Flavor Classification and Differential Toxicity of Oral Nicotine Pouches (ONPs) in Lung Epithelial Cells

Wai Cheung Tung, Sadiya Shaikh, Joseph Lucas, Dongmei Li, Irfan Rahman
Department of Environmental Medicine and CTSI
University of Rochester Medical Center, Rochester, NY

INTRODUCTION

- Nicotine-containing products (NCPs) such oral nicotine pouches (ONPs) are substitutes for traditional tobacco products, and are becoming increasingly popular due to their perceived safety and extensive use of various flavors (menthol, fruit, drink, and tobacco etc.)
- Lack of a standardized classification of ONPs and increased use of synthetic nicotine compounds has complicated regulatory oversight, leading to the unregulated manufacture of ONPs.
- The potential systemic toxicity and negative effect from consuming ONPs is poorly understood.

HYPOTHESIS

Flavored ONPs are unsafe and likely to cause increased reactive oxygen species production and inflammation

METHODS

- ONP pouches were classified by flavor and type of nicotine (tobacco derived vs synthetic) in a wheel diagram
- ONPs with similar nicotine concentrations (menthol, tobacco and fruit flavors) were agitated in PBS for 1h at 37°C. Extract was filtered and used to treat lung epithelial cells (Beas-2b and 16HBE) at 0.25% and 1% concentrations.
- 4h following treatment, reactive oxygen species production (ROS) was measured by CellROX Green. Mean intensity was calculated in Image J.
- 24h following treatment, cytotoxicity (LDH release) by Roche kit and inflammation (IL-8 and IL-6) were measured by ELISA

RESULTS

- Differential Cytotoxicity of ONPs
- Differential Inflammatory Responses

CONCLUSION

- Biomarkers including inflammatory cytokines, oxidative stress and cytotoxicity show different levels of toxicity induced by ONP to bronchial epithelial cells.
- Further studies would be done on oral epithelial cells
- TFN product vs TDN product
- Flavor comparisons
- Different concentrations

ACKNOWLEDGEMENT

Supported by NIH U54CA228110 CRoFT NCI