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Specialist Testing Laboratory

18 July 2013

Dear Dr Barnes, Nicholas

Ref: Elphinstone, Darren

Thank you for referring your patient to Bioscreen-Medical.

Faecal Microbiology Summary Report

Laboratory Receipt Date: 10/07/2013

The following is a summary and comments of the faecal microbial flora from the sample received on this particular date.

Faecal Aerobes

E. coli: Overgrowth
Streptococcus sp.: Overgrowth
Citrobacter sp.: Overgrowth
Total Aerobic Flora: Overgrowth

Comments

E. coli

- The intake of fructo-oligosaccharide (FOS) may assist the suppression of the facultative anaerobic organism (eg *E. coli*)¹.

Citrobacter sp.

- Citrobacter sp.* Is a member of the enteric organisms not generally considered enteropathogenic, however the organism is known to catabolize glucose with the production of acid and gas.

Streptococcus/Enterococcus

- Streptococcus 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 pH² and has been reported to: (1) modify faecal microbial metabolism particularly the *Bacteroides* and *Bifidobacterium spp.*, resulting in a decreased production of volatile fatty acids³, 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)^{4,5,6,7}, 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 intestine⁸. The possibility of fat malabsorption may occur. However, this consideration requires further study.

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- 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.

Faecal Anaerobes

Eubacterium sp.: Overgrowth

Bifidobacterium sp.: Overgrowth

Lactobacillus sp.: Overgrowth

Comments

Bifidobacterium/Lactobacillus sp.

- Members of the genera *Lactobacillus* and *Bifidobacterium* are Gram positive bacilli and lactic acid producing bacteria. A few members of both genera can grow in a microaerophilic environment; but most are obligate anaerobes.
- High levels of *Bifidobacterium* spp. in the anaerobic microbial flora. Increased level of *Bifidobacterium* may stimulate amine production⁹. Similarly, increased levels of this organism may also lower the colonic pH², modifying faecal microbial metabolism particularly the *Bacteroides* spp, resulting in a decreased production of volatile fatty acids³, and altering intestinal epithelial barrier function increasing passive intestinal permeability to small and large molecules.
- 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 flora¹⁰.
- Cease all oral supplementation of lactic acid probiotics if indicated.

Eubacterium spp: Overgrowth

- *Eubacterium* sp is generally regarded as one of the most frequently recovered organisms in the gastrointestinal tract, second only to *Bacteroides* spp. The increased distribution of this organism may be related to the low recovery levels of *Bacteroides* spp.

Faecal Yeasts

Comments

- Undetectable levels of yeasts in the sample.

We trust these comments assist you in the interpretation of Bioscreen reports. If you require further assistance please do not hesitate to contact Bioscreen anytime.

References

1. Wang X, Gibson GR. Effects of the in vitro fermentation of oligofructose and inulin by bacteria growing in the human large intestine. *Journal of Applied Bacteriology* 1993;75:373-80.
2. van der Wiel-Korstanje JA, Winkler KC. The faecal flora in ulcerative colitis. *J-Med-Microbiol.* 1975;8:491-501.



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3. 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.
4. 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
5. Hove H, Mortensen PB. Colonic lactate metabolism and D-lactic acidosis. *Dig Dis Sci* 1995;40.
6. 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.
7. 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.
8. 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.
9. E.A. Smith and G.T. Macfarlane. Studies on Amine Production in the Human Colon: Enumeration of Amine forming Bacteria and Physiological Effects of Carbohydrate and pH. *Anaerobe* 1996;2:285-97.
10. Haan E, Brown G, Bankier A, Mitchell D, Hunt S, Blakey J, Barnes G. Severe illness caused by the products of bacterial metabolism in a child with a short gut. *European Journal of Pediatrics*. 144(1):63-5, 1985.