LAB #: Sample Report
PATIENT: Sample Patient
ID:
SEX: Female
DOB: 01/01/2015 AGE: 3

CLIENT #: 12345
DOCTOR: Sample Doctor
Doctor's Data, Inc.
3755 Illinois Ave.
St. Charles, IL 60174 U.S.A.

Comprehensive Parasitology,stool, x3

BACTERIOLOGY CULTURE

Expected/Beneficial flora	Commensal (Imbalanced) flora	Dysbiotic flora
3+ Bacteroides fragilis group	2+ Alpha hemolytic strep	
1+ Bifidobacterium spp.	2+ Citrobacter freundii complex	
3+ Escherichia coli	1+ Gamma hemolytic strep	
2+ Lactobacillus spp.	1+ Pseudomonas aeruginosa	
NG Enterococcus spp.	3+ Pseudomonas chlororaphis group	
	2+ Staphylococcus aureus	
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:
Few	None - Rare

Yeast in stool is expected at a level of none-rare. A microscopic finding of yeast in stool of few, moderate, or many may be helpful in identifying potential yeast overgrowth, or non-viable or dietary yeast.

YEAST INFORMATION

Yeast may normally be present in small quantities in the skin, mouth, and intestine. When investigating the presence of yeast, disparity may exist between culturing and microscopic examination. Yeast are not uniformly dispersed throughout the stool and this may lead to undetectable or low levels of yeast identified by microscopy, despite culture and identified yeast species. Conversely, microscopic examination may reveal a significant amount of yeast present but no viable yeast cultured. Yeast may not always survive transit through the intestines. Nonviable diet-derived yeast may also be detected microscopically. Consideration of clinical intervention for yeast detected microscopically should be made in the context of other findings and presentation of symptoms.

Comments:

Date Collected: **04/28/2019**
Date Received: **05/02/2019**
Date Reported: **05/13/2019**

**** 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 Parasitology,stool, x3

PROTOZOA	PX1	PX2	PX3
Balantidium coli	None Detected	None Detected	None Detected
Blastocystis spp	None Detected	None Detected	None Detected
Chilomastix mesnili	None Detected	None Detected	None Detected
Dientamoeba fragilis	None Detected	Rare trophs	Rare trophs
Entamoeba coli	None Detected	None Detected	None Detected
Entamoeba histolytica/dispar	None Detected	None Detected	None Detected
Entamoeba hartmanni	None Detected	None Detected	None Detected
Entamoeba polecki	None Detected	None Detected	None Detected
Endolimax nana	None Detected	None Detected	None Detected
Enteromonas hominis	None Detected	None Detected	None Detected
Giardia duodenalis	None Detected	None Detected	None Detected
Iodamoeba butschlii	None Detected	None Detected	None Detected
Isospora belli oocysts	None Detected	None Detected	None Detected
Pentatrichomonas hominis	None Detected	None Detected	None Detected
Retortamonas intestinalis	None Detected	None Detected	None Detected
NEMATODES - ROUNDWORMS			
Ascaris lumbricoides eggs	None Detected	None Detected	None Detected
Capillaria philippinesis eggs	None Detected	None Detected	None Detected
Capillaria hepatica eggs	None Detected	None Detected	None Detected
Enterobius vermcularis eggs	None Detected	None Detected	None Detected
Hookworm eggs	None Detected	None Detected	None Detected
Strongyloides stercoralis	None Detected	None Detected	None Detected
Trichuris trichiura eggs	None Detected	None Detected	None Detected
CESTODES - TAPEWORMS			
Diphyllobothrium latum eggs	None Detected	None Detected	None Detected
Dipylidium caninum eggs	None Detected	None Detected	None Detected
Hymenolepis diminuta eggs	None Detected	None Detected	None Detected
Hymenolepis nana eggs	None Detected	None Detected	None Detected
Taenia eggs	None Detected	None Detected	None Detected
TREMATODES - FLUKES			
Clonorchis sinensis eggs	None Detected	None Detected	None Detected
Fasciola hepatica/Fasciolopsis buski	None Detected	None Detected	None Detected
Paragonimus westermani eggs	None Detected	None Detected	None Detected
Heterophyes heterophyes	None Detected	None Detected	None Detected
ADDITIONAL ORGANISMS			
Ova or Parasites	None Detected		

OTHER MARKERS			
Yeast	Few	Rare	Rare
Red Blood Cells	None Detected	Rare	None Detected
White Blood Cells	None Detected	None Detected	None Detected
Charcot-Leyden Crystals	None Detected	None Detected	None Detected
Pollen	None Detected	None Detected	None Detected

IMMUNOASSAY	RESULT	REFERENCE INTERVAL
Giardia duodenalis	Neg	Neg
Cryptosporidium	Neg	Neg

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.

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.

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

Comments:

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Date Reported: **05/13/2019** Methodology: **Microscopy, EIA**

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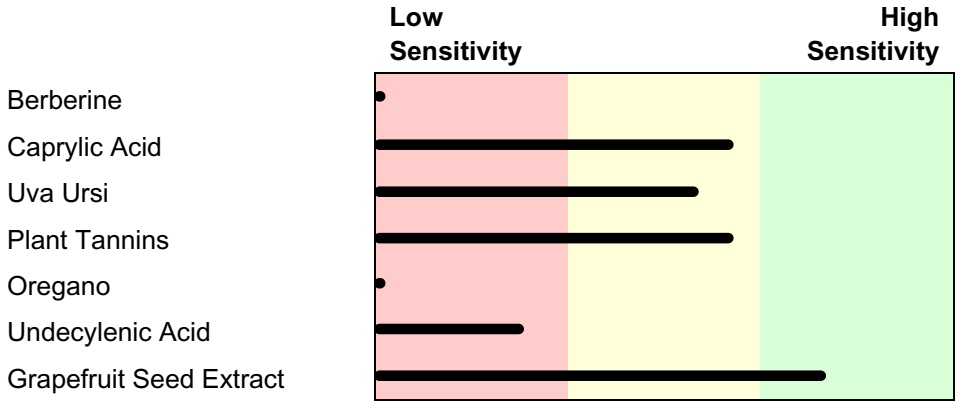
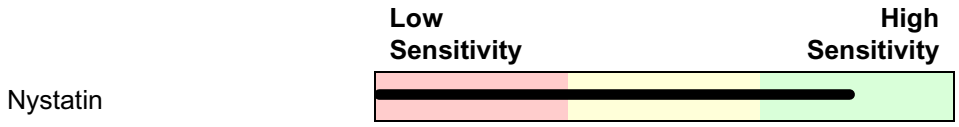
Yeast Susceptibilities: Candida parapsilosis

NATURAL ANTIFUNGALS



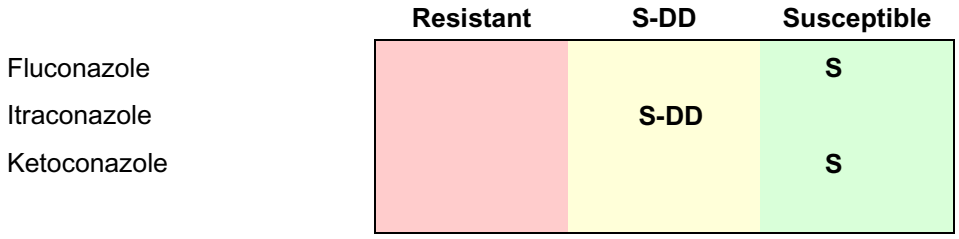
Natural antifungal agents may be useful for treatment of patients when organisms display in-vitro sensitivity to these agents. The test is performed by using standardized techniques and filter paper disks impregnated with the listed agent. Relative sensitivity is reported for each natural agent based upon the diameter of the zone of inhibition surrounding the disk. Data based on over 5000 individual observations were used to relate the zone size to the activity level of the agent. A scale of relative sensitivity is defined for the natural agents tested.

NON-ABSORBED ANTIFUNGALS



Non-absorbed antifungals may be useful for treatment of patients when organisms display in-vitro sensitivity to these agents. The test is performed using standardized commercially prepared disks impregnated with Nystatin. Relative sensitivity is reported based upon the diameter of the zone of inhibition surrounding the disk.

AZOLE ANTIFUNGALS



Susceptible results imply that an infection due to the fungus may be appropriately treated when the recommended dosage of the tested antifungal agent is used.
Susceptible - Dose Dependent (S-DD) results imply that an infection due to the fungus may be treated when the highest recommended dosage of the tested antifungal agent is used.
Resistant results imply that the fungus will not be inhibited by normal dosage levels of the tested antifungal agent.

Standardized test interpretive categories established for Candida spp. are used for all yeast isolates.

Comments:
Date Collected: **04/28/2019**
Date Received: **05/02/2019**
Date Completed: **05/13/2019**

Yeast antifungal susceptibility testing is intended for research use only.
Not for use in diagnostic procedures.

v10.11

INTRODUCTION

This analysis of the stool specimen provides fundamental information about the overall gastrointestinal health of the patient. When abnormal microflora or significant aberrations in intestinal health markers are detected, specific interpretive paragraphs are presented. If no significant abnormalities are found, interpretive paragraphs are not presented.

Clostridium spp

Clostridia are expected inhabitants of the human intestine. Although most clostridia in the intestine are not virulent, certain species have been associated with disease. Clostridium perfringens is a major cause of food poisoning and is also one cause of antibiotic-associated diarrhea. Clostridium difficile is a causative agent in antibiotic-associated diarrhea and pseudomembranous colitis. Other species reported to be prevalent in high amounts in patients with Autistic Spectrum Disorder include Clostridium histolyticum group, Clostridium cluster I, Clostridium bolteae, and Clostridium tetani.

If these disease associations are a concern further testing may be necessary.

Washington W, Allen S, Janda W, Koneman E, Procop G, Schreckenberger P, Woods, G. Koneman's Color Atlas and Textbook of Diagnostic Microbiology, 6th edition. Lippincott Williams and Wilkins; 2006. pg 931-939

Song Y, Liu C, Finegold SM. Real-Time PCR Quantitation of Clostridia in Feces of Autistic Children. Applied and Environmental Microbiology. Nov. 2004, 6459-6465.

Parracho H, Bingham MO, Gibson GR, McCartney AL. Differences Between the Gut Microflora of Children with Autistic Spectrum Disorders and That of Healthy Children. Journal of Medical Microbiology. 2005;54, 987-991.

Imbalanced flora

Most of the reported imbalanced flora are commensal bacteria that reside in the host gastrointestinal tract; they do not benefit nor harm the host. Certain dysbiotic bacteria may appear under the commensal/imbalanced category if found at low levels (<3+) because they are not likely pathogenic at the levels detected. When several species of imbalanced bacteria are present, it is common to find inadequate levels of one or more of the beneficial bacteria, and/or an alkaline fecal pH. Hemolytic or mucoid E. coli are often associated with a low level of beneficial E. coli and alkaline pH, secondary to a mutation of beneficial E. coli (DDI observations). Treatment with antimicrobial agents is unnecessary unless bacteria appear under the dysbiotic category.

Mackowiak PA. The normal microbial flora. N Engl J Med. 1982;307(2):83-93.
Tenaillon O, Skurnik D, Picard B, et al. The population genetics of commensal Escherichia coli. Nat Rev Microbiol 2010;8:207-217.

Cultured Yeast

Yeast, such as Candida are normally present in the GI tract in very small amounts. Many species of yeast exist and are commensal; however, they are always poised to create opportunistic infections and have detrimental effects throughout the body. Factors that contribute to a proliferation of yeast include frequent use of wide-spread antibiotics/low levels of beneficial flora, oral contraceptives, pregnancy, cortisone and other immunosuppressant drugs, weak immune system/low levels of sIgA, high-sugar diet, and high stress levels.

When investigating the presence of yeast, disparity may exist between culturing and microscopic examination. Yeast grows in colonies and is typically 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 for culturing. Therefore, both microscopic examination and culture are helpful in determining if abnormally high levels of yeast are present.

Microscopic yeast

Microscopic examination has revealed yeast in this stool sample. The microscopic finding of yeast in the stool is helpful in identifying whether the proliferation of fungi, such as Candida albicans, is present. Yeast is normally found in very small amounts in a healthy intestinal tract. While small quantities of yeast (reported as none or rare) may be normal, yeast observed in higher amounts (few, moderate to many) is considered abnormal.

An overgrowth of intestinal yeast is prohibited by beneficial flora, intestinal immune defense (secretory IgA), and intestinal pH. Beneficial bacteria, such as Lactobacillus colonize in the intestines and create an environment unsuitable for yeast by producing acids, such as lactic acid, which lowers intestinal pH. Also, lactobacillus is capable of releasing antagonistic substances such as hydrogen peroxide, lactocidin, lactobacillin, and acidolin.

Many factors can lead to an overgrowth of yeast including frequent use of antibiotics (leading to insufficient beneficial bacteria), synthetic corticosteroids, oral contraceptives, and diets high in sugar. Although there is a wide range of symptoms which can result from intestinal yeast overgrowth, some of the most common include brain fog, fatigue, reccurring vaginal or bladder infections, sensitivity to smells (perfumes, chemicals, environment), mood swings/depression, sugar and carbohydrate cravings, gas/bloating, and constipation or loose stools.

A positive yeast culture (mycology) and sensitivity to prescriptive and natural agents is helpful in determining which anti-fungal agents to use as part of a therapeutic treatment plan for chronic colonic yeast. However, yeast are colonizers and do not appear to be dispersed uniformly throughout the stool. Yeast may therefore be observed microscopically, but not

grow out on culture even when collected from the same bowel movement.

Parasites

Parasites were detected by microscopic examination in this stool specimen. Intestinal parasites are abnormal inhabitants of the GI tract that live off and have the potential to cause damage to their host. Factors such as contaminated food and water supplies, day care centers, increased international travel, pets, carriers such as mosquitoes and fleas, and sexual transmission have contributed to an increased prevalence of intestinal parasites.

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 and 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, decreased immune function, and fatigue.

Murray MT. Stomach Ailments And Digestive Disturbances. Rocklin, CA: Prima Publishing;1997.

Gittleman AL. Guess What Came to Dinner Parasites And Your Health. New York, NY: Penguin Group; 2001.

Dientamoeba fragilis

Dientamoeba fragilis, an ameboflagellate, was detected in this specimen. Dientamoeba fragilis infects the large intestine. This parasite does not have a cyst stage, and cannot survive long outside the body alone. It may be spread in pinworm (Enterobius vermicularis) eggs. Infection is common worldwide, including in the United States.

D. fragilis is known to cause non-invasive diarrheal illness in humans. 90% of children are symptomatic, whereas only 15-20% of adults are. The most common symptoms include diarrhea, stomach pain, and stomach cramping. Loss of appetite and weight, nausea, and fatigue are also common.

Recommended treatment is iodoquinol (650 mg tid x 20 days, adult dose). Alternatives include tetracycline (500 mg qid x 10 days, adult dose) and metronidazole (500-750 mg tid x 10 days, adult dose). Natural agents include berberine, wormwood, black walnut, grapefruit seed extract, and oil of oregano.

More Information:

1. Windsor, JJ; Johnson, EH. Dientamoeba fragilis: the unflagellated human flagellate. British J Biomed Sci 1999; 56:293-306.
2. Windsor, JJ; Rafay, AM; Shenoy, AK; Johnson, EH. Incidence of Dientamoeba fragilis in faecal samples submitted for routine microbiological analysis. British J Biomed Sci 1998;55:172-5.
3. Spencer, MJ; Chapin, MR; Garcia, LS. Dientamoeba fragilis: a gastrointestinal protozoan

infection in adults. Am J Gastroenterol 1982;77:565-9.
4. Spencer, MJ; Garcia, LS; Chapin, MR. Dientamoeba fragilis: an intestinal pathogen in children(c) Am J Dis Child 1979;133:390-3.
5. Yang, J; Scholten T. Dientamoeba fragilis: a review with notes on its epidemiology, pathogenicity, mode of transmission and diagnosis. Am J Trop Med Hyg 1977;26:16-22.

References:

Sanford JP. The Sanford Guide to Antimicrobial Therapy. 35th edition. Gilbert DN, Moellering Jr, RC, Sande MA, eds. Hyde Park (VT): Antimicrobial Therapy Inc; 2005.

Abramowicz, M. The Medical Letter On Drugs and Therapeutics. Drugs For Parasitic Infections. New Rochelle (NY): The Medical Letter, Inc.

Beers, M. H., & Berkow, R. (Eds.). The Merck Manual of Diagnosis and Therapy Online. http://www.merck.com/mrkshared/mmanual/section13/chapter161/161a.jsp, Accessed August, 2005.

CDC Division of Parasitic Diseases website. http://www.cdc.gov/ncidod/dpd/default.htm, Accessed August, 2005.

Garcia, LS. Diagnostic Medical Parasitology. 4th ed. Washington DC: ASM; 2001; 6.

Leber AL, Movak SM In: Murray PR, Baron EJ, Pfaller MA, Tenover FC, Yolken RH, eds. Manual of Clinical Microbiology. 7th ed. Washington DC: ASM Press; 1999; 1401.

Beneficial Flora

One or more of the expected or beneficial bacteria are low in this specimen. Normally abundant include lactobacilli, bifidobacteria, clostridia, Bacteroides fragilis group, enterococci, and some strains of Escherichia coli. The beneficial flora have many health-protecting effects in the gut, and as a consequence, are crucial to the health of the whole organism. Some of the roles of the beneficial flora include digestion of proteins and carbohydrates, manufacture of vitamins and essential fatty acids, increase in the number of immune system cells, break down of bacterial toxins and the conversion of flavinoids into anti-tumor and anti-inflammatory factors. Lactobacilli, bifidobacteria, clostridia, and enterococci secrete lactic acid as well as other acids including acetate, propionate, butyrate, and valerate. This secretion causes a subsequent decrease in intestinal pH, which is crucial in preventing an enteric proliferation of microbial pathogens, including bacteria and yeast. Many GI pathogens thrive in alkaline environments. Lactobacilli also secrete the antifungal and antimicrobial agents lactocidin, lactobacillin, acidolin, and hydrogen peroxide. The beneficial flora of the GI have thus been found useful in the inhibition of microbial pathogens, prevention and treatment of antibiotic associated diarrhea, prevention of traveler's diarrhea, enhancement of immune function, and inhibition of the proliferation of yeast.

In a healthy balanced state of intestinal flora, the beneficial bacteria make up a significant aproportion of the total microflora. Healthy levels of each of the beneficial bacteria are indicated by either a 2+, 3+ or 4+ (0 to 4 scale). However, in some individuals there is an imbalance or deficiency of beneficial flora and an overgrowth of non-beneficial (imbalance) or even

pathogenic microorganisms (dysbiosis). This can be due to a number of factors including: consumption of contaminated water or food; daily exposure of chemicals that are toxic to beneficial bacteria; the use of antibiotics, oral contraceptives or other medications; poor fiber intake and high stress levels.

A number of toxic substances can be produced by the dysbiotic bacteria including amines, ammonia, hydrogen sulfide, phenols, and secondary bile acids which may cause inflammation or damage to the brush border of the intesting lining. If left unchecked, long-term damage to the intestinal lining may result in leaky gut symdrome, fatigue, chronic headaches, and sensitivitites to a variety of foods. In addition, pathogenic bacteria can cause acute symptoms such as abdominal pain, nausea, diarrhea, vomiting and fever in cases of food poisoning.

Antibacterial and antifungal susceptibility testing to a variety of prescriptive and natural agents may be provided for the pathogenic organisms that are cultured from this patient's specimen. This testing is intended to provide the practitioner with useful information to help plan an appropriate treatment regimen. A comprehensive program may be helpful in individuals in whom a dysbiotic condition has caused extensive GI damage.

Note: Not all genera or species can be tested for susceptibility in the laboratory due to their specific growth requirements. In addition, the Centers for Disease Control and prevention recommend not testing certain orgamisms such as those associated with food poisoning. If a practitioner has specific questions, please contact customer service.

Percival M. Intestinal Health. Clin Nutr In. 1997;5(5):1-6.

Fuller R. Probiotics in Human Medicine. Gut. 1991;32: 439-442.

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Valeur, N, et al. Colonization and Immunomodulation by Lactobacillus reuteri ATCC 55730 in the Human Gastrointestinal Tract. Appl Environ. Microbiol. 2004 Feb; 70(2):1176-81.

Elmer G, Surawicz C, and McFarland L. Biotherapeutic agents - a Neglected Modality for the Treatment and Prevention of Intestinal and Vaginal Infections. JAMA. 1996; 275(11):870-876.

Fitzsimmons N and Berry D. Inhibition of Candida albicans by Lactobacillus acidophilus: Evidence for Involvement of a Peroxidase System. Microbio. 1994; 80:125-133

Weisburger JH. Proc Soc Exp Biol Med 1999;220(4):271-5.