LAB #: Sample Report
PATIENT: Sample Patient
ID:
SEX: Male
DOB: 01/01/1953 AGE: 65

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

Comprehensive Stool Analysis / Parasitology x3

BACTERIOLOGY CULTURE

Expected/Beneficial flora	Commensal (Imbalanced) flora	Dysbiotic flora
3+ Bacteroides fragilis group	2+ Pantoea spp	3+ Klebsiella pneumoniae ssp pneumoniae
3+ Bifidobacterium spp.		
4+ Escherichia coli		
2+ Lactobacillus spp.		
1+ Enterococcus spp.		
4+ 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 glabrata	

MICROSCOPIC YEAST

Result:	Expected:
None	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: **02/18/2019**
Date Received: **02/20/2019**
Date Reported: **02/28/2019**

**** 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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PROTOZOA	PX1	PX2	PX3
Balantidium coli	None Detected	None Detected	None Detected
Blastocystis spp	Many	Many	Moderate
Chilomastix mesnili	None Detected	None Detected	None Detected
Dientamoeba fragilis	Rare trophs	Rare trophs	Few 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	Moderate cysts/trophs	Rare cysts/trophs	Moderate cysts/trophs
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			

OTHER MARKERS			
Yeast	Many	Many	Moderate
Red Blood Cells	None Detected	None Detected	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:

Date Collected: **02/13/2019**
Date Received: **02/19/2019**
Date Reported: **02/28/2019** Methodology: **Microscopy, EIA**

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Comprehensive Stool Analysis / Parasitology x3

DIGESTION /ABSORPTION

	Within	Outside	Reference Range
Elastase	**247**		> 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	**0.7**		< 7.3 µg/mL
Calprotectin*	**< 10**		<= 50 µg/g
Lysozyme*	**152**		<= 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*	**151**		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: **02/18/2019**
Date Received: **02/20/2019**
Date Completed: **02/28/2019**

*For Research Use Only. Not for use in diagnostic procedures.

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

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Comprehensive Stool Analysis / Parasitology x3

SHORT CHAIN FATTY ACIDS

	Within	Outside	Reference Range
% Acetate	**60**		40 - 75 %
% Propionate	**21**		9 - 29 %
% Butyrate	**17**		9 - 37 %
% Valerate	**2.2**		0.5 - 7 %
Butyrate	**1.2**		0.8 - 4.8 mg/mL
Total SCFA's	**7.2**		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	**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.

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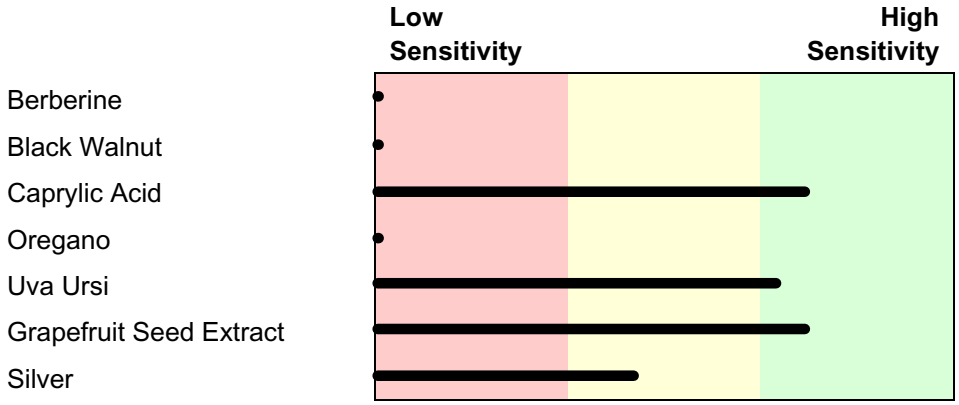
Bacterial Susceptibilities: Klebsiella pneumoniae ssp pneumoniae

NATURAL ANTIBACTERIALS



Natural antibacterial 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.

PRESCRIPTIVE AGENTS

	Resistant	Intermediate	Susceptible
Amoxicillin-Clavulanic Acid			S
Ampicillin	R		
Cefazolin			S
Ceftazidime			S
Ciprofloxacin			S
Trimeth-sulfa			S

Susceptible results imply that an infection due to the bacteria may be appropriately treated when the recommended dosage of the tested antimicrobial agent is used.
Intermediate results imply that response rates may be lower than for susceptible bacteria when the tested antimicrobial agent is used.
Resistant results imply that the bacteria will not be inhibited by normal dosage levels of the tested antimicrobial agent.

Comments:
Date Collected: 02/18/2019
Date Received: 02/20/2019
Date Completed: 02/28/2019

Natural antibacterial agent susceptibility testing is intended for research use only. Not for use in diagnostic procedures.

v10.11

LAB #: Sample Report
PATIENT: Sample
Patient ID:
SEX: Male
DOB: 01/01/1953

CLIENT #: 12345
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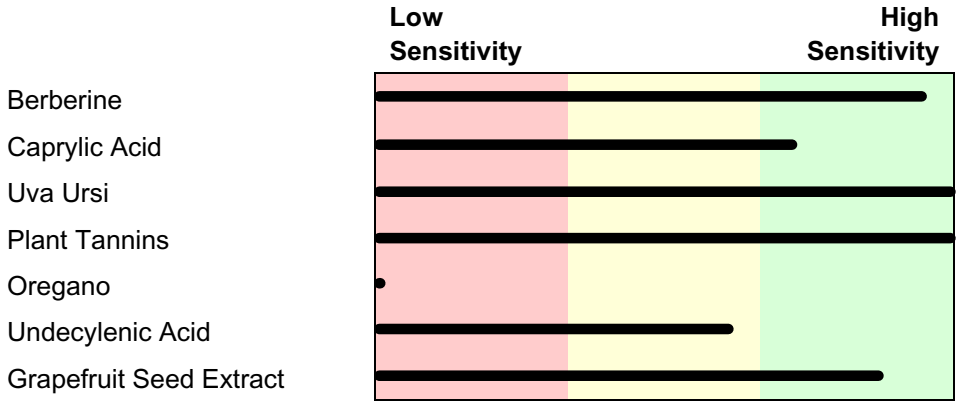
3755 Illinois Ave.
St. Charles, IL 60174 U.S.A.

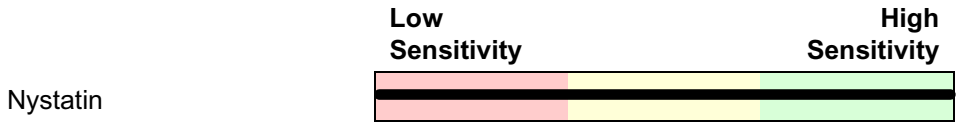
Yeast Susceptibilities: Candida glabrata

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

	Resistant	S-DD	Susceptible
Fluconazole		S-DD	
Itraconazole			S
Ketoconazole			S

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: 02/18/2019
Date Received: 02/20/2019
Date Completed: 02/28/2019

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.

Dysbiotic Flora

In a healthy balanced state of intestinal flora, the beneficial bacteria make up a significant proportion of the total microflora. However, in many 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 intestinal lining. If left unchecked, long-term damage to the intestinal lining may result in leaky gut syndrome, allergies, autoimmune disease (e.g. rheumatoid arthritis), irritable bowel syndrome, fatigue, chronic headaches, and sensitivities 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.

Bacterial sensitivities to a variety of prescriptive and natural agents have been provided for the pathogenic bacteria that were cultured from this patient's specimen. This provides the practitioner with useful information to help plan an appropriate treatment regimen. Supplementation with probiotics or consumption of foods (yogurt, kefir, miso, tempeh, tamari sauce) containing strains of lactobacilli, bifidobacteria, and enterococci can help restore healthy flora levels. Polyphenols in green and ginseng tea have been found to increase the numbers of beneficial bacteria. Hypochlorhydria may also predispose an individual to bacterial overgrowth, particularly in the small intestine. Nutritional anti-inflammatories can aid in reversing irritation to the GI lining. These include quercetin, vitamin C, curcumin, gamma-linoleic acid, omega-3 fatty acids (EPA, DHA), and aloe vera. Other nutrients such as zinc, beta-carotene, pantothenic acid, and L-glutamine provide support for regeneration of the GI mucosa. A comprehensive program may be helpful in individuals in whom a dysbiotic condition has caused extensive GI damage.

Lispki E. Digestive Wellness. New Canaan,CT: Keats Publishing;1996.

Mitsuoka T. Intestinal Flora and Aging. Nutr Rev 1992;50(12):438-446.

Weisburger JH. Tea and Health: The Underlying Mechanisms. Proc Soc Exp Biol Med 1999;220(4):271-275.4.

Pereira SP, Gainsborough N, Dowling RH. Drug-induced Hypochlorhydria Causes High Duodenal Bacterial Counts in the Elderly. Ailment Pharmacol Ther 1998;12(1)99-104.

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

Klebsiella species

Klebsiella belongs to the Enterobacteriaceae family and is closely related to the genera Enterobacter and Serratia. This gram-negative bacterium is considered dysbiotic in the amount of 3 - 4+.

Klebsiellae are widely distributed in nature and in the gastrointestinal tract of humans. In humans, they may colonize the skin, oral cavity, pharynx, or gastrointestinal tract. Klebsiellae may be regarded as normal flora in many parts of the colon, intestinal tract and biliary tract, but the gut is also the main reservoir of opportunistic strains.

This bacterium has the potential to cause intestinal, lung, urinary tract, and wound infections in susceptible individuals, but Klebsiella overgrowth is commonly asymptomatic. K. pneumoniae, in particular, may cause diarrhea and some strains are enterotoxigenic. Infection has been linked to ankylosing spondylitis as well as myasthenia gravis (antigenic cross-reactivity), and these patients usually carry larger numbers of the organism in their intestines than healthy individuals. Klebsiella oxytoca has been found to be the cause of antibiotic-associated hemorrhagic colitis. These strains have been shown to produce a cytotoxin that is capable of inducing cell death in various epithelial-cell cultures.

Klebsiella is also an infamously known nosocomial infectious agent, partially due to the ability of organisms to spread rapidly. Klebsiella accounts for approximately 3-7% of all hospital-acquired infections, placing it among the top eight pathogens in hospitals. Extraintestinal infection typically involves the respiratory or urinary tracts, but may infect other areas such as the biliary tract and surgical wound sites. K. pneumoniae and K. oxytoca are the two members of this genus responsible for most extraintestinal human infections.

Treatment of these species has become a major problem in most hospitals because of resistance to multiple antibiotics and potential transfer of plasmids to other organisms. Proper hand washing is crucial to prevent transmission from patient to patient via medical personnel. Contact isolation should be used for patients colonized or infected with highly antibiotic-resistant Klebsiella strains.

Klebsiella ozaenae and Klebsiella rhinoscleromatis are infrequent isolates that are subspecies of K. pneumoniae; however, each is associated with at unique spectrum of disease. K. ozaenae is associated with atrophic rhinitis, a condition called ozena, and purulent infections of the nasal mucous membranes. K. rhinoscleromatis causes the granulomatous disease rhinoscleroma, an infection of the respiratory mucosa, oropharynx, nose, and paranasal sinuses.

For the otherwise healthy individual, antimicrobial therapy is often unnecessary. Klebsiella thrives on a diet high in starch, so a low-starch diet may be helpful. A further caution is that Klebsiella thrives on Fructooligosaccharides (FOS) a class of oligosaccharides used as an artificial or alternative sweetener. Antibiotics may be indicated if symptoms are prolonged and in systemic infections. Refer to the bacterial sensitivities to identify the most appropriate pharmaceutical or natural agent.

Hogenauer C, Langner C, Beubler E, et al. Klebsiella oxytoca as a Causative Organism of Antibiotic-Associated Hemorrhagic Colitis. New England Journal of Medicine. December 2006;355;23.

Levy I et al. Nosocomial Infections After Cardiac Surgery in Infants and Children: Incidence and Risk Factors. J Hosp Infect. 2003;53(2):111-6.

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 259-264.

Murray PR, Baron EJ, Jorgensen JH, Pfaller MA, Yolken RH. Manual of Clinical Microbiology, 8th edition. Washington, DC: ASM Press; 2003. pg 688-689.

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.

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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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.

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Blastocystis spp

Blastocystis hominis was identified in this specimen. Blastocystis is a common protozoan found throughout the world. Blastocystis is transmitted via the fecal-oral route or from contaminated food or water.

Whether Blastocystis infection can cause symptoms is still considered controversial. Symptoms may be compounded by concomitant infection with other parasitic organisms, bacteria, or viruses. Often, Blastocystis is found along with other such organisms. Nausea, diarrhea, abdominal pain, anal itching, weight loss, and excess gas have been reported in some persons with Blastocystis infection.

Metronidazole has been the traditionally considered the most effective drug (recommended adult dosage varies from 250 mg bid for 5-7 days to 750 mg tid x 10 days). Iodoquinol is also an effective medication (650 mg tid x 20 days). Recommended therapy can also eliminate G. lamblia, E. histolytica and D. fragilis. Various herbs may be effective, including oil of oregano.
Limit refined carbohydrates in diet.

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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:

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Endolimax nana

Endolimax nana, an amoeba, was identified in this specimen. Endolimax nana is generally considered nonpathogenic or commensal. It lives in the large intestine of humans, mainly at the level of the cecum and feeds on bacteria. Infection occurs via fecal-oral route, and indicates increased risk of exposure to potential pathogens.

Some research indicates that infection with Endolimax nana may be associated with diarrhea, urticaria, or reactive arthritis, possibly due to prolonged antigenic stimulation with formation of circulating antigen-antibody complexes.

As E. nana is generally considered nonpathogenic there is no treatment suggested in the Sanford Guide or Medical Letter. Natural agents include oil of oregano and quassia.

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