

ABSTRACT SUBMISSION FORM

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SEX + GENDER

Exploring the role of sex and gender on health research



CHR D 2020: Abstract Submission Form

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Title

Inhaled diesel exhaust alters antimicrobial peptide Amphiregulin in a sex-dependent manner: A pilot study

Background

Traffic-related air pollution (TRAP), a risk factor for respiratory and cardiovascular diseases, is also associated with increased susceptibility to infections. We have previously shown that inhaled diesel exhaust (DE), a paradigm of TRAP, changes the antimicrobial peptide and protein (APP) profile in human lungs. TRAP-mediated changes in APP beyond the lung have not been characterized.

Objective

To examine APP plasma proteome in response to inhaled DE, in controlled human exposures.

Methods

Ex-smokers (n=6), with and without COPD (n=3 each), were exposed to inhaled filtered air (FA) and DE (300 mg PM_{2.5}/m³) for 2h (in a crossover; random order). Plasma obtained 24h after each exposure was probed using aptamer-based proteomic arrays and Welch's T-test was used to determine significant changes in the abundance of 39 different APPs. In a second study, healthy never-smokers (females (n=5) and males (n=6)) were exposed to FA and DE as described above, and plasma samples were used to independently quantify APP (selected from the proteomics data) using western blots. Sex-disaggregated data analysis was used to compare responses in females and males separately.

Results

The proteomics study showed that the abundance of three APPs (Amphiregulin, Vasoactive Intestinal Peptide and Azurocidin) significantly ($p < 0.01$) decreased following inhaled DE exposure compared to FA, in the plasma obtained from ex-smokers. In order to determine if this change was DE-driven, we performed independent validation in healthy, never-smokers. This showed a trend in decrease of Amphiregulin in plasma in females ($p = 0.08$), but increase in males ($p = 0.07$), in response to DE compared to FA exposure.

Conclusion

This pilot study indicates that abundance of specific APP in plasma is significantly altered by TRAP, and that these changes may be dependent on biological sex. This study provides objective evidence to supports further examination of sex-related differences in how TRAP alters anti-infective immunity.

Theme:

Basic Science

Do you have a table/figure to upload?

No

Are you willing to participate in Goodbear's Den?

Yes

Presenter Status:

PhD Student

What was your role in the project?

perform experiments / analyze data / write abstract

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