Microbiota Modulation: Can Probiotics Prevent/Treat Disease in Pediatrics?

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Microbiota manipulation, such as through the administration of probiotics, may potentially contribute to improved health outcomes. Here, some examples of current research related to this topic and published in the last 3 years are described.

**Treatment of Acute Gastroenteritis**

Select probiotics with proven clinical efficacy [e.g. Lactobacillus GG (LGG), Saccharomyces boulardii] may be used as an adjunct to rehydration therapy for the management of acute gastroenteritis [1]. A number of studies have been conducted to evaluate the effects of administering other probiotics (single or in combinations) to patients with acute gastroenteritis. Many, albeit not all, reported a shortened duration of diarrhea in the probiotic-treated group [2].

**Prevention of Antibiotic-Associated Diarrhea**

There is some evidence to support the use of probiotics (e.g. high dose of Lactobacillus rhamnosus or S. boulardii) for preventing antibiotic-associated diarrhea, but there is no evidence that use of probiotics is beneficial for treatment [2].

**Nosocomial Diarrhea**

The administration of LGG compared with placebo has the potential to reduce the overall incidence of healthcare-associated diarrhea, including rotavirus gastroenteritis [3] (fig. 1).

**Infantile Colic**

Exclusively or predominantly breastfed infants with infantile colic benefit from the administration of L. reuteri DSM 17938 compared with placebo (fig. 2) [4].
Prevention of Necrotizing Enterocolitis

Certain probiotics prevent NEC [2]. Before the routine use of probiotics in preterm infants, data regarding which products should be administered, at what dosages, and for how long are needed. In settings in which the incidence of NEC is high, one may consider the use of probiotics. However, care should be taken in choosing those that are the best studied, with the highest effect size and the best safety profile.

Prevention of Respiratory Tract Infections

The role of probiotics in preventing respiratory tract infections in children remains to be defined; however, there are substantial grounds to consider LGG as a good candidate.

Fig. 1. Effect of Lactobacillus GG on healthcare-associated diarrhea. Reproduced with permission from Szajewska et al. [3].
Chronic Conditions

Overweight and Obesity

The composition of the gut microbiota differs between lean and obese individuals. Differences are apparent within the first week of life. It has been documented that a shortage of bifidobacteria in early gut microbiota is followed by the later development of overweight and obesity in children [5]. In one study, LGG had a transient preventive effect on weight gain during the first years of life [6].

![Graph showing the reduction in crying time for infants treated with L. reuteri DSM 17938 compared to placebo.](image)

**Fig. 2.** *L. reuteri* DSM 17938 for the management of infantile colic. Primary outcome – treatment success (reduction in the daily average crying time ≥50%). CI = Confidence interval; RR = relative risk; NNT = number needed to treat. Reproduced with permission from Szajewska et al. [4].

<table>
<thead>
<tr>
<th>Day</th>
<th>RR (95% CI)</th>
<th>NNT (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 7</td>
<td>–</td>
<td>7 (4 to 19)</td>
<td>0.026</td>
</tr>
<tr>
<td>Day 14</td>
<td>4.3 (2.3 to 8.7)</td>
<td>2 (2 to 3)</td>
<td>&lt;0.001</td>
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<tr>
<td>Day 21</td>
<td>3.2 (1.8 to 4.0)</td>
<td>2 (2 to 3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Day 28*</td>
<td>1.6 (1.3 to 2.1)</td>
<td>3 (2 to 5)</td>
<td>&lt;0.001</td>
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</tbody>
</table>

*Follow-up visit 1 week after the termination of the intervention
Concluding Remarks

‘The microbes are coming’ [7]. This statement recently made by Gregor Reid speaks for itself.

References

7 Reid G: The microbes are coming. CMAJ 2011;183:1332.