Pseudomonas aeruginosa (PA) is a common Gram-negative bacterium. PA’s infections are increasingly associated with acute exacerbations in chronic obstructive pulmonary disease (COPD). We report herein the use of 3D airway epithelia, MucilAir™ - pool of donors, made of a mixture of nasal primary cells from 14 human donors for screening novel antibiotics upon PA infection.

PA was inoculated (1E+02 CFU/0.33 cm²) on fully differentiated MucilAir™ in presence or absence of mucus, with or without Meronem (50 μg/ml). PA growth, cilia beating frequency (CBF), cytotoxicity (LDH) and tissue integrity (TEER) were assessed daily during 4 days.

A higher proliferation rate of PA in absence of mucus was observed, highlighting the protective role of mucus containing antimicrobial peptides. Meronem efficiently inhibited both growth of PA and the cytotoxicity (LDH) and restored the impaired barrier function (TEER) in a time dependent manner.

Testing Strategy

**Quantification of PA growth on MucilAir™**
- Without (left) and with (right) Meronem

**Cytotoxic effect of PA infection on MucilAir™**
- Without (left) and with (right) Meronem

**Evaluation of barrier function on MucilAir™ after PA infection**
- Without (left) and with (right) Meronem

**Cilia Beating Frequency, IL-8 and β-Defensin 2 are not affected by PA infection**
- Not infected
- Infected without mucus
- Infected with mucus

**Conclusion**
1) Mucus inhibits PA growth and protects the barrier function up to 48h.
2) Meronem efficiently inhibits PA growth, preventing cytotoxicity and loss of tissues integrity.
3) These results demonstrate that MucilAir™ is a robust, reliable and relevant tool for drug development against PA infection.