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## Specialist Testing

24 September 2016

Ref: Thank you for referring your patient to Bioscreen-Medical.

### Faecal Microbiology Summary Report

Laboratory Receipt Date: 6/09/2016

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

#### Aerobe:Anaerobe Ratio - Low

- A low aerobe:anaerobe ratio may suggest an overall low distribution of the organism *Escherichia coli*. A general diet consisting of galactose, or supplementation with *E.coli* probiotics may improve the viable counts of the organism

#### Faecal Aerobes

**Streptococcus sp.: Overgrowth**

**E.Coli: Undergrowth**

**Total Aerobic Flora: 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.
- E.coli* is an important intestinal micro-organism responsible for the synthesis of essential amino acids (eg. tryptophan, phenylalanine, tyrosine)<sup>1,2,3</sup> vitamins (folic acid, vit K2)<sup>4,5</sup>, and coenzymes (CoQ10)<sup>6</sup> 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<sup>7</sup>. Tyrosine depletion has also shown to have recognition and working memory impairment<sup>8</sup>.
- Consider supplementing oral sugars (eg galactose, fucose) to increase the densities of current intestinal coliforms (eg *E.coli*)<sup>9,10</sup> 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.

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### *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 pH<sup>11</sup> 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<sup>12</sup>, 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)<sup>13,14,15,16</sup>, 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<sup>17</sup>. 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.

### Faecal Anaerobes

**Prevotella sp.: Overgrowth**

**Eubacterium sp.: Overgrowth**

**Bifidobacterium sp.: Undergrowth**

**Lactobacillus sp.: Undergrowth**

### Comments

#### *Prevotella/Porphyromonas sp.*

- Prevotella, and Porphyromonas spp are anaerobic Gram negative bacilli, previously classified in the genus Bacteroides. Both genera are generally referred to as the 'pigmented', bile-sensitive anaerobes composing of saccharolytic and asaccharolytic species with Prevotella spp. being saccharolytic and Porphyromonas spp. asaccharolytic.
- The relative absence of Bacteroides fragilis and an increased distribution of Prevotella spp. may reflect a low availability of bile acids in the gastrointestinal tract. Prevotella copri has been implicated in rheumatoid arthritis
- Consider supplementing bile salt to aid digestion and to suppress the pigmented anaerobes (eg Prevotella spp.) if indicated.

#### *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.

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- Low levels of Lactobacillus and Bifidobacterium spp. detected. Oral Supplementation of the two probiotics may be beneficial.

## *Eubacterium sp.*

- 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 in the gastrointestinal tract is unclear, however, the cell wall of the organism has shown to be pro inflammatory and arthritogenic.

## Faecal Yeasts

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

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.

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