

LOW VERSUS HIGH DIVERSITY AIRWAY MICROBIOME AND ITS EFFECT ON AIRWAY DEFENSIVE REFLEXES

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For a long period of time the airways and lungs considered being sterile. New sequencing methods however accelerated the knowledge about the airway microbiome as an entity that contributes to the airway physiology, especially development of normal host defence mechanisms. This has led to major paradigm shifts including the potential importance of airway microbial networks in chronic respiratory disease states, including asthma, cystic fibrosis, COPD and even lung cancer.

In airway disease animal models, researchers were increasingly frustrated with the presence of an infection as an unwanted variable in their experiments. This is the reason why SPF method of breeding is adopted by most commercial and institutional animal husbandry facilities, with certification that the colony is free from a selection of common pathogens and SPF animals were highly recommended for laboratory use. We tested the airway defensive reflexes in animals with high and low diversity microbiome and we found that airway defensive reflexes in SPF animals were significantly insufficient comparing to conventionally bred animals, which is very likely the reason how SPF airway microbiome heterogeneity may contribute to the disconnect between animal studies showing promising drug development and failure to translate to humans.