Meridian Valley LAB

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LAB#:
PATIENT:
ID:
SEX: Male
AGE: 69

Microbiology Profile, stool

MICROBIOLOGY

Bacteriology Culture

Beneficial flora		Imbalances		Dysbiotic flora
Bifidobacterium	4+	Pseudomonas spp.	4+	
E. coli spp.	0+	Kluyvera spp.	4+	
Lactobacillus spp.	0+			
Enterococcus spp.	4+			

Mycology (Yeast) Culture

Normal flora		Dysbiotic flora
Candida glabrata	1+	

	Normal	Abnormal	Reference
Yeast (microscopic)		Few	None - Rare

Beneficial flora: In a healthy balanced state of intestinal flora, the beneficial bacteria make up a significant proportion of the total microflora. The beneficial flora have many health-protecting effects in the gut including manufacturing vitamins, fermenting fibers, digesting proteins and the disaccharide lactose, and propagating anti-tumor and anti-inflammatory factors. Acidophilus, Bifidus, and Enterococcus produce lactic acid and short-chain fatty acids. The fermentation of fibers by beneficial bacteria and subsequent production of short chain fatty acids is crucial in lowering colonic pH and preventing the proliferation of microbial pathogens, including bacteria and yeast. Enterococcus has antibacterial activity against methicillin-resistant S. aureus (MRSA) and food-borne pathogens.

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YEAST SUSCEPTIBILITIES

Candida glabrata

Prescriptive agents	Sensitive	Intermediate	Resistant
Fluconazole	S		
Itraconazole			R
Ketoconazole	S		
Nystatin	S		

Natural agents	Sensitive	Resistant
Berberine	S	
Caprylic Acid	S	
Goldenseal	S	
Oregano		R
Tanalbit		R
Undecylenic Acid		R
Uva Ursi	S	

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.

Beneficial Flora

One or more of the beneficial bacteria are low in this specimen. Beneficial flora include Lactobacillus, Bifidus, Enterococcus sp., and beneficial E. 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 the disaccharide lactose, manufacture of vitamins and essential fatty acids, increasing the number of immune system cells, breaking down bacterial toxins and converting flavinoids into anti-tumor and anti-inflammatory factors [1]. Lactobacillus, Bifidus, and Enterococcus sp. secrete lactic acid as well as other acids including acetate, propionate, butyrate, and valerate. This 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. Lactobacillus acidophilus also secretes the antifungal and antimicrobial agents lactocidin, lactobacillin, acidolin, and hydrogen peroxide [2]. The beneficial flora of the GI have thus been found useful in the inhibition of microbial pathogens [3], prevention and treatment of antibiotic associated diarrhea [4], prevention of traveler's diarrhea [5], enhancement of immune function [6], and inhibition of the proliferation of Candida albicans [7,8].

Enterococcus sp. Are prominent non-anaerobic beneficial bacteria in the gastrointestinal tract. They are fementive yet not gas producing bacteria that can survive in relatively harsh environments. Most importantly, Enterococcus sp. Provide antimicrobial activity against methicillin-resistant Staphylococcus aureas (MRSA), and impede the growth of food-borne pathogens. S. aureas strains, which are resistant to multiple antibiotics, have dramatically increased hospital associated infections. There is concern that the pharmaceutical industry cannot keep up the MRSA strains, therefore maintenance of healthy levels of Enterococcus sp. is important for antimicrobial activity against MRSA.

In a healthy balanced state of intestinal flora, the beneficial flora make up a significant proportion of the total non-anaerobic microflora. Healthy levels of each of the beneficial bacteria are indicated by either a 3+ or 4+ (0 to 4 scale). However, some individuals have low levels of beneficial bacteria and an overgrowth of nonbeneficial (imbalances) or even pathogenic microorganisms (dysbiosis). Often attributed to the use of antibiotics, individuals with low beneficial bacteria may present with chronic symptoms such as irregular transit time, irritable bowel syndrome, bloating, gas, chronic fatigue,

headaches, autoimmune diseases (e.g. rheumatoid arthritis), and sensitivities to a variety of foods [1]. Treatment may include the use of probiotic supplements containing various strains of Lactobacillus, Bifidobacter, and Enterococcus and/or consumption of cultured or fermented foods including yogurt, kefir, miso, tofu, tempen and tamari sauce. Polyphenols in green and ginseng tea have been found to increase the numbers of beneficial bacteria [9]. If dysbiosis is present, treatment may also include the removal of pathogenic bacteria, yeast, or parasites.

1. Percival M. Intestinal Health. Clin Nutr In 1997;5(5):1-6.
2. Fuller R. Probiotics in human medicine. Gut 1991;32:439-442.
3. Siitonen S, Vapaatalo H, Salminen S, et al. Effect of Lactobacilli GG yoghurt in prevention of antibiotic associated diarrhea. Ann Med 1990; 22:57-59.
4. Oksanen P, Salminen S, Saxelin M, et al. Prevention of travelers' diarrhea by Lactobacillus GG. Ann Med 1990;22:53-56.
5. Perdigon G, Alvarez M, et al. The oral administration of lactic acid bacteria increases the mucosal intestinal immunity in response to enteropathogens. J Food Prot 1990;53:404-410.
6. 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.
7. 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.
8. Fitzsimmons N and Berry D. Inhibition of Candida albicans by Lactobacillus acidophilus: evidence for involvement of a peroxidase system. Microbio 1994; 80:125-133
9. Weisburger JH. Proc Soc Exp Biol Med 1999;220(4):271-5.

Imbalanced flora

Imbalanced flora are those bacteria that are not pathogenic but are rather commensal. They reside in the host organism (GI tract) and neither injure nor benefit the host [1]. Certain dysbiotic bacteria may appear under the imbalances category if found at low levels because they are not likely pathogenic at the levels detected. When imbalanced flora appear, it is not uncommon to find inadequate levels of one or more of the beneficial bacteria and/or a fecal pH which is more towards the alkaline end of the reference range (6.0 - 7.2). It is also not uncommon to find Haemolytic or NLF E. coli with a concomitant deficiency of beneficial E. coli and alkaline pH, secondary to a mutation of beneficial E. coli in alkaline conditions (DDI observations). Treatment with antimicrobial agents is unnecessary unless bacteria appear under the dysbiosis category.

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 rare or few) may be normal, yeast observed in higher amounts (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.