

Pre- and Pro-biotics

Karen Maunder
Senior Nutritionist



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Prebiotics and Probiotics

- **What are pre- and pro-biotics?**
- **What does the research show?**
- **European Society of Paediatric Gastroenterology, Hepatology and Nutrition (ESPGHAN) opinion 2010 – preterm infants**
- **ESPGHAN opinion 2011 – term infants**

PREBIOTICS

Prebiotics

- **“Prebiotics are non-digestible food ingredients that benefit the host by selectively stimulating the growth or activity of one or a limited number of bacteria in the colon.”**

Roberfroid MB. American Journal of Clinical Nutrition 2000; 71 (6): 1682S-1687s

Prebiotics

- Human milk contains more than **130** different oligosaccharides that are fermented in part in the infant's colon.
- The concentration changes with the duration of lactation:
 - Highest in colostrum at **20 to 23 g/L**,
 - about **20 g/L** on day 4 of lactation,
 - **9 g/L** on day 120 of lactation

Preterm infants and prebiotics

Preterm infants show some absorption of intact human milk oligosaccharides, but most resist digestion in the small intestine and undergo fermentation in the colon

Formula and prebiotics

- In infant formula primarily one type of oligosaccharide mixture has been systematically studied in term and preterm infants:

90% Galacto-oligosaccharides (GOS) and 10% fructo-oligosaccharides (FOS)

Moro G, et al. JPGN 2002;34:291–5;

Boehm G, et al. Arch Dis Child Fetal Neonatal Ed 2002;86:F178–81;

Knol J, et al. JPGN 2005;40:36–42;

Knol J, et al. Acta Paediatr Suppl 2005;94:31–3;

Mihatsch WA, et al. Acta Paediatr 2006;95:843–8.

Moro G, et al. Arch Dis Child 2006;91: 814–9.

What does the research show?

Prebiotics have been shown to:

- 1.increase faecal bifidobacteria counts**
- 2.reduce stool pH**
- 3.reduce stool viscosity**
- 4.accelerate gastrointestinal transport**

Mihatsch WA, et al. *Acta Paediatr* 2006;95:843–8;
Kapiki A, et al. *Early Hum Dev* 2007;83:335–9

HYPOTHESISED benefits of prebiotics in preterm infants

- Accelerate feeding advancement
- Reducing the incidence of gastrointestinal complications such as NEC
- Improve immunological functions – including reduce the incidence of hospital acquired infections

There are no data available from preterm studies to support these assumptions

Further trials required...

Further trials relating to the safety of prebiotics should address:

**Nutrient
bioavailability**

**Intestinal
gas
production**

**Possible
interactions
with other
fermentable
substances**

**Intestinal
water
loss**

**Intestinal
flora**

PROBIOTICS

Probiotics

“A probiotic is a viable microbial dietary supplement that beneficially affects the host through its effects in the intestinal tract.”

Roberfroid MB. American Journal of Clinical Nutrition 2000; 71
(6): 1682S-1687s

What does the research show?

- **Several probiotics have been shown to transiently modify faecal flora in preterm infants**
- **A systematic review of 12 randomised control trials concluded that probiotics **might reduce the risk** of necrotizing enterocolitis in preterm neonates less than 33 weeks' gestation**

ESPGHAN opinion on probiotics

- **Currently the most effective probiotic or combination of probiotics, dosage and timing are unknown.**
- **In addition, the effect might depend on type of feeding**

ESPGHAN opinion on probiotics

“ Although the available studies have not reported any adverse effects, we counsel caution in the introduction of any potentially infectious agent for immunologically immature VLBW infants.”

Further trials required...

- **Future randomised probiotic trials should also address:**

The risk of transformation of probiotics in vivo

Transposition of antibiotic resistance

Infections by probiotics

Lasting effects on gut microbiota

ESPGHAN OPINION ON PRE- AND PRO-BIOTICS IN PRETERM INFANTS

ESPGHAN Opinion 2010

- In conclusion, there is **not enough available evidence** suggesting that the use of probiotics or prebiotics in preterm infants is safe.
- Efficacy and safety should be established for each product.

ESPGHAN

“We conclude that the presently available data do not permit recommending the routine use of prebiotics or probiotics as food supplements in preterm infants.”

ESPGHAN OPINION ON PRE- AND PRO-BIOTICS IN TERM INFANTS

ESPGHAN 2011 – Term infants

“...the Committee does not recommend the routine use of formula supplemented with prebiotics or probiotics in infants”

ESPGHAN 2011 – term infants

HOWEVER:

- They consider the supplementation of formula with pro- and/or pre-biotics is **an important field of further research**
- Validated clinical outcome measures required within carefully conducted, well designed RCTs
- Independent trials required

Summary

- **Pre- and pro-biotics are an important field of research in both preterm and term infants**
- **Further well designed research is required in the area**

Thank you!



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