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Report of Faecal Microbiology

Patient Name:	Tania LUTAN
Address:	130 Goonawarra Dr
	Mooloolaba QLD 4557
Date of Birth:	10/01/1965
Name of Requesting Practitioner:	Anja MICHEL
Laboratory Number:	156265
Date of Sample Collection:	24/10/2022
Date of Sample Processing	27/10/2022
Date of Report Issued:	07/11/2022

Dear Dr Anja MICHEL,

Thank you for referring your patient to Bioscreen.

The following is a summary of our faecal microbiota testing from your patient's sample.

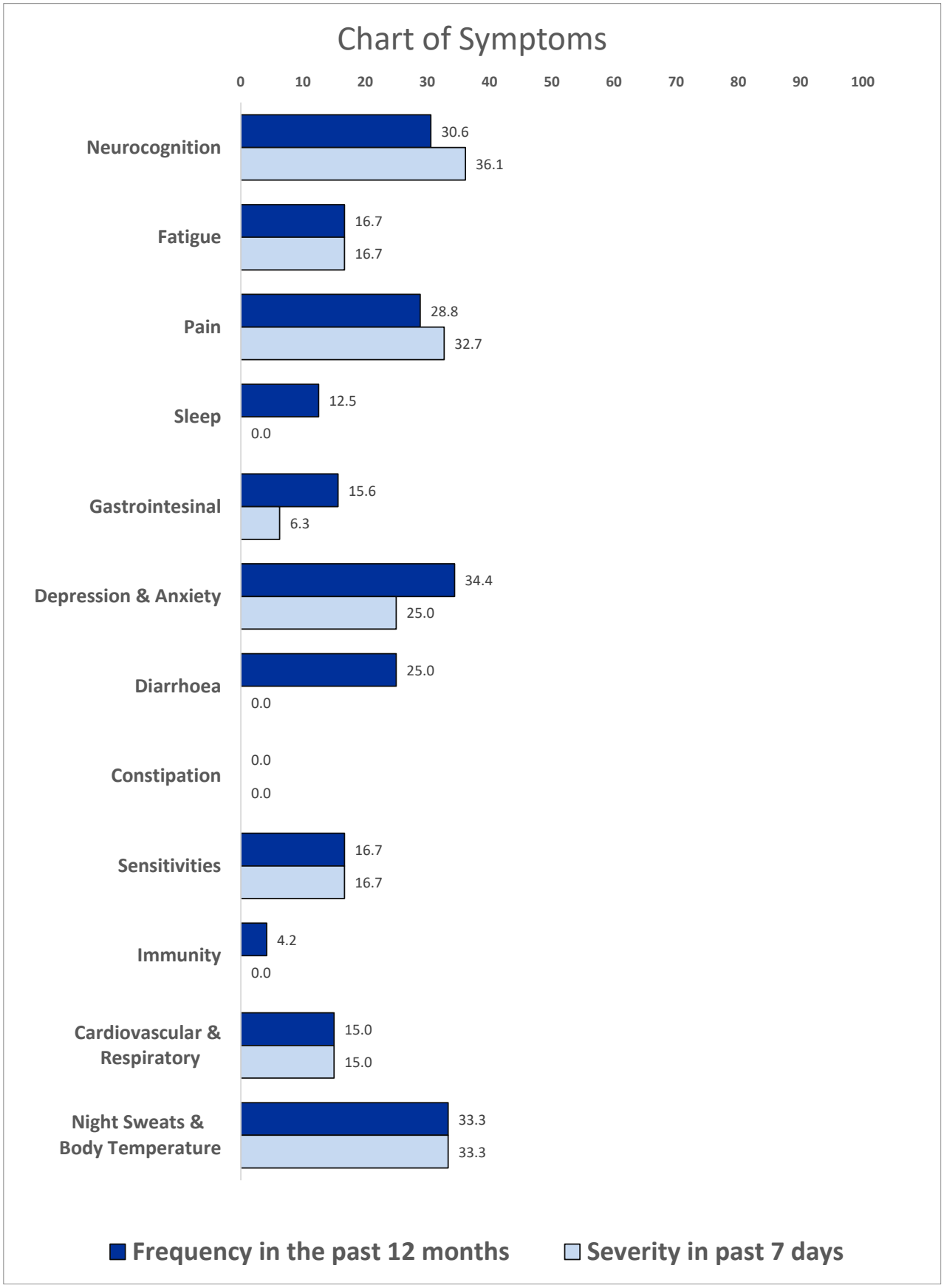
Chart of Symptoms
0
10
20
30
40
50
60
70
80
90
100
Neurocognition
30.6
36.1
Fatigue
16.7
16.7
Pain
28.8
32.7
Sleep
12.5
0.0
Gastrointesinal
15.6
6.3
Depression & Anxiety
34.4
25.0
Diarrhoea
25.0
0.0
Constipation
0.0
0.0
Sensitivities
16.7
16.7
Immunity
4.2
0.0
Cardiovascular & Respiratory
15.0
15.0
Night Sweats & Body Temperature
33.3
33.3
Frequency in the past 12 months
Severity in past 7 days

Detailed Report, Faecal Microbiology

	Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
Bacterial Count (Total)	1.1×10^{10}	1.0×10^{9} - 1.0×10^{12}	Within Ref Range		
Facultative Anaerobe [Aerobe] Counts	5.4×10^{7}	1.0×10^{7} - 1.0×10^{8}	Within Ref Range		
Anaerobe Count	1.1×10^{10}	1.0×10^{8} - 1.0×10^{12}	Within Ref Range		

Aerobe:Anaerobe Ratio: 4.8 (Reference Range is 0.5 - 4.0)

Facultative Anaerobe [Aerobe] Counts

	Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
Aerobe Count (total)	5.4×10^{7}	1.0×10^{7} - 1.0×10^{8}	Within Ref Range		
Escherichia coli coliform (Total)	4.3×10^{5}	7.0×10^{6} - 9.0×10^{7}	Low		
Escherichia coli	4.3×10^{5}			0.8%	70-90%
Non-E.coli coliforms	2.1×10^{5}	$<5.0 \times 10^{5}$	Within Ref Range		
Enterobacter cloacae	2.1×10^{5}			0.4%	<5%
Enterococcus (Total)	2.1×10^{4}	$<5.0 \times 10^{5}$	Within Ref Range	< 0.01%	<5%
Enterococcus faecium	2.1×10^{4}			< 0.01%	
Streptococcus (Total)	5.3×10^{7}	$<3.0 \times 10^{5}$	High	98.2%	<5%
Streptococcus salivarius	1.1×10^{7}			19.6%	
Streptococcus parasanguinis	1.1×10^{7}			19.6%	
Streptococcus oralis/mitis	3.2×10^{7}			58.9%	
Staphylococcus (Total)	1.2×10^{5}	$<2.0 \times 10^{5}$	Within Ref Range	0.2%	<5%
Staphylococcus capitis	1.1×10^{5}	$<2.0 \times 10^{5}$		0.2%	
Staphylococcus aureus	1.1×10^{4}	$<2.0 \times 10^{5}$		< 0.01%	
Other aerobes		$<1.0 \times 10^{5}$			<5%
Corynebacterium amycolatum	2.1×10^{5}	$<1.00 \times 10^{5}$	High	0.4%	

	Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
Faecal Fungi (Total)	1.8×10^{4}	$<1.0 \times 10^{4}$	High		
Candida glabrata	9.6×10^{3}				
Saccharomyces cerevisiae	8.5×10^{3}				

Anaerobe Counts

	Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
Anaerobe Count (total)	1.1×10^{10}	1.0×10^{8} - 1.0×10^{12}	Within Ref Range		
Bacteroides and related genera (Total)	1.1×10^{10}	5.0×10^{8} - 9.5×10^{11}	Within Ref Range	96.5%	85-95%
Bacteroides uniformis	6.4×10^{9}			56.2%	
Bacteroides nordii	1.1×10^{9}			9.4%	
Bacteroides cellulosilyticus	1.1×10^{9}			9.4%	
Bacteroides eggerthii	1.1×10^{9}			9.4%	
Phocaeicola vulgatus	1.1×10^{9}			9.4%	
Bacteroides fragilis	3.2×10^{8}			2.8%	
Eubacterium and related genera (Total)	3.2×10^{8}	1.0×10^{8} - 1.0×10^{9}	Within Ref Range	2.8%	<15%
Eubacterium limosum	3.2×10^{8}			2.8%	
Lactobacillus and related genera (Total)	1.2×10^{7}	5.0×10^{5} - 1.0×10^{7}	High	0.1%	0.5-2%
Lactobacillus gasseri	1.1×10^{7}			0.1%	
Levilactobacillus brevis	1.1×10^{6}			< 0.01%	
Bifidobacterium and related genera (Total)	$<5.0 \times 10^{5}$	5.0×10^{5} - 5.0×10^{8}	Low	< 0.01%	5-11%
Clostridium and related genera (Total)	6.4×10^{7}	$<5.0 \times 10^{8}$	Within Ref Range	0.6%	1-10%
Flavonifractor plautii	6.4×10^{7}			0.6%	

Examples of Scientific Notation of Powers of Ten

$10^{2} = 10 \times 10 = 100$ $10^{3} = 10 \times 10 \times 10 = 1,000$ $3.5 \times 10^{2} = 3.5 \times 10 \times 10 = 3500$

Summary Report, Faecal Microbiology

Total Aerobe Count: 5.4 x 10^7 cfu/g (colony forming units/g)

Total Anaerobe Count: 1.1 x 10^{10} cfu/g

Aerobe: Anaerobe Ratio is: 4.8. The Reference Range is 0.5 to 4.

Comment: This ratio is above the reference range.

Aerobe:Anaerobe Ratio - High

- A high aerobe:anaerobe ratio is usually due to a low count of anaerobes or the absence some genera of anaerobes. Growth of anaerobes is promoted by a diet that includes plentiful meat and /or bone broth, fish and soybean protein.

Faecal Aerobes

Streptococcus sp.: Overgrowth
Corynebacterium sp.: Overgrowth
E.Coli: Undergrowth

Comments

E. coli

- The reason for the low E.coli percentage distribution/ total count in the sample is unclear. However, recent exposure to antipyretics and/or analgesia (eg. paracetamol) may cause a marked change in the faecal ecology resulting in a significant alteration of the E.coli viable count (Bioscreen data, 2001). Recent supplementation with fructo-oligosaccharide (FOS) may also have suppressed growth of this organism.
- Undetectable levels of E.coli. Oral application of E.coli probiotics may be beneficial. Changing and normalizing the colonic aerobic microbial flora with the E. coli probiotic has shown to be safe and beneficial in patients with Ulcerative Colitis[1,2] and Crohn's Disease[3]. The probiotic, once ingested and if adhere to the mucosal wall, will colonize the colon within a few days, and will remain colonized after oral administration ceased. Oral application of the E.coli probiotic has shown to stimulate and enhance immune responses and induces nonspecific natural immunity[4,5].
- E.coli is an important intestinal micro-organism responsible for the synthesis of essential amino acids (eg. trytophan, phenylalanine, tyrosine)[6,7,8] vitamins (folic acid, vit K2)[9,10], and coenzymes (CoQ10)[11] important for cellular metabolism and reproduction. Determination into the levels of these essential amino acids in patients with persistent and chronic low levels of E.coli may be beneficial. Acute depletion of tyrosine and phenylalanine has shown to have selective effect on decision-making in depressive patients[12]. Tyrosine depletion has also shown to have recognition and working memory impairment[13].
- Consider supplementing oral sugars (eg galactose, fucose) to increase the densities of current intestinal coliforms (eg E.coli)[14,15] as opposed to adding a different strain with probiotics. Health professionals can contact Bioscreen for further information.
- Consider checking the folate, vitamin K2, CoQ10 levels and supplement if indicated.
- Consider checking the levels of the following essential amino acids: tryptophan, tyrosine, phenylalanine, and supplement if indicated.

Streptococcus/Enterococcus

- Streptococcus spp. are Gram positive, facultative anaerobic organisms and are classified as homofermenative, producing only lactic acid from glucose catabolism and generally regarded as potent D- and L-lactic acid producers (Bioscreen data).

- Increased distribution of lactic acid bacteria (Streptococcus, Enterococcus sp.) may lower the colonic pH[16] and has been reported to :(1) modify faecal microbial metabolism particularly the Bacteroides and Bifidobacterium spp, resulting in a decreased production of volatile fatty acids[17], and (2) alter intestinal epithelial barrier function increasing passive intestinal permeability to small and large molecules. However, this consideration requires further study.
- High colonization of faecal lactic acid bacteria (Streptococcus, Enterococcus sp.) significantly and positively correlate with cognitive dysfunctions (nervousness, memory loss, forgetfulness, confusion, mind going blank)[18,19,20,21], and sleep patterns (Bioscreen data).
- Increased proportion of lactic acid may result in a change in the distribution of the anaerobic microbial flora. This change of the fecal flora may affect the production of primary bile acids and influencing the bile acid composition in both the bile and the intestine[22]. The possibility of fat malabsorption may occur. However, this consideration requires further study.
- If indicated, erythromycin may assist in the suppression of the faecal Streptococcus spp. Ampicillin/amoxycillin may be a suitable alternative if patient is reported to have adverse reactions to the macrolids.

Corynebacterium sp.

- An ubiquitous organism generally related to soil environment. The organism has also been used as starter culture in fermented foods e.g. cheese and meats. The clinical significance of this organism in faecal samples is unclear.

Faecal Anaerobes

Lactobacillus sp.: Overgrowth
Bifidobacterium sp.: Undergrowth

Comments

Bifidobacterium/Lactobacillus sp.

- Members of the genus Lactobacillus are Gram positive bacilli and lactic acid producing bacteria. A few members can grow in a microaerophilic environment; but most are obligate anaerobes.
- High levels of Lactobacillus spp. in the anaerobic microbial flora. Metabolic acidosis and neurological dysfunction (depressed conscious state, confusion, aggressive behaviour, slurred speech and ataxia) have been reported in patients with increased level of lactobacilli in the anaerobic faecal flora[23].
- Cease all oral supplementation of lactic acid probiotics if indicated. If required, consider an antimicrobial agent (eg. ampicillin) to assist in the suppression of the organisms Lactobacillus spp.
- Members of the genus Bifidobacterium are Gram positive branching bacilli and lactic acid producing bacteria. A few members can grow in a microaerophilic environment; but most are obligate anaerobes.
- Consider the oral supplementation of the prebiotics, fructo-oligosaccharide (FOS), to stimulate the growth of Bifidobacterium spp[24,25] (caution if E. coli is low or absent).
- Oral Supplementation of Bifidobacterium probiotics may be beneficial.

Faecal Fungi

- Candida and Sacchaaromyces spp. were recovered and the % abundance of each was within the normal range.

If you require further assistance please contact Bioscreen and arrange a consultation.

Report authorised 8th November, 2022 by Dr Henry Butt.

Bioscreen Pty Ltd.

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