KAT JACOB

-.ALEXANDRA MIDDLETON

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Sex : F
Collected : 22/Oct/2018
Received: 24-Oct-2018
22/173-179 BRONTE ROAD
QUEENS PARK NSW 2022
Lab id : **3566180** UR#: 6535727

12/50 BELLEVUE ROAD
BELLEVUE HILL NSW 2023

COMPLETE DIGESTIVE STOOL ANALYSIS - Level 3

MACROSCOPIC DESCRIPTION

	Result	Range	Markers
Stool Colour	TAN	Brown	**Colour** - Brown is the colour of normal stool. Other colours may indicate abnormal GIT conditions.
Stool Form	Formed	Formed	**Form** -A formed stool is considered normal. Variations to this may indicate abnormal GIT conditions.
Mucous	ND	< +	**Mucous** - Mucous production may indcate the presence of an infection, inflammation or malignancy.
Blood (Macro)	ND	< +	**Blood (Macro)**- The presence of blood in the stool may indicate possible GIT ulcer, and must always be investigated immediately.

Macroscopy Comment

TAN or GREY coloured stool:
Consider biliary obstruction, pancreatic insufficiency (greasy stool) or steatorrhoea.
Treatment:
- Investigate and treat possible underlying causes.
- Assess other CDSA markers such as pH, fat globules & pancreatic elastase 1.

MICROSCOPIC DESCRIPTION

	Result	Range	Markers
RBCs (Micro)	ND	< +	**RBC(Micro)** - The presence of RBCs in the stool may indicate the presence of an infection, inflammation or haemorrhage.
WBCs (Micro)	0	< 10	**WBC(Micro)** - The presence of WBCs in the stool may indicate the presence of an infection, inflammation or haemorrhage.
Food Remnants	+	< ++	**Food Remnants** - The presence of food remnants may indicate maldigestion.
Fat Globules	ND	< +	**Fat Globules** -The presence of fat globules may indicate fat maldigestion.
Starch	ND	< +	**Starch** - The presence of starch grains may indicate carbohydrate maldigestion.

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DIGESTIVE MARKERS

Chymotrypsin

10.3

Short Chain Fatty Acids, Putrefactive

5.8

Markers

Chymotrypsin - Chymotrypsin is involved in protein digestion. Low levels of chymotrypsin may indicate protein maldigestion due to pancreatic insufficiency.

Short Chain Fatty Acids, Putrefactive - Putrefactive SCFAs are produced when anaerobic bacteria ferment undigested protein, indicating protein maldigestion.

	Result	Range
Meat Fibres	ND	< +
Vegetable Fibres	+	< ++

Markers

Meat Fibres - The presence of meat fibres may indicate maldigestion from gastric hypoacidity or diminished pancreatic output.

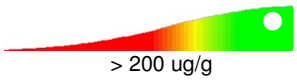
Vegetable Fibres - The presence of vegetable fibres may indicate maldigestion from gastric hypoacidity or diminished pancreatic output.

Digestive Markers Comment

PANCREATIC ELASTASE: Normal exocrine pancreatic function.
Pancreatic Elastase reflects trypsin, chymotrypsin, amylase and lipase activity.
This test is not affected by supplements of pancreatic enzymes.
Healthy individuals produce on average 500 ug/g of PE-1. Thus, levels below 500 ug/g and above 200 ug/g suggest a deviation from optimal pancreatic function.
The clinician should therefore consider digestive enzyme supplementation if one or more of the following conditions is present:
Loose watery stools, Undigested food in the stools, Post-prandial abdominal pain, Nausea or colicky abdominal pain, Gastroesophageal reflux symptoms, Bloating or food intolerance.

Pancreatic Elastase 1

455



Pancreatic Elastase is used to assess pancreatic exocrine function.
Pancreatic insufficiency is associated with diabetes mellitus, cholelithiasis, pancreatic tumour, cystic fibrosis and osteoporosis.This test is not affected by substitution therapy with enzymes of animal origin. PE-1 levels decline with age.

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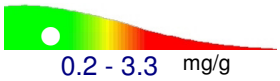
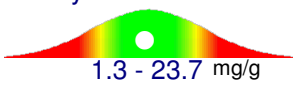
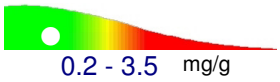
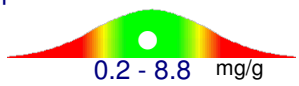
ABSORPTION MARKERS

Triglycerides, Stool
1.6


Long Chain Fatty Acids
12.7


Cholesterol, Stool
2.0


Phospholipids
3.7


Markers

Triglycerides, Stool - Elevated levels of Triglycerides in the stool may indicate lipid maldigestion.

Long Chain Fatty Acids - Elevated levels of LCFAs in the stool may indicate inadequate lipid absorption.

Cholesterol, Stool - Elevated levels of Cholesterol in the stool may indicate inadequate absorption.

Phospholipids - Elevated levels of Phospholipids in the stool may indicate inadequate absorption.

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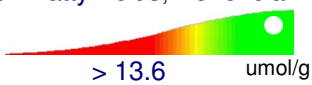
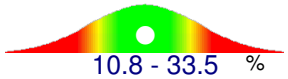
METABOLIC MARKERS

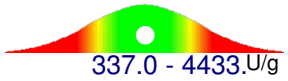
Markers

Short Chain Fatty Acids, Beneficial
49.8


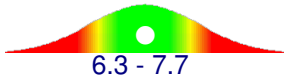
Short Chain Fatty Acids, Beneficial (Total) - Elevated SCFAs may indicate bacterial overgrowth. Inadequate SCFAs may indicate inadequate normal flora.

Butyrate
21.7


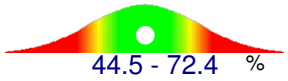
Butyrate - Decreased Butyrate levels may indicate inadequate colonic function.

b-Glucuronidase
2011.0


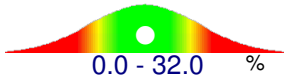
b-Glucuronidase - Increased levels of b-Glucuronidase may reverse the effects of Phase II detoxification processes.

pH
6.8


pH - Imbalances in gut pH, will influence SCFA production and effect.

Acetate
60.2


Acetate - Decreased Acetate levels may indicate inadequate colonic function.

Propionate
19.2


Propionate - Decreased Propionate levels may indicate inadequate colonic function.

Metabolic Markers Comment

In a healthy gut Short Chain Fatty Acids are exhibited in the following proportions;
Butyrate, Acetate, Propionate (16% : 60% : 24%)

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BENEFICIAL BACTERIA

	Result	Range
Bifidobacteria	++	2 - 4 +
Lactobacilli	+	2 - 4 +
Eschericia coli	++	2 - 4 +
Enterococci	+	1 - 2 +

COMMENTS:
Significant numbers of Lactobacilli, Bifidobacteria and E coli are normally present in the healthy gut: Lactobacilli and Bifidobacteria, in particular, are essential for gut health because they contribute to 1) the inhibition of gut pathogens and carcinogens. 2) the control of intetinal pH, 3) the reduction of cholesterol, 4) the synthesis of vitamins and disaccharidase enzymes.

OTHER BACTERIA

	Result	Range
Klebsiella	++	< +++
Pseudomonas	+	< +++
Campylobacter	ND	< +
Citrobacter	++	< +++
Yersinia	ND	< +
Other Bacteria.	++	< +++

COMMENTS:

YEASTS

	Result	Range
Candida albicans	ND	< +
Other Yeasts	++	< +

COMMENTS:

PARASITES

	Result	Range
Cryptosporidium	ND	< +
Giardia lamblia	ND	< +
Entamoeba Histolytica	ND	< +
Blastocystis Hominis	ND	< +
Dientamoeba fragilis	ND	< +
Other Parasites	ND	< +

COMMENTS:

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MICROORGANISM SUMMARY

BENEFICIAL BACTERIA LEVELS LOW:
Consider possible causes and symptoms include antibiotics use, chlorinated water consumption, food allergy or sensitivity, IBS, IBD, inadequate dietary fiber or water, low intestinal sIgA, maldigestion, NSAIDs use, nutrient insufficiencies, parasite infection and slow transit time.
Ideally, Bifidobacteria should be recovered at levels of 4+, whilst Lactobacillus and E. coli should be 2+ or greater.
To Improve the levels of beneficial bacteria follow the four R's:
REMOVE
• Allergenic foods, Alcohol, NSAIDs, Pathogens, Sugar, refined carbohyrates, saturated fat, red meat, fermented foods
REPLACE
• Supplement hydrochloride, digestive enzymes or other digestive aids (see pancreatic elastase 1 results)
REINOCULATE
• Prebiotic and probiotic supplementation (see bacterial culture results)
REPAIR
• Use nutraceutical agents that will help heal the gastrointestinal lining. eg. L-glutamine, aloe vera, zinc, slippery elm.

Adequate levels of Bifidobacteria detected.

Klebsiella sp. PRESENT:
Klebsiella is isolated from foods and environmental sources.
Klebsiella appears to thrive in individuals on a high starch diet.
Avoiding carbohydrates such as rice, potatoes, flour products and sugary foods reduces the amount of Klebsiella in the gut.
Klebsiella forms part of the normal GI flora in small numbers, but can be an opportunistic pathogen.

Currently, standard texts provide no specific antimicrobial guidelines for GI overgrowth of Klebsiella. Klebsiella organisms are resistant to multiple antibiotics. Treatment depends on the organ system involved.

CITROBACTER PRESENT:
Citrobacter is considered an opportunistic pathogen and therefore can be found in the gut as normal flora. It is occasionally implicated in diarrheal disease, particularly C. freundii, C. diversus and C. koseri.

Treatment: Currently no specific antimicrobial guidelines for GI overgrowth of Citrobacter exist.
Carbapenems and fluroquinolones are the antibiotics of choice for extra-intestinal sites.
Low numbers of the bacteria should be ignored whilst supplementing with adequate levels of probiotics if indicated.

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ANTIBIOTIC SENSITIVITIES and NATURAL INHIBITORS

	Klebsiella oxytoca	Citrobacter braakii	Pseudomonas aeruginosa
Antibiotics			
	Susceptible	Susceptible	Susceptible
Penicillin.	YES	NO	NO
Ampicillin	NO	NO	NO
Erythromycin	NO	NO	NO
Tetracycline	YES	YES	NO
Sulphonamides	YES	YES	NO
Trimethoprim	YES	YES	NO
Ciprofloxacin	YES	YES	YES
Gentamycin.	NO	NO	NO
Ticarcillin	NO	NO	NO
Tobramycin	NO	NO	NO
Augmentin	NO	NO	NO
Cephalexin	YES	NO	NO
Inhibitors			
	Inhibition %	Inhibition %	Inhibition %
Berberine	60%	100%	60.00
Oregano	60%	80%	60.00
Plant Tannins	100%	100%	80.00
Uva-Ursi	100%	100%	80.00

LEGEND

Low Inhibition — High Inhibition

0	20	40	60	80	100

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YEAST - SENSITIVITIES and NATURAL ANTIFUNGALS

Candida Parapsilosis

Antifungals

	Inhibition
Fluconazole	1=S
Voriconazole	0.03=S
Itraconazole	

INHIBITION CATEGORY

R	Resistant	This category indicates that the organism is not inhibited by obtainable levels of the pharmaceutical agent
I	Intermediate	This category indicates where the minimum inhibiition concentrations (MIC) approach obtainable pharmaceutical agent levels and for which response rates may be lower than for susceptible isolates
SDD	Susceptible, Dose Dependent	This category indicates that clinical efficay is achieved when higher than normal dosage of a drug is used to achieve maximal concentrations
S	Susceptible	This category indicates that the organisms are inhibited by the usual achievable concentration of the agent
NI	No Interpretative Guidelines	This category indicates that there are no established guidelines for MIC interpreatation for these organisams

Non-absorbed Antifungals

	Inhibition %
Nystatin	60%

Natural Antifungals

	Inhibition %
Berberine.	60%
Caprylic Acid	20%
Garlic	80%
Undecylenic Acid	20%
Uva-Ursi.	60%

LEGEND

Low Inhibition — High Inhibition

0	20	40	60	80	100

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PATHOGEN SUMMARY

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OTHER BACTERIA PRESENT:

Organism	Result	Range	Classification

The following group of organisms are deemed commensal, being neither beneficial or pathogenic. Where present, often inadequate levels of beneficial bacteria are also noted. These organisms may become dysbiotic at high levels where treatment may become necessary.

gamma-haemolytic Streptococcus	2+	0 - 3+	Non-Pathogen
Streptococcus agalactiae Group B	1+	0 - 3+	Non-Pathogen
Bacillus species	1+	0 - 3+	Non-Pathogen
Citrobacter braakii	2+	0 - 3+	Non-Pathogen
Klebsiella oxytoca	2+	0 - 3+	Non-Pathogen
Pseudomonas aeruginosa	1+	0 - 3+	Non-Pathogen

OTHER YEASTS PRESENT:

Organism	Result	Range	Classification
Candida parapsilosis	2+ * H	0 - 1+	POSSIBLE Pathogen

OTHER PARASITES PRESENT:

Organism	Result	Range	Classification

NO PARASITIC ORGANISMS DETECTED

BACILLUS SPECIES:
Bacillus species are spore forming, gram-positive rods belonging to the Bacillaceae family. There are currently 50 valid species within the genus.

Sources:
Meat dishes are a common source of infection in other species of Bacillus such as B. subtilis and B. licheniformis

Pathogenicity:
As yet, no toxins or other virulence factors have been identified in association with the symptoms that accompany non-B. cereus species.

Symptoms:
B. licheniformis and B. subtilis are associated with food-borne diarrheal illness.

Treatment:
B. species is almost always susceptible to clindamycin, erythromycin and vancomycin.

CITROBACTER:
Sources:
Common in the environment and may be spread by person-to person contact. Several outbreaks have occurred in babies in hospital units. Isolated from water, fish, animals and food.

Pathogenicity:
Citrobacter is considered an opportunistic pathogen and therefore can be found in the gut as part of the normal flora.

Symptoms:
Citrobacter has occasionally been implicated in diarrheal disease, particularly C. freundii and C. diversus and C. koseri

Treatment:
Currently, standard texts provide no specific antimicrobial guidelines for GI overgrowth of Citrobacter. Carbapenems and fluroquinolones are the recommended antibiotics for extraintestinal sites.

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KLEBSIELLA:
Sources:
Isolated from foods and environmental sources.
Klebsiella appears to thrive in individuals on a high starch diet.
Avoiding carbohydrates such as rice, potatoes, flour products and sugary foods reduces the amount of Klebsiella in the gut

Pathogenicity:
Part of the normal GI flora in small numbers, but can be an opportunistic pathogen.
Klebsiella is capable of translocating from the gut when in high numbers.
Certain strains of K. oxytoca have demonstrated cytotoxin production.

Symptoms:
K. pneumoniae and K. oxytoca have been associated with diarrhea in humans.
Cytotoxin-producing strains are associated with acute hemorrhagic enterocolitis.
Increased colonization of Klebsiella in the stool has been found in HLA-B27 + AS patients.

Treatment:
Currently, standard texts provide no specific antimicrobial guidelines for GI overgrowth of Klebsiella.
Third generation cephalosporins and fluroquinolones are the recommended antimicrobial agents for extra-intestinal sites.

Other Herbal antimicrobials include:
Lemon and clove, Burr marigold, Thyme, Licorice, euphobia, cordyceps.

PSEUDOMONAS SPECIES:
Pseudomonas is found in water and soil as well as fruits and vegetables.
Bottled water can be a common source of infection.
Because the organism is able to survive aqueous environments, it is an important nosocomial pathogen.
Pseudomonas can also be found on a number of surfaces and in aqueous solutions.

Pathogenicity:
Pseudomonas is considered an opportunistic pathogen.

Symptoms:
Associated with diarrhoeal infection, particularly in the immunocompromised host.

Treatment:
Ciprofloxacin is recommended for the treatment of Pseudomonas induced antibiotic-associated colitis.
Pseudomonas is usually susceptible to antipseudomonal penicillins, aminoglycosides, carbapenems, 3rd generation cephalosporins and gentamycin.

Other Herbal antimicrobials include:
Andrographis, Tea tree, Prunus armeniaca, Prunella vulgaris, Nelumbo nucifera, Panax notoginseng root, Panax notoginseng flower, Punica granatum, Areca catechu and Imperata cylindrical.

CANDIDA
Sources:
Most sources of Candida infection are thought to be of endogenous origin.While yeast are ubiquitous in the environment and are found on fruits, vegetables and other plant materials, contamination from

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external sources is linked to patients and health care workers.

Pathogenicity:
A normal inhabitant of the GI tract. May become an opportunistic pathogen after disruption of the mucosal barrier, imbalance of the normal intestinal flora and/or impaired immunity.
Risk factors for colonization include: Antibiotics, corticosteroids, antacids, H2 blockers, oral contraceptives, irradiation, GI surgery, Diabetes mellitus, burns, T cell dysfunction, chronic stress and chronic renal disease.

Symptoms:
The most common symptom attributable to non-invasive yeast overgrowth is diarrhea. Symptoms of chronic candidiasis affect four main areas of the body.
1 . Intestinal system - symptoms include: diarrhea, constipation, abdominal discomfort, distention, flatulence and rectal itching.
2. Genital Urinary system - symptoms include: menstrual complaints, vaginitis, cystitis and urethritis.
3. Nervous system - symptoms include: severe depression, extreme irritability, inability to concentrate, memory lapses and headaches.
4. Immune system - symptoms include urticaria, hayfever, asthma, and external otitis.
Sensitivities to tobacco, perfumes, diesel fumes and other chemicals.

Treatment:
Currently, standard texts provide no specific antifungal guidelines for GI overgrowth of Candida.
Oral azoles have been recommended for extra intestinal infections.
Susceptibility testing is advised due to increasing drug resistance.