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Gut microbial metabolomics to understand allergies in early life

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Stellingen
Behorende bij het proefschrift
Gut Microbial Metabolomics to Understand Allergies in Early Life

1. Microbiome compositional analysis alone is insufficient to understand the role that the gut microbiome plays in cow's milk allergy, with metabolomics providing important complementary functional insights. (This thesis)
2. Fecal metabolomics captures the metabolic products of food, host metabolism, and gut microbiome, offering a non-invasive approach to study the interplay between nutrition, gut microbiome, and host physiology in early life. (This thesis)
3. The effect of bifidogenic synbiotic treatment on the gut microbiome activity is duration-dependent, suggesting that optimization of intervention timing and length is critical for maximizing the therapeutic potential. (Chapter 4)
4. Medium conditions impact the inflammatory response and lipid signaling in gut-on-a-chip models, highlighting the importance of thorough reporting of model conditions to ensure good reproducibility, accurate interpretation, and reliable translation. (Chapter 5)
5. *"Probiotics supplementation during pregnancy and infancy reduces food allergy risk"*. [Jiang *et al.* Nutr. Rev. 2024]. A diverse, healthy, fiber-rich maternal diet may be more influential in allergy prevention than probiotic supplementation alone.
6. *"Physiological crosstalk of breastfeeding-microbiota assists proper immunological programming after birth, providing a mutual interface for healthy outcomes."* [Camacho-Morales *et al.* Front. Pediatr. 2021]. While considerable research focuses on breastmilk-microbial composition, the immune-relevant microbial metabolites in breastmilk remain largely underexplored.
7. *"Intestinal bile acid metabolites [...] could be predictive biomarkers for persistent food allergy in early childhood"* [Lee So-Yeon *et al.* Pediatr. Allergy Immunol. 2023]. Understanding how gut microbiome affects allergies requires comprehensive examination of the diverse pool of secondary bile acids, rather than a narrow focus on the most extensively studied bile acids.
8. *"[...] External factors that cause [...] disruption in the epithelial barrier constitute a common pathway in the development of multiple allergic conditions. Moreover, the interaction between the epithelium and immune cells in addition to crosstalk with microbiota and environmental factors take part in the pathogenesis of atopic disorders [...]"* [Sozener *et al.* Allergy 2022]. This can be addressed mechanistically using organ-on-chip models, allowing to study the link between environmental exposures, epithelial barrier integrity, microbiome, and allergic immune response.
9. *"Follow the evidence wherever it leads, and question everything."* - Neil deGrasse Tyson
10. *"What we know is a drop, what we don't know is an ocean."* - Isaac Newton

11. *“When life gives you a pile of poop, you’re gonna get dirty - so you may as well roll with it.”* - Lynn Plourde

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