Pathogens colonizing the respiratory tract compete with a range of other bacteria. *Pseudomonas aeruginosa* (PA) infections are increasingly associated with acute exacerbations in chronic obstructive pulmonary disease. *Streptococcus pneumoniae* (SP), meanwhile is a main cause of pneumonia, meningitis, it can lead to infections and other respiratory diseases such as bronchitis. We report herein the use of 3D airway epithelia reconstituted in vitro to study interactions of PA and SP on nasal mucosa. MucilAir™, a fully differentiated human airway epithelium made of a mixture of primary nasal cells from 14 donors, was used to study the effects and behaviour of PA and SP (inoculated at 3E+08 and 3E+11 CFU/cm² respectively) cultured separately or together over 24 hours.

**Testing Strategy**

*Streptococcus pneumoniae* inhibits *Pseudomonas aeruginosa* growth on nasal human epithelium in vitro

**Results**

Apical, basolateral and intratissular PA and SP growth were quantified by Colony Forming Unit (CFU). Impairment of epithelial homeostatic barrier function was evaluated through monitoring Trans Epithelial Electrical Resistance (TEER), cytotoxicity (LDH), cilia activity, mucin and IL-8 release.

**Conclusion**

These results suggest that *in vitro* human airway epithelia is a useful model to study bacterial interaction on the human nasal mucosa.