

## A Deeper View of Early Life Microbiota and Hygiene Hypothesis Relationship: Reducing the Risk of Allergic Diseases is Dependent on the Permanent Presence of Good Microbiota throughout Life

To the Editor,

After 30 years, the Hygiene Hypothesis is still being debated in the scientific community. The essence of Hygiene Hypothesis is that exposure of the immune system to microbes in early life prevents allergic disease later in life.<sup>[1]</sup> In other words, people who live in rural areas have a low risk for allergic disease than in urban areas. The concept of this hypothesis backs to the balance of the Th1/2 response.<sup>[1]</sup> According to Nitya Jain's review, the early life microbiota is formed during the first two years of life and educates the immune system to be involved in health and disease for the rest of its life.<sup>[2]</sup> But there's a question: does early life microbiota and Th1 polarization could dominant until the end of life? If we look at children in rural areas, in addition to microbial antigens, they also encounter allergens, such as mites, pollens, and intestinal helminth infections, which indicates the polarization of responses to Th2 response.<sup>[3]</sup> The effect of helminths on allergic disease varies depending on the species, infection duration, and parasite load. Some of them reduce the risk of this disease (*Schistosoma mansoni*), whereas others induce or develop allergic symptoms such as *Ascaris lumbricoides*.<sup>[4]</sup> On the other hand, the presence of a high level of pathogenic bacteria (*Staphylococcus aureus* and *Clostridium difficile*) and also Anelloviruses have a positive correlate with the allergic disease, while good bacteria such as *Bifidobacterium lactis Bb-12* and some *Lactobacillus* spp. such as *Lactobacillus GG* develop anti-inflammatory responses in the gut.<sup>[1,2,5-7]</sup> Moreover, immigrants who have migrated from low allergy prevalence areas to high allergy prevalence countries acquire an allergy sensitivity profile over time.<sup>[8]</sup> Furthermore, probiotics can help to repair the microbiota, balance the Th1/Th2 response, and reduce allergy symptoms.<sup>[5]</sup> Cumulative evidence suggests that only attention to the microbiota in early life is not enough for the rest of life. As a result, if we want to have a normal immune response that reduces the risk of allergies, we must guarantee the presence of a good microbiota throughout life.

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### Conflicts of interest

There are no conflicts of interest.

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### References

1. Pfefferle PI, Keber CU, Cohen RM, Garn H. The Hygiene Hypothesis-Learning from but not living in the past. *Front Immunol* 2021;12:635935.
2. Jain N. The early life education of the immune system: Moms, microbes and (missed) opportunities. *Gut Microbes* 2020;12:1824564.
3. Figueiredo CA, Barreto ML, Rodrigues LC, Cooper PJ, Silva NB, Amorim LD, et al. Chronic intestinal helminth infections are associated with immune hypo-responsiveness and induction of a regulatory network. *Infect Immun* 2010;78:3160-7.
4. Bohnacker S, Troisi F, de Los Reyes Jiménez M, Esser-von Bieren J. What can parasites tell us about the pathogenesis and treatment of asthma and allergic diseases. *Front Immunol* 2020;11:2106.
5. de Azevedo MS, Innocentin S, Dorella FA, Rocha CS, Mariat D, Pontes DS, et al. Immunotherapy of allergic diseases using probiotics or recombinant probiotics. *J Appl Microbiol* 2013;115:319-33.
6. Freer G, Maggi F, Pifferi M, Di Cicco ME, Peroni DG, Pistello M. The virome and its major component, anellovirus, a convoluted system molding human immune defenses and possibly affecting the development of asthma and respiratory diseases in childhood. *Front Microbiol* 2018;9:686.
7. Özdemir Ö. Various effects of different probiotic strains in allergic disorders: An update from laboratory and clinical data. *Clin Exp Immunol* 2010;160:295-304.
8. Tham EH, Loo EXL, Zhu Y, Shek LP. Effects of migration on allergic diseases. *Int Arch Allergy Immunol* 2019;178:128-40.

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