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Impact of the development of the lung microbiota on neonatal immunity

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While the healthy lungs had been thought of as sterile, the concept and the description of a commensal lung flora recently emerged. It has been described a bacterial community in the healthy Human lung, with *Pseudomonas*, *Streptococcus*, *Prevotella*, *Fusobacteria*, and *Veillonella* as dominant members. As it is now admitted for intestinal tract, the pattern of colonization in respiratory tract is expected to influence the health.

The exploration of the impact of the development of the pulmonary microbiota on neonatal immunity is a new and promising area which will impact the management of newborn health. We combined *ex vivo* and *in vivo* strategies to put in evidence how lung bacteria shape the innate and acquired respiratory immunity in mice.

First, we isolated and characterized the primocolonizing bacteria arriving early in the lung of newborn specific pathogen free (SPF) BALB/c mice, using both molecular approaches and *in vitro* cultures. We were able to isolated lung bacteria (mainly facultative anaerobes bacteria, including *Lactobacillus*) as soon as 3 days after birth. Their number was significantly increased after 3 weeks. Then, the effects of the establishment of the microbiota on lung epithelium and immunity were assessed with naive lung explants. Co-culture of explants with lung bacteria revealed differences in the cytokine secretion pattern according to the type of bacteria used. Finally, the influence of the microbiota on the lung protection will be investigated *in vivo* by induction of asthma with House Dust Mite in SPF.

To better understand how the microbial factors influence the immune defenses at early age should improve fundamental knowledge and led to envisage innovative pediatric treatments (like respiratory probiotics) for respiratory diseases.

Keywords: Lung, *Lactobacillus*, Probiotics, Asthma