



## Gastro and immune support for infants and children

Infants and children are exposed to various pathogens and bacteria every day, challenging their immune system. During the first three years of age, the majority of the gastrointestinal (GI) bacterial composition is determined. A well balanced and diverse gut microbiota is of great importance, since more than 70% of the immune system resides in the GI-tract and is regulated by the microbiota.

For many years, the belief was that the newborn child had a sterile GI-tract, but research has shown in recent years that the main bacteria in the infant GI-tract are of the *Lactobacillus* and *Bifidobacterium* species. During early childhood, the gut microbiota is developing, and the "set-up" of the microbiota that will follow us all through life is determined.

The GI bacterial diversity is determined firstly by our genes, but also by a variety of other factors. Mode of delivery, where caesarian section is associated with a less diverse microbiota, our mothers life-style choices during pregnancy, use of antibiotics, infections we encounter as young children and diet all have big impact on the GI composition. Moreover, breast-feeding or not has been shown to greatly affect the microbiota.

We all have a general concern for the wellbeing and safety of our children, and giving them the best possible starting point

in life is of high priority. The GI-tract can in some ways be seen as our "first line of defense", as it can help us withstand pathogens that could cause more or less severe infections or inflammations. As the majority of immune functions originate from the GI-tract, a well-established and diverse microbiota is crucial for a well-balanced immune system. A healthy gut environment promotes the development and maturation of the immune system, while an abnormal microbiota is considered being a major cause of severe immune and GI disorders during childhood. A weak immune system may result in frequent infections and inflammations, whereas an overactive immune response may result in allergies or even autoimmune diseases.

A beneficial composition of the microbiota supports a healthy start in life. Probi Select Kids can strengthen and regulate the immune system and improve gastro function in infants and children.

### Short facts

**Strain:** *Lactobacillus rhamnosus* DSM 6594

**Indication:** Gastro and immune support for infants and children

**Documentation:** Multiple preclinical and clinical studies

**Recommended daily dose:** minimum 10<sup>9</sup> CFU

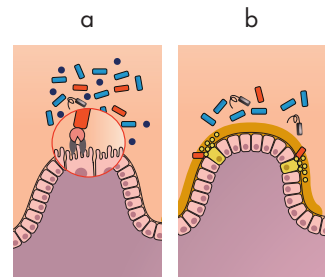
**Probi Select Kids** is based on the clinically documented and patent protected strain *Lactobacillus rhamnosus* 6594. Several studies have shown that *L. rhamnosus* is a natural inhabitant of the intestinal microbiota already in the newborn child, and is associated with improved gastrointestinal health and less fussing and crying.

The recommended dose of 1 billion bacteria per day will promote a healthy gut environment and a strong immune defense in the growing child.

### Benefits of *Lactobacillus rhamnosus* 6594:

- a) Survives the passage through the GI-tract and attaches to intestinal cells
  - main criterion for activity in the intestine
- b) Supports the immune system, having anti-inflammatory and immunity-enhancing effects
  - decreases risk for infections
- c) Improves gut microbial composition and diversity
  - a healthier, more resilient gut

**Figure 1.** *Lactobacillus rhamnosus* 6594 is a clinically supported probiotic bacteria proven to survive the passage through the GI tract and attach to intestinal cells (a). It is clinically proven to support the immune system (b), resulting in a well-balanced and healthy gastrointestinal environment.



### Supporting preclinical and clinical studies

*Lactobacillus rhamnosus* 6594 possesses anti-microbial activity against pathogenic bacteria such as *Listeria monocytogenes*, *Bacillus cereus*, *E. coli*, *Shigella flexneri*, *Yersinia enterocolitica*, *Citrobacter freundii*, *Enterobacteriaceae* and others<sup>1</sup>.

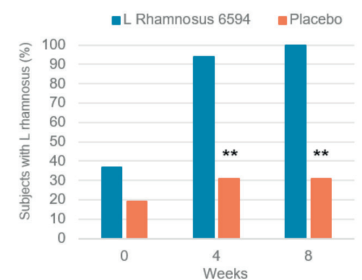
Translocation of bacteria from the intestine to blood and organs may have detrimental effects. Supplementation of *L. rhamnosus* 6594 have been shown to reduce translocation in several preclinical studies<sup>2,4</sup>.

A preclinical study investigated the effects of *L. rhamnosus* 6594 given in combination with barley. The result was increased levels of short chain fatty acids (SCFA)<sup>5</sup>, important for regulation of the metabolism, maintenance of the gut barrier function and for improving the overall GI environment<sup>6</sup>.

In a randomized, double-blind and placebo-controlled clinical study, *L. rhamnosus* 6594 was given to infants of 4 to 83 days of age, for a total duration of 8 weeks<sup>7</sup>. The results showed that intake of *L. rhamnosus* 6594 already from the age of 4 days is safe and well-tolerated. A decreased incidence of acquiring upper respiratory tract infections (URTI) was found in the group receiving *L. rhamnosus* 6594, compared to the placebo group. The amount of Lactobacilli, as well as *L. rhamnosus per se* was significantly increased after both 4 and 8 weeks intake (Figure 2).

In another study on infants, the colonization of several lactobacilli was studied<sup>3</sup>. The results showed that *L. rhamnosus* was the most common lactobacilli in all the included infants (n=112). Moreover, breast-feeding and vaginal delivery was associated with a more pronounced dominance of *L. rhamnosus* during the first 6 months of life.

A 2-week, double-blind and placebo-controlled clinical study investigated the effects on the innate and adaptive immune system after intake of *L. rhamnosus* 6594<sup>8</sup>. The results were down-regulation of several parameters of cell-mediated immunity, as well as an increase in the anti-inflammatory cytokine IL-10. The conclusion of this study was that *L. rhamnosus* 6594 supports the immune system, preventing a too strong immune response and promotes anti-inflammatory responses. Thus, protection against infections and several diseases such as allergies and colitis can be achieved.



**Figure 2.** *Lactobacillus rhamnosus* 6594 given to infants from 4-days of age. The amount of *Lactobacillus rhamnosus* (a), as well as general Lactobacilli (data not shown), was significantly increased after both 4 and 8 weeks intake in the probiotic group vs placebo.

1. Jacobsen *et al.* (1999) *Appl. Environ. Microbiol.* 65:4949-4956.  
 2. Adawi *et al.* (1997) *Hepatology* 25:642-647.  
 3. Adawi *et al.* (2001) *Int. J. Food. Microbiol.* 70:213-220.  
 4. Mao *et al.* (1997) *Digestive Surgery* 14: 284-291.

5. Bränning *et al.* (2010) *J. Nutr.* 141:101-107.  
 6. Rios-Cavian *et al.* (2016) *Nutrition* 18:609-615 *Front Microbiol.* 7:185.  
 7. Probi Study Report (2012) Tolerance of a probiotic formula containing lactobacilli.  
 8. Rask *et al.* (2013) *Clin. Exp. Immunol.* 172:321-332.

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