

EDITORIAL

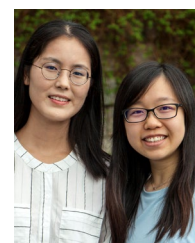
The effect of short term microbial exposure and diversity on allergy, and how FcεRI expression on inflammatory cells modulates asthma

This editorial introduces a new issue of *Pediatric Allergy and Immunology*. This issue reflects the extensive work provided by researchers and clinicians, and the whole editorial team and the reviewers. Altogether, they aim to provide the best of research and education in our field. Here, I have made a personal selection of articles I would like to introduce to you. The issues always start with an educational review, and this month Erik Melén and colleagues link asthma, most prevalent in allergic children, with chronic obstructive pulmonary disease, a disease better known to physicians treating adults.¹ When reading this contribution, I realized again how important it is to define risk factors in children. This helps prevent progression of a disease most often considered as benign when well controlled in childhood, to a devastating chronic lung disease in adults.



Eila Kujansuu

From the section on original research articles, I first selected the study published by Eila Kujansuu et al.² They took advantage of an unusual event, an accidental mixing of sewage water with drinking water in Nokia Finland, and they hypothesized that according to the "hygiene hypothesis," this short-term exposure to water contaminated with bacteria could influence the emergence of sensitization and allergies in children. Over 100 exposed children were assessed for allergies and skin tested 2 to 5 years later, and compared to age-matched, non-exposed controls. The study showed that in particular children below 1 year of age at the time of the contamination, and children who suffered from gastroenteritis at exposure, had lower skin test reactivity. This study suggests that a very short oral exposure to a high microbial load may influence sensitization later in life. Earlier studies published in PAI have also shown a protection by microbial exposure. The most studied type of exposure has been by living in a farming environment,^{3,4} although other environmental factors such as pollution may also intervene.⁵ While most studies such as the one commented on here are focusing on bacterial exposure, studies published in PAI have also highlighted that other microorganisms, such as fungi, can also modulate the immune system.⁶



Jinpao Hou (left) and Jennifer Wing-Ki Yau (right)

My second selection is the article by Jennifer Wing-Ki Yau and colleagues.⁷ This research group from Singapore has investigated the bacterial microbiome of the nose and the eye in relation to allergic rhinitis and conjunctivitis (ARC). The originality of this publication is largely related to the sample sites, the eyes, and the nose. Indeed, the gut microbiome has been the target of most studies in relation to allergies.⁸ Nevertheless, recent studies published in PAI have also investigated the microbiome of other sites such as the skin,⁹ or the airways.¹⁰ As relevant findings, Yau et al report a larger nasal microbial diversity in ARC patients than in controls, which was not seen for the ocular microbiome. This observation highlights the difference in terms of microbial diversity of the bacterial flora between these two very close sites. However, authors suggest an interaction of the microbiome of the nose and the eyes, as the microbial composition tends to become more similar in terms of bacterial communities in ARC patients when compared to healthy controls. This study with a relatively low number of patients opens a large field for future investigations in relation to local microbial flora and allergic diseases.



Jonatan Leffler (left) and James F. Read (right)

The third highlighted contribution in this issue addresses asthma and atopy in school-age children in relation to FcεRI expression on circulating cells. A research group from Western Australia with Jonatan Leffler as the first author has collected peripheral blood from 391 asthmatic children recruited in four cohorts and isolated for further studies basophils, monocytes, and various types of dendritic cells.¹¹ FACS analysis defined cell types in relation to the expression of the IgE high-affinity receptor FcεRI. In summary, they could show upregulated expression of FcεRI on both effector (basophil) and regulatory (myeloid, and especially various types of dendritic cells) populations, and that this upregulation was associated with current atopic asthma. The authors also suggest that FcεRI expression may be used to identify children with maximal susceptibility to allergic asthma and thus identify those who may benefit the most from intervention therapies targeting Th2-mediated inflammation, such as with biologic agents.¹² This publication adds additional insights into the mechanisms of asthma. Readers with a special research interest in the field might also refer to these recent original publications in PAI¹³⁻¹⁵ or to a recent review on oxidative stress and asthma.¹⁶

The other articles in this issue of PAI also deserve your attentive reading, and we hope that this issue of PAI will nurture your interest in the exciting field of pediatric allergy and immunology.

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REFERENCES

1. Melén E, Guerra S, Hallberg J, et al. Linking COPD epidemiology with pediatric asthma care: implications for the patient and the physician. *Pediatr Allergy Immunol.* 2019;30:589-597.
2. Kujansuu E, Kujansuu L, Paasilta M, et al. Exposure to sewage water and the development of allergic manifestations in Finnish children. *Pediatr Allergy Immunol.* 2019;30:598-603.
3. Vasileiadou S, Wennergren G, Strömberg Celind F, et al. Eating fish and farm life reduce allergic rhinitis at the age of twelve. *Pediatr Allergy Immunol.* 2018;29:283-289.
4. Müller-Rompa S, Markevych I, Hose AJ, et al. An approach to the asthma-protective farm effect by geocoding: good farms and better farms. *Pediatr Allergy Immunol.* 2018;29:275-282.
5. Martikainen M-V, Rönkkö TJ, Schaub B, et al. Integrating farm and air pollution studies in search for immunoregulatory mechanisms operating in protective and high-risk environments. *Pediatr Allergy Immunol.* 2018;29:815-822.
6. Mueller-Rompa S, Janke T, Schwaiger K, et al. Identification of fungal candidates for asthma protection in a large population-based study. *Pediatr Allergy Immunol.* 2017;28:72-78.
7. Yau JW-K, Hou J, Tsui S, et al. Characterization of ocular and nasopharyngeal microbiome in allergic rhinoconjunctivitis. *Pediatr Allergy Immunol.* 2019;30:624-631.
8. Kourosh A, Luna RA, Balderas M, et al. Fecal microbiome signatures are different in food-allergic children compared to siblings and healthy children. *Pediatr Allergy Immunol.* 2018;29:545-554.
9. Lehtimäki J, Laatikainen T, Karkman A, et al. Nature-oriented daycare diversifies skin microbiota in children-No robust association with allergies. *Pediatr Allergy Immunol.* 2018;29:318-321.
10. Toivonen L, Hasegawa K, Ajami NJ, et al. Circulating 25-hydroxyvitamin D, nasopharyngeal microbiota, and bronchiolitis severity. *Pediatr Allergy Immunol.* 2018;29:877-880.
11. Leffler J, Read JF, Jones AC, et al. Progressive increase of FcεRI expression across several PBMC subsets is associated with atopy and atopic asthma within school-aged children. *Pediatr Allergy Immunol.* 2019;30:646-653.
12. Just J, Saint Pierre P, Amat F, et al. What lessons can be learned about asthma phenotypes in children from cohort studies? *Pediatr Allergy Immunol.* 2015;26:300-305.
13. Landgraf-Rauf K, Boeck A, Siemens D, et al. IRF-1 SNPs influence the risk for childhood allergic asthma: a critical role for pro-inflammatory immune regulation. *Pediatr Allergy Immunol.* 2018;29:34-41.
14. Boeck A, Landgraf-Rauf K, Vogelsang V, et al. Ca²⁺ and innate immune pathways are activated and differentially expressed in childhood asthma phenotypes. *Pediatr Allergy Immunol.* 2018;29:823-833.
15. Gallo V, Dijk FN, Holloway JW, et al. TRPA1 gene polymorphisms and childhood asthma. *Pediatr Allergy Immunol.* 2017;28:191-198.
16. Sahiner UM, Birben E, Erzurum S, et al. Oxidative stress in asthma: part of the puzzle. *Pediatr Allergy Immunol.* 2018;29:789-800.