EFFECT OF EARLY POSTNATAL SUPPLEMENTATION OF NEWBORNS BY *ESCHERICHIA COLI* O83:K24:H31 ON ALLERGY INCIDENCE, MICROBIOTA AND SELECTED IMMUNE CHARATERISTICS

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Objectives

The early postnatal period is critical for maturation of neonatal immune system and setting mutual homeostatic interactions between developing microbiota and immune system. Delayed immune system maturation has been associated with increased risk for allergy development. Probiotic supplementation could support maturation of neonatal immune system.

Methods

Newborns of allergic mothers (neonates at higher risk for allergy development) were supplemented by probiotic strain of *Escherichia coli* O83:K24:H31 (EcO83) within 48 hrs after delivery and followed prospectively. Proportional and functional characteristics of dendritic cells (DC) and regulatory T cells (Treg) in peripheral blood of ten year old children were analysed by flow cytometry. The impact of early postnatal EcO83 supplementation on microbiota composition at the age of 10 years was detected by next generation sequencing.

Results

Children supplemented by EcO83 have lower allergy incidence compared to non-supplemented children of allergic mothers. The allergy incidence in EcO83 supplemented children was comparable with non-supplemented children of healthy mothers (children at lower risk for allergy development). There was no impact of early postnatal supplementation on proportion of DC but children supplemented by EcO83 had increased functional capacity of Treg (higher intracellular presence of IL-10, PD1, CTLA-4). Concentration of IL-10 has been elevated in sera of EcO83 supplemented children of allergic mothers compared on nonsupplemented ones. EcO83 was able to promote maturation of cord blood DC together with induction of both expression and secretion of IL-10 *in vitro*. The early postnatal EcO83 administration has no impact on microbiota composition at the age of 10 years.

Conclusions

The beneficial effect of early postnatal EcO83 supplementation on lowering allergy incidence could be mediated via promotion of immune system maturation together with setting appropriate regulatory responses.

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