

Report of Faecal Microbiology

Patient Name: Bear JOYCE
Address: 46 Sunshine St
Manly Vale NSW 2093
Date of Birth: 17/05/2018
Name of Requesting Practitioner: Robyn COSFORD
Laboratory Number: 158764
Date of Sample Collection: 6/05/2024
Date of Sample Processing 09/05/2024
Date of Report Issued: 16/05/2024

Dear Dr Robyn COSFORD,

Thank you for referring your patient to Bioscreen.

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

Bioscreen Questionnaire

No Questionnaire received.

Detailed Report, Faecal Microbiology

Bacterial Count (Total)

Facultative Anaerobe [Aerobe] Counts

Anaerobe Count

Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
4.2×10^9	$1.0 \times 10^9 - 1.0 \times 10^{12}$	Within Ref Range		
3.2×10^7	$1.0 \times 10^7 - 1.0 \times 10^8$	Within Ref Range		
4.1×10^9	$1.0 \times 10^8 - 1.0 \times 10^{12}$	Within Ref Range		

Aerobe:Anaerobe Ratio: 7.7 (Reference Range is 0.5 - 4.0)

Facultative Anaerobe [Aerobe] Counts

Aerobe Count (total)

Escherichia coli coliform (Total)

Escherichia coli

Enterococcus (Total)

Enterococcus mundtii

Enterococcus faecium

Enterococcus faecalis

Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
3.2×10^7	$1.0 \times 10^7 - 1.0 \times 10^8$	Within Ref Range		
2.9×10^7	$7.0 \times 10^6 - 9.0 \times 10^7$	Within Ref Range		
2.9×10^7			90.9%	70-90%
2.9×10^6	$<5.0 \times 10^5$	High	9.1%	<5%
9.7×10^3			< 0.01%	
9.7×10^5			3%	
1.9×10^6			6.1%	

Faecal Fungi (Total)

Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
$<1.0 \times 10^1$	$<1.0 \times 10^4$	Within Ref Range		

Anaerobe Counts

Anaerobe Count (total)

Bacteroides and related genera (Total)

Bacteroides uniformis

Bacteroides fragilis

Phocaeicola plebeius

Parabacteroides distasonis

Eubacterium and related genera (Total)

Lactobacillus and related genera (Total)

Bifidobacterium and related genera (Total)

Bifidobacterium longum

Count cfu/g	Counts Reference Range cfu/g	Comment	Distribution % Total Count	Distribution Reference Range
4.1×10^9	$1.0 \times 10^8 - 1.0 \times 10^{12}$	Within Ref Range		
4.1×10^9	$5.0 \times 10^8 - 9.5 \times 10^{11}$	Within Ref Range Limited Species Detected	98.8%	85-95%
2.0×10^9			47.2%	
1.9×10^8			4.7%	
4.9×10^8			11.7%	
1.5×10^9			35.2%	
$<9.0 \times 10^7$	$1.0 \times 10^8 - 1.0 \times 10^9$	Low	< 0.01%	<15%
$<5.0 \times 10^5$	$5.0 \times 10^5 - 1.0 \times 10^7$	Low	< 0.01%	0.5-2%
4.9×10^7	$5.0 \times 10^5 - 5.0 \times 10^8$	Within Ref Range	1.2%	5-11%
4.9×10^7			1.2%	

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: 3.2×10^7 cfu/g (colony forming units/g)

Total Anaerobe Count: 4.1×10^9 cfu/g

Aerobe: Anaerobe Ratio is: 7.7. 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

Enterococcus sp.: Overgrowth

Comments

Streptococcus/Enterococcus

- Enterococcus spp. are Gram positive, facultative anaerobic organisms and are classified as homofermentative, 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 pH¹ and has been reported to : (1) modify faecal microbial metabolism particularly the Bacteroides and Bifidobacterium spp, resulting in a decreased production of volatile fatty acids², 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)^{3,4,5,6}, 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 intestine⁷. The possibility of fat malabsorption may occur. However, this consideration requires further study.
- If indicated, ampicillin/amoxycillin may assist in the suppression of the faecal Enterococcus spp. Zinc bacitracin may be a suitable alternative if patient is reported to have adverse reactions to the penicillins. Bacitracin is a non-absorbable antibiotic; however, potential nephrotoxicity and allergic reactions may occur in patients with intestinal permeability⁸.

Faecal Anaerobes

Bacteroides sp.: Limited Bacteroides spp. detected

Lactobacillus sp.: Undergrowth

Eubacterium sp.: Undergrowth

Comments

Bacteroides sp.

- Limited and low distribution of Bacteroides spp may affect the availability of volatile fatty acids for cellular metabolism.

- Consider the supplement of menaquinones (vitamin K2), and protoporphyrin IX (hemin) to improve the growth of anaerobes. High concentration of vitamin K2 (up to 300µg/kg) is found in natural yogurt, cheese, and butter⁹.
- Consider the supplement of biotin, bicarbonate, sodium and/or potassium to assist the production of volatile fatty acids by anaerobes.
- A general diet consisting of meat/bone broth, fish protein or soybean protein may assist the growth of these organisms
- 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 intestine⁷.
- *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.
- Low levels of Lactobacillus spp. detected. Oral Supplementation of Lactobacillus probiotics may be beneficial. Consider the intake of vitamin B6 and biotin to promote lactobacilli growth^{10,11}.

Eubacterium sp.

- Eubacterium sp is member of the intestinal microbial flora of human, and is regarded as one of the most frequently recovered organisms in the gastrointestinal tract, second only to the Bacteroides spp.
- The organism is responsible for the deconjugation of bile acids and the production of butyric acids.
- The organism requires the amino acids arginine and citrulline for growth.

Faecal Fungi

- Undetectable levels of faecal fungi in the sample.

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

Report authorised 20th May, 2024 by Dr Henry Butt.

Bioscreen Pty Ltd.

References

1. van der Wiel-Korstanje JA, Winkler KC. The faecal flora in ulcerative colitis. *J-Med-Microbiol.* 1975;8:491-501.
2. Edwards CA, Duerden BI, Read NW. The effects of pH on colonic bacteria grown in continuous culture. *Journal of Medical Microbiology.* 19(2):169-80, 1985.
3. Caldarini MI, Pons S, D'Agostino D et al. Abnormal fecal flora in a patient with short bowel syndrome. An in vitro study on effect of pH on D-lactic acid production. *Dig Dis Sci.* 1996;41:1649-1652
4. Hove H, Mortensen PB. Colonic lactate metabolism and D-lactic acidosis. *Dig Dis Sci* 1995;40.
5. Shah M, Beuerlein M, Danayan K. An approach to the patient with a life-threatening acid-base disturbance: the acidemias. . *University of Toronto Medical Journal* 2001;78:122-28.
6. Uribarri J, Oh MS, Carroll HJ. D-lactic acidosis. A review of clinical presentation, biochemical features, and pathophysiologic mechanisms. *Medicine (Baltimore)* 30 1998;77:73-82.
7. Salvioli G, Salati R, Bondi M, et al. Bile acid transformation by the intestinal flora and cholesterol saturation in bile. Effects of *Streptococcus faecium* administration. *Digestion.* 1982;23:80-88.
8. Jacob SE, James WD. From Road Rash to Top Allergen in a Flash: Bacitracin. *American Society for Dermatologic Surgery* 2004;30:521-24.
9. Hirauchi K, Sakano T, Notsumoto S, Nagaoka T, Morimoto A. Measurement of K vitamins in food by high-performance liquid chromatography with fluorometric detection. *Vitamins* 1989;63:147-51.
10. Mulligan JH, Snell EE. Transport and metabolism of vitamin B6 in lactic acid bacteria. *Journal of Biological Chemistry.* 252(3):835-9, 1977.
11. Buenrostro JL, Kratzer FH. Effect of *Lactobacillus* inoculation and antibiotic feeding of chickens on availability of dietary biotin. *Poultry Science* 1983;62:2022-29.