

## **Nasal responses to organic dust from swine confinement buildings are unlinked from pulmonary and systemic responses**

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Background: Exposure to organic dust at the workplace constitutes a health hazard. Swine farming is a major industry in Denmark in which employees are exposed to organic dust. The nose is the first part of the respiratory tract that meets dust, and also the one that is exposed to respirable and inhalable dust.

Aim: We evaluated the impact on the inflammatory and immune system of a short term three hour exposure in a swine confinement building on 16 persons previously exposed to this type of work. Here we report on the nasal response to exposure.

Methods: Participants were selected from a cohort of farm worker apprentices. They were investigated at baseline, exposed and monitored for up to two weeks after exposure. Nasal lavage was obtained at five time points. Cells were counted and typed by differential staining. Cytokines were evaluated with the CBA kit. As lavage cytokine levels typically are below 20 pg/ml, the detection threshold as well as the time dependence and of the kit was explored. The assay was also compared to ELISA for one solute.

Results: The CBA assay can be used to determine cytokine concentrations in NAL. It correlates well with ELISA. There is significant time drift in the CBA signal. Exposure to swine dust increased cell numbers and cytokine levels in all participants. IL-1b, IL-6 and IL-8 could be detected, whereas TNF, IL-10 and IL-12 were below detection threshold. There was no correlation between NAL and BAL cytokine concentrations, or between NAL cytokines and cells. There was strong correlation between inhalable endotoxin and total cell number and neutrophil number. There was no correlation between cytokine concentration and exposure levels.

Conclusion: There is a significant difference in the cytokine profiles in the nose, the lung and blood in response to an inflammatory stimulus. All three organs react to the inflammatory stimulus, but with different kinetics. There is no united airways, but a loosely connected conglomerate of tissues, each with its own alarm system.