive lymph draining from the gut (mesenteric nodes) and Kupffer cells (phagocytic cells in the liver) also play important roles in protecting the body against invasion.

What are probiotics and prebiotics and what are their benefits?

Probiotics are generally the live micro-organisms in foods such as yogurt; they survive passage through the gut and temporarily bring the benefits to the gut flora. They can modify the composition and some metabolic activities of the microflora. Probiotics have been used to treat or prevent diarrhea and to improve symptoms in lactose intolerance.

Prebiotics are non-digestible oligosaccharides that can selectively stimulate the growth of probiotic-like bacteria normally present in the gut.

Can probiotics help with IBS?

In a study conducted at the Mayo Clinic, 25 patients with IBS and predominant diarrhea were randomly assigned to receive 450 billion lyophilized probiotic bacteria or matching placebo twice

daily for eight weeks. Patients were assessed for pre- and post-treatment gastrointestinal transit as well as daily bowel function and symptoms. The scientists concluded the probiotic supplement appeared to be promising in the relief of abdominal bloating in patients with diarrhea-predominant IBS.

Can bacteria in your stool affect your immune system?

A 2002 study in *Gut* evaluated stools of babies with severe eczema. They found that as bacteria increased in the stool, especially *E. coli*, so did IgE antibodies in the blood (evidence of allergy), and both correlated to the degree of eczema on the skin. When these babies were weaned, half got hypoallergenic formula and the other half got hypoallergenic formula with probiotics. The babies with probiotics had lower levels of *E. coli* and bacteria in their stools, less IgE in their blood, and less eczema.

What is celiac disease?

Celiac disease (gluten enteropathy) is an autoimmune disorder of the small intestine leading to damage of the mucosa, resulting in malabsorption. Clinical presentation is varied, but those most commonly seen are bloating, anemia, fatigue, weight loss, constipation and diarrhea.

Unfortunately, the clinical presentation of patients with celiac disease ranges from asymptomatic to severe, making it difficult to diagnose and often taking many years. Those with celiac disease have a 3-10 times greater risk of developing autoimmune diseases, such as arthritis and lupus.

Early diagnosis and treatment (avoidance of gluten) may decrease the incidence of related diseases.

Stool Testing with Metamatrix

For what symptoms should I use the GI EffectsSM Stool Profiles?

Irritable bowel syndrome, inflammatory bowel disease (IBD), Crohn's disease, ulcerative colitis, constipation, bloating, diarrhea, cramping, maldigestion, gas, blood in stool, headaches, and eczema. If you have a family history of celiac disease or another autoimmune bowel disease you may want to consider doing a test even when no symptoms are present to ensure you are not experiencing damage without symptoms. If you have a family history of celiac disease, Metamatrix also offers the Celiac Profile, a serum test. If symptoms are restricted to headache and/or the upper GI (belching, etc), consider OrganixSM and/or AllergixSM IgG4 Food Antibody testing.

When should I have the patient collect the specimen?

For IBD patients, it is ideal to collect the specimen when they are experiencing symptoms. For patients who are constipated, collect as much stool as possible.

Should probiotic preparations be withheld before specimen collection?

It is preferable if the patient can avoid taking probiotics the morning of collection. But if the patient is taking probiotics, it is okay. The results may show a little increase in lactobacillus and bifidobacteria species if the patient is taking probiotics.

How do you identify pathogenic organisms with the GI Effects?

Metamatrix uses polymerase chain reaction (PCR) with hybridization for DNA identification of microorganisms.

What is PCR?

PCR stands for polymerase chain reaction, a powerful tool that allows accurate and sensitive detection of a single genome of any infectious agent in any body fluid. In PCR, DNA is denatured (or broken down) then copied. This increases the amount of DNA available for the scientist to measure even when there is only a small amount of bacteria present in the specimen. This method is the most advanced technology available for organism identification on the market. It is commonly used in research and has been used clinically for pap smears and gonorrhea testing.

In reading about PCR, primers and probes are discussed. What is a primer? What is a probe?

Primers start the reaction and probes, being larger and more specific to a particular region of DNA, begin the detection process. Primers are used in PCR, and probes are used in hybridization.

If PCR with hybridization is so much better, why aren't the other "stool labs" doing it?

To date, it has generally been used in research institutions. The equipment is expensive, as is finding experienced staff. No other commercial labs conducting stool tests use this technique so there has been no incentive to invest in new technology.

How did you reach your reference ranges with such a new technology?

Established ranges for the presence of microorganisms have been in use for many years. Most of the research in the last ten years has been utilizing DNA-related techniques because they are accurate and sensitive, unlike most culture methods. The "CFU" has been the standard unit for many years.

What is a CFU?

CFU stands for Colony Forming Unit which represents one bacterium. Each bacterium or CFU has a certain amount of DNA which can be quantified.

If you test for so many organisms, why do I only see a handful on the report?

All pathogenic bacteria are tested. However, the list of dysbiotic aerobes is so long, Metamatrix only reports the aerobes that are detected in a given patient.

How can you claim that a single day is as good as a three-day collection for parasites?

If a person has a parasite, differing amounts will be excreted in the stool. It is not evenly distributed, so concentrations may be low in a single stool sample. In old stool technology, a three-day stool collection is needed to increase the chances that enough parasites were in the stool to be found by medical technicians looking through a microscope to identify parasite presence. Since we do DNA testing, (which is even more accurate than the Enzyme Immunoassay (EIA) method) if a parasite is in the stool, we will positively identify it with only one specimen collected on one day.

What percentage of the normal anaerobe population do you detect?

We detect all known clinically significant anaerobes.

Why is lactoferrin better than calprotectin as an inflammatory marker?

Calprotectin and lactoferrin are both specific neutrophil-derived proteins, which can be measured in the feces because they are released by cells in inflammatory conditions. Fecal lactoferrin was found to be the most specific marker for active disease in 31 patients when compared to calprotectin, polymorphonuclear neutrophil-elastase, and lysozyme. Significant variation in calprotectin has been seen in patients without symptoms of active disease possibly due to diet, obesity, or lack of physical activity.

How does your profile show pancreatic function?

Pancreatic Elastase 1 or Elastase 1 (E1) is a digestive enzyme secreted exclusively by the human pancreas and is used to assess exocrine pancreatic function. It breaks down protein in food and unlike other pancreatic enzymes, it is highly stable and not degraded during passage through the gut. Its assessment allows the clinician to establish a prompt and reliable diagnosis. Determination of fecal elastase-1 is highly sensitive in the diagnosis of severe and moderate exocrine pancreatic insufficiency, and is less sensitive in milder cases. It is of significantly higher sensitivity than fecal chymotrypsin estimation.¹

How do you test for sensitivities?

After the medical laboratory technician identifies that there is a dysbiotic aerobic organism (*Klebsiella pne.*, *Bacillus sp.*, *Citrobacter freundii*, *Haemolytic E. coli*, or *Pseudomonas sp.*), a sensitivity test for that organism is run. A number of pharmaceuticals and herbal anti-microbials are tested against the dysbiotic organism. Remember, these must be aerobic or else they would never grow in cell culture. The treatments are added to the stool specimen in decreasing concentration. If the target organism does not grow at the lowest concentration of drug, then it is “sensitive” to the drug. That organism is then identified by DNA analysis. If the organism grows in the wells with high concentration of the pharmaceutical or herbal treatment, it is termed “resistant” on the report.

What is a resistance gene?

Bacteria evolve to resist antibiotics and genes corresponding to resistance can be identified. Every patient sample is tested for the presence of resistance genes. This information gives the clinician better tools for superior clinical treatment.

Interpreting the GI Effects Stool Profiles

If my patient has high lactoferrin, how should I treat?

Very high lactoferrin is a specific marker for inflammatory bowel disease (IBD) such as ulcerative colitis or Crohn's disease. It is useful in screening for inflammation in patients presenting with abdominal pain and diarrhea, and is sensitive and specific for detecting inflammation in chronic IBD. Normal lactoferrin would indicate a noninflammatory condition such as irritable bowel syndrome (IBS). An elevated lactoferrin may identify other sources of inflammation such as increased parasites or other infection, in which case the clinician should treat the infection. Probiotics, fiber or prebiotics, therapies to heal the GI tract, and amino acids are recommended. Full nutritional evaluation is also recommended in patients suspected to have poor digestion and/or absorption issues.

When should I consider running follow-up tests?

IgG/IgE?

The immune system is made up of two functional components, the adaptive immune system and the innate immune system. The innate immune system prevents penetration via the skin or mucosa. The adaptive immune system responds after an initial attack and develops a specific immunological memory. The fighters of this system include the lymphocytes T-cells and B-cells. The B-cells differentiate into plasma cells and make antibodies or immunoglobulins, these include IgG, IgM, IgA, IgD and IgE. IgG makes up 75% of the plasma concentration; IgG4 is an immunoglobulin found in the gut, and is considered a long term protector because it blocks foods that may result in IgE reactions. Patients with irritable bowel syndrome (IBS) often feel they have some form of dietary intolerance and frequently try exclusion diets. Food elimination based on IgG antibodies may be effective in reducing IBS or in tailoring a diet with a low antibody response.

Celiac?

Though not diagnostic, if a patient has a high anti-gliadin antibody in stool, they may consider a celiac test (especially anti-tissue transglutaminase) to rule it out, particularly if symptoms warrant.

OrganixSM Dysbiosis?

While the stool analysis evaluates the end result of metabolism, bacteria content and digestive efficiency, the Organix Dysbiosis gives a picture of the bacteria that predominate the small intestine. As digestion proceeds, the bacteria in the intestine change because the environment changes. The pH also increases, as does the amount of aerobic bacteria and the secretion of

digestive enzymes. Thus, having both an Organix Dysbiosis panel and a stool analysis will aid in getting a comprehensive picture of the entire intestine.

Can the type of bacteria in my gut affect my weight?

The trillions of microbes that colonize the adult intestine function collectively as a metabolic organ that communicates with and complements human metabolism. Bacteroidetes and Firmicutes are the two most dominant bacterial divisions in the human gut. New research (Nature, 12-2006) found that comparisons of the distal gut microbiota of obese and lean human volunteers revealed that obesity was associated with changes in the relative abundance of the Bacteroidetes and the Firmicutes species. It is now believed that obesity may have a microbial component which could be treated.

Collection

There are only two vials in my kit - where are the others? (for patients who previously used another lab)

We only need two vials because the increased sensitivity requires less specimen.

How long is my sample stable after collection?

We need to receive the samples within 5 days of collection.

My vials are expired, what should I do?

The Expiration date printed on the vials refers to a month and year. Example 10/07 means October 2007 - NOT October 7th. If vials are in fact expired, request replacement vials to be sent.

I spilled some of the liquid out of one of the vials. What should I do?

First, carefully clean up the spilled liquid and wash hands/skin thoroughly. Then, call Metametrix to request new tubes. It is imperative that we have the correct amount of liquid and stool sample in each vial.

Can I collect a stool sample from a diaper?

Yes, if this is the only way to get a patient's specimen. The specimen is best if formed, since if it is liquid, it can be absorbed by the diaper. Try to avoid contamination with urine because it can dilute the specimen.

I misplaced or broke the cardboard collection container, what else can I use?

You could use a paper bowl or paper plate - anything that is clean, non-porous, and disposable. The collection container only needs to be clean, NOT sterile.

There is blood in my stool, is the sample still good?

If the blood is due to menstruation, you should wait and collect again after menstruation. If the blood was part of the stool and came from the bowel it will be tested and does not interfere with the rest of the test. Blood is one of the things we look for in the GI Effects Stool Profiles.

GI Effects Profiles

Can a one-day collection ‘find’ parasites if they are in small amounts?

Yes, the sensitivity and specificity of PCR technology allow us to use a one-day collection. Using DNA analysis is up to 5,000 times more sensitive than the old stool technology.

Do you test for all of the same analytes the other labs test for?

Actually, we test for more. We test for all of the aerobic bacteria, yeast, and parasites that other laboratories do with traditional methods. We also test for anaerobes that are not found in other stool analysis.

How can you test for anaerobes when other stool analysis cannot?

DNA technology identifies an organisms’ DNA. By the old technology, anaerobic cultures cannot be done routinely due to very high costs and lack of sensitivity.

Since GI Effects tests for anaerobes, will it tell me more about the small bowel?

No, the limitation of the test is the sample. Stool, as a sample, is most accurate for the colon, however, our OrganixSM urinary dysbiosis markers are for the small intestine!

Can the test be performed on pediatric patients?

Yes, once a child is weaned, the beneficial bacteria will be normal. Prior to weaning, the amounts of beneficial bacteria will vary.

Results

How long is the turnaround time?

TAT is 10-14 business days.

I received my results – what do they mean?

Clinicians may schedule consults to review results with a trained Metamatrix consultant. Interpretive text is also found in the right hand column of the results page. Patients should consult their healthcare provider.

References

1. Langhorst J, Elsenbruch S, Mueller T, et al. Comparison of 4 neutrophil-derived proteins in feces as indicators of disease activity in ulcerative colitis. *Inflamm Bowel Dis*. Dec 2005;11(12):1085-1091.