

## BACTERIOLOGY CULTURE

### Expected/Beneficial flora

3+ Bacteroides fragilis group  
3+ Bifidobacterium spp.  
4+ Escherichia coli  
4+ Lactobacillus spp.  
2+ Enterococcus spp.

2+ Clostridium spp.

NG = No Growth

### Commensal (Imbalanced) flora

1+ Beta strep, group B

### Dysbiotic flora

## 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

2+ Candida glabrata

## MICROSCOPIC YEAST

### Result:

Rare

### 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: 01/28/2015  
Date Received: 01/30/2015  
Date Completed: 02/06/2015

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





## DIGESTION / ABSORPTION

	Within	Outside	Reference Range	<p><b>Elastase</b> 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. <b>Fat Stain:</b> Microscopic determination of fecal fat using Sudan IV staining is a qualitative procedure utilized to assess fat absorption and to detect steatorrhea. <b>Muscle fibers</b> in the stool are an indicator of incomplete digestion. Bloating, flatulence, feelings of "fullness" may be associated with increase in muscle fibers. <b>Vegetable fibers</b> in the stool may be indicative of inadequate chewing, or eating "on the run". <b>Carbohydrates:</b> The presence of reducing substances in stool specimens can indicate carbohydrate malabsorption.</p>
Elastase	496		> 200 µg/mL	
Fat Stain		Many	None - Mod	
Muscle fibers	None		None - Rare	
Vegetable fibers	Rare		None - Few	
Carbohydrates	Neg		Neg	

## INFLAMMATION

	Within	Outside	Reference Range	<p><b>Lactoferrin</b> and <b>Calprotectin</b> are reliable markers for differentiating organic inflammation (IBD) from functional 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. <b>Lysozyme*</b> is an enzyme secreted at the site of inflammation in the GI tract and elevated levels have been identified in IBD patients. <b>White Blood Cells</b> (WBC) and <b>Mucus</b> 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.</p>
Lactoferrin		23.6	< 7.3 µg/mL	
Calprotectin*		92	10 - 50 µg/g	
Lysozyme*		1400	<= 600 ng/mL	
White Blood Cells	None		None - Rare	
Mucus	Neg		Neg	

## IMMUNOLOGY

	Within	Outside	Reference Range	<p><b>Secretory IgA*</b> (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.</p>
Secretory IgA*		1410	51 - 204 mg/dL	

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

Methodology: **Elisa, Microscopy, Colormetric, Gas Chromatography, pH Electrode**



## SHORT CHAIN FATTY ACIDS

	Within	Outside	Reference Range	<b>Short chain fatty acids (SCFAs):</b> 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 <b>Butyrate</b> and <b>Total SCFA</b> in mg/mL are important for assessing overall SCFA production, and are reflective of beneficial flora levels and/or adequate fiber intake.
% Acetate	58		40 - 75 %	
% Propionate	18		9 - 29 %	
% Butyrate	17		9 - 37 %	
% Valerate	7.0		0.5 - 7 %	
Butyrate	1.2		0.8 - 4.8 mg/mL	
Total SCFA's	6.7		4 - 18 mg/mL	

## INTESTINAL HEALTH MARKERS

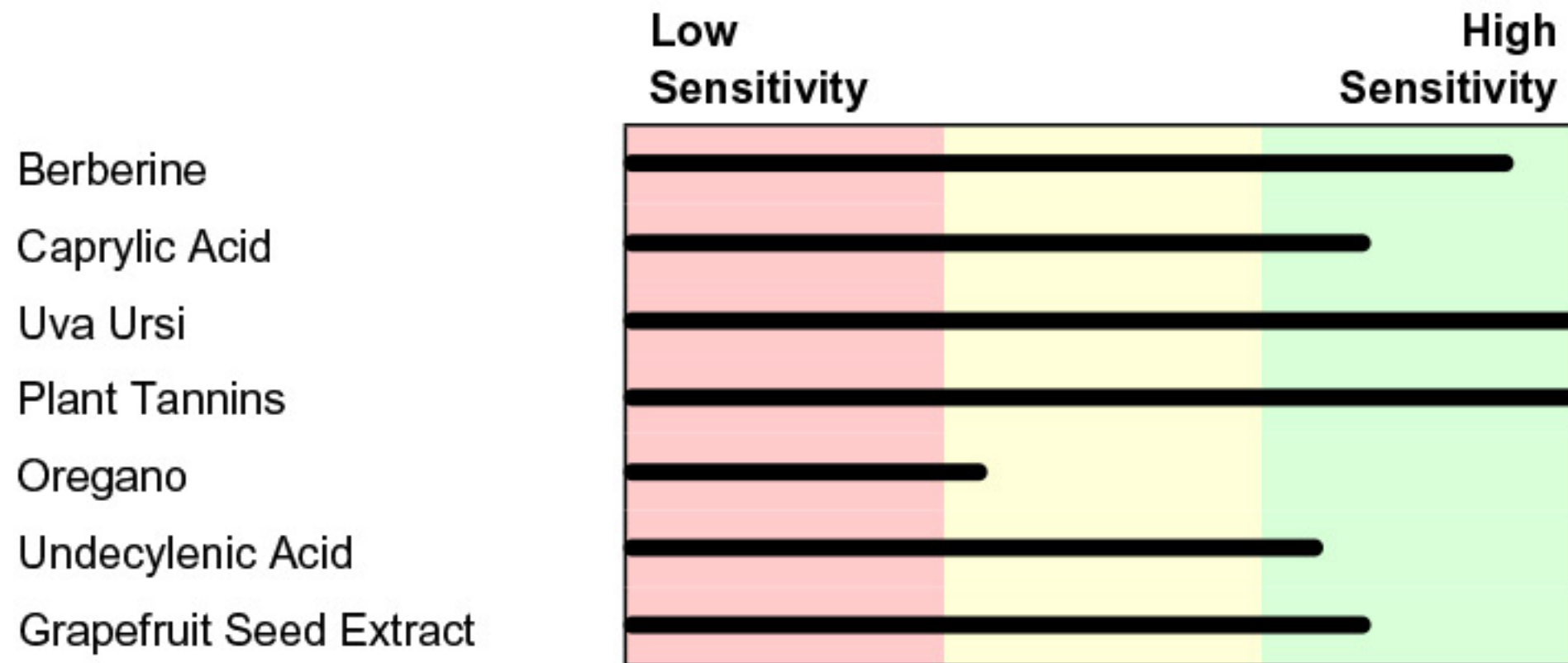
	Within	Outside	Reference Range	<b>Red Blood Cells (RBC)</b> in the stool may be associated with a parasitic or bacterial infection, or an inflammatory bowel condition such as ulcerative colitis. Colorectal cancer, anal fistulas, and hemorrhoids should also be ruled out. <b>pH:</b> Fecal pH is largely dependent on the fermentation of fiber by the beneficial flora of the gut. <b>Occult blood:</b> A positive occult blood indicates the presence of free hemoglobin found in the stool, which is released when red blood cells are lysed.
Red Blood Cells	None		None - Rare	
pH	6.3		6 - 7.8	
Occult Blood	Neg		Neg	

## MACROSCOPIC APPEARANCE

	Appearance	Expected	<b>Color:</b> 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. <b>Consistency:</b> Stool normally contains about 75% water and ideally should be formed and soft. Stool consistency can vary based upon transit time and water absorption.
Color	Brown	Brown	
Consistency	Loose/Watery	Formed/Soft	

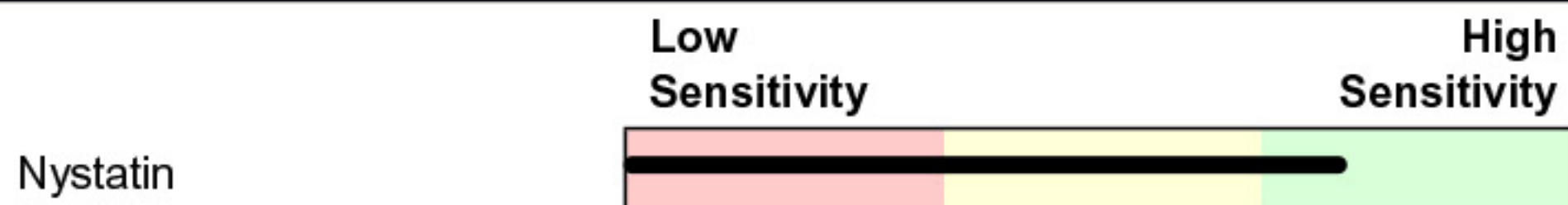


## NATURAL ANTIFUNGALS



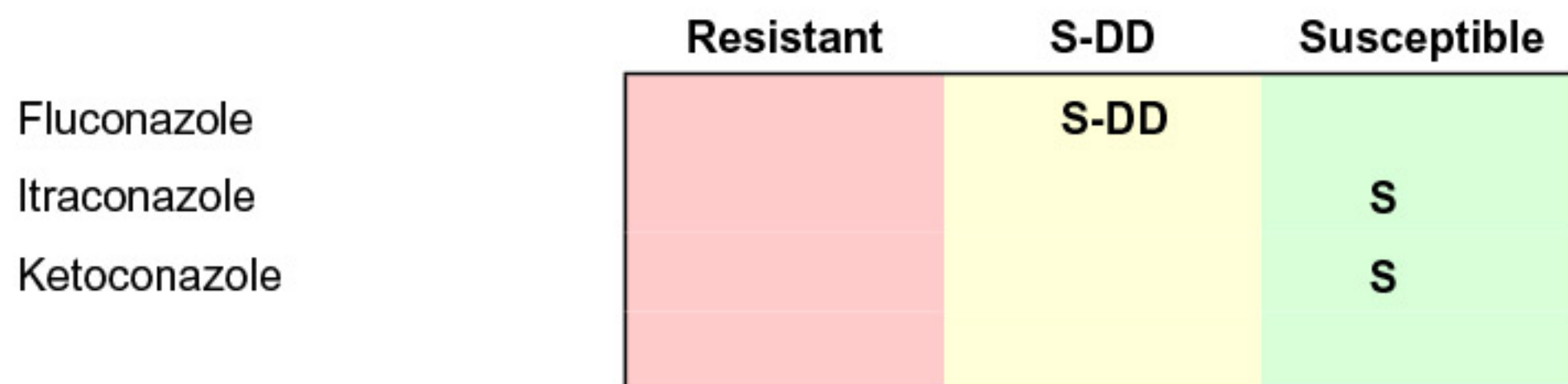
**Natural antifungal** agents may be useful for treatment of patients when organisms display in-vitro sensitivity to these agents. The test is performed by using standardized techniques and filter paper disks impregnated with the listed agent. Relative sensitivity is reported for each natural agent based 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.

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Yeast antifungal susceptibility testing is intended for research use only.

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