

Effects of environmental biodiversity on health and microbiome development in early childhood

OBJECTIVE

Various observational studies, including our own birth cohorts, have shown that reduced microbial exposure in early-life is associated with inadequate microbiome and immune development and hence the risk of immune-mediated diseases such as allergies. We are now taking this microbiome research from 'lab to life' by formulating and executing early-life microbiome interventions for disease prevention. Including:

- Investigating the impact of environmental biodiversity on the development of the microbiome and physical and mental health in early infancy.
- Encouraging children to interact and play with natural materials, like species rich soil, wood and plants, to analyse the effects of increased biodiversity on the child's microbiome and immune system.

METHODOLOGY

- Using results from in vitro and in vivo studies as well as observational birth cohort studies to understand the role of food-borne and plant-based microbes on the infant microbiome and immune development with the ultimate goal to guide the design of intervention studies.

Conduct randomized placebo-controlled trials such as forest playgroups to expose children to biodiverse environments and encourage their engagement with nature.

- Comprehensive microbiome and immune profiling and extensive clinical phenotyping to monitor the impact of such interventions on microbiome and immune maturation as well as on the risk of immune-mediated diseases.

KEY FINDINGS

- Identification of key microbial species that can prevent or treat chronic noncommunicable diseases in children.
- Using a holomicrobiome approach by connecting microbiomes in the environment (soil, plants, food) to the microbiomes colonizing the infant skin and gut.
- Development of strategies for future interventions, including healthcare, behavior modification, and urban/landscape planning.
- Reduction in the incidence and severity of allergies and asthma
- Provision of affordable therapies to improve health and quality of life for a large patient group.

SCIENTIFIC AND/OR SOCIETAL IMPACT

- Enhanced understanding of how environmental and dietary factors influence the gut-immune axis in early life and its role in disease prevention.
- Contribution to the growing body of knowledge on the human microbiome and its manipulation through environmental and dietary interventions.
- Improved public health through the development of targeted early-life nutritional and environmental strategies.
- Reduction in the incidence of chronic diseases, leading to decreased healthcare costs and improved quality of life.
- Empowerment of parents and caregivers with actionable insights into fostering a healthy microbiome in children.
- Influencing urban and landscape development to incorporate natural elements that support healthy microbiome development in children.

MORE INFORMATION

www.feda.bio/en/projects/biodivgesundheitsprojekte/endemic/



Who's Involved

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