

Reparatory Toxicity of Cigarette Smoke and ENDS Aerosols in MucilAir™ Airway Model

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OBJECTIVE

To assess the reduced harm potential of aerosols from a commercially available ENDS product in comparison to 1R6F reference cigarette smoke by evaluating acute effects and the reversibility of damage after a 7-day recovery period using MucilAir™ Bronchial tissue model paired with Vitrocell® exposure system

APPROACH

TESTED PRODUCTS & EXPOSURE REGIMEN



1R6F smoke (ISO 20778)

- 64 min
- 10 → 1 L/min

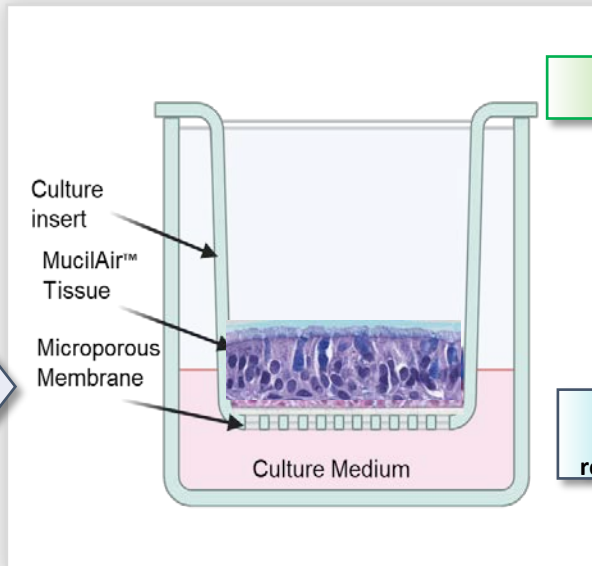


ENDS aerosols (ISO 20768)

- 240 min, 6 → 0.25 L/min
- 180 min, undiluted

Exposure

EXPOSURE SYSTEM



- MucilAir™ Bronchial tissue
- Vitrocell® HTP2.0+ 24-well module
- Vitrocell® VC10® smoking robot

AEROSOL CHARACTERIZATION & DOSIMETRY ASSESSMENT

1R6F: nicotine, carbonyls
ENDS: nicotine, carbonyls

BIOLOGICAL ASSESSMENT (N = 3)

Tissue:

- **Cytotoxicity:** WST-8
- **Tissue integrity:** TEER
- **Ciliary Function:** AA & CBF
- **Mucociliary clearance***
- **Histology:** H&E*
- **Immunohistochemistry***

Supernatant:

- **Cytotoxicity:** LDH
- **Oxidative Stress:** 8-Isoprostane
- **Inflammation:** Cytokines

24 h &
7 days
recovery

AA = cilia active area; CBF = cilia beat frequency; H&E = Hematoxylin and Eosin staining; LDH = Lactate Dehydrogenase Assay; TEER = transepithelial electrical resistance.

*Not presented here. Pending analysis.

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MAIN RESULTS AND CONCLUSION

- ✓ **1R6F** exhibited greater toxicity than **ENDS** with more severe and persistent effects across all endpoints evaluated, while **ENDS demonstrated overall better recovery over time**
- ✓ The reduction in the toxicity profile of ENDS aligns with their **substantially lower levels of HPHCs** compared to 1R6F



IMPACT

- This study provides strong in vitro evidence supporting **ENDS** as a less harmful alternative to combustible cigarettes
- Highlights the potential for **ENDS** to offer a reduced-harm alternative for adult smokers
- For more information, contact: Mariana Farcas, mariana.t.farcas@altria.com.



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