FOOD-CT-2005-007036

EARNEST

EARly Nutrition programming- long term follow up of Efficacy and Safety Trials and integrated epidemiological, genetic, animal, consumer and economic research

Instrument: Integrated Project

Thematic Priority 5.4.3.1: Food Quality and Safety

Final public report on activity 1.4.1

Effects of probiotics on the development of gut mucosal immune responsiveness of newborns at risk of atopic disease

Period covered from 15.04.2005 to 14.10.2010

Start date of project: 15.04.2005 Duration: 5,5 Years

Organisation Name of Lead Contractor for this report: TUCH

According to the original study plan the long term impacts of perinatal administration of probiotics was examined. The study cohort was followed and evaluated in this project at 7 years of age. The study population comprised 159 children participating in a randomized, double-blind, prospective follow-up of probiotics in allergic diseases. Children with at least one close relative (mother, father, sibling) with atopic dermatitis, allergic rhinitis or asthma were included. Mothers had been recruited in antenatal clinics in Turku, Finland, and had been randomized in a double-blind, placebo-controlled manner to receive 1 x 10^{10} colony-forming units of *Lactobacillus rhamnosus* GG (ATCC 53103, Valio Ltd.,Finland) or placebo (microcrystalline cellulose) in capsules once a day for 2-4 weeks before expected delivery. After delivery, the capsule contents were given either to the mothers if they were breastfeeding or otherwise to the children mixed in water for 6 months. The study complies with the Declaration of Helsinki as revised in 2000. Written informed consent for the origina study (published in Lancet in 2001) had been obtained from the children's parents and the study design was approved by the Ethics Committee of the Hospital District of Southwest Finland. The clinical outcome of the intervention has been reported (Kalliomäki 2001).

The long-term effect and safety of the approach in the follow-up of the cohort in infants receiving probiotics perinatally was of specific focus here. Probiotics intervention resulted in neither permanent alteration in the compositional development of the gut microbiota nor with permanent colonization of the administered strain.

For the evaluation of the clinical impact and the cumulative effect of probiotic intervention during the first 7 years of age the diagnosis of eczema was made in a blind fashion on the basis of both a questionnaire and a clinical examination and skin prick tests were performed. The incidence of atopic diseases in the Lactobacillus GG group was compared with that in the placebo group using the relative risk estimate. The cumulative risk for developing eczema during the first 7 years of life was significantly lower in the Lactobacillus GG group than in the placebo group (42.6% vs 66.1%; Relative risk, 0.64; 95% CI, 0.45-0.92) in the group of children completing the 7-year follow-up.

We conclude that probiotics could offer a useful intervention strategy in the battle against allergy epidemic, the long-term benefits demonstrated here as a reduced risk of atopic eczema up to 7 years of age, i.e. beyond the intervention period and infancy.

The goal for the future is to optimise dietary treatment in early infancy and to provide a new direction in the search for means of treating and preventing allergy. The intervention with probiotics is initiated to induce tolerance/ immunomodulation to preferentially stimulate healthy immune balance.

The results have been published in:

Kalliomäki M, Salminen S, Poussa T, Isolauri E. Probiotics during the first 7 years of life: A cumulative risk reduction of eczema in a randomized, placebo-controlled trial. J Allergy Clin Immunol 2007;119: 1019-21.