Work Related Asthma Symptoms among Professional Cleaners

M. Obadia[1], G.M. Liss[1], W.Y. Lou[2], J. Purdham[1], L. Holness[1], S.M. Tarlo[1]. [1]Gage Occupational and Environmental Health Unit, University of Toronto, Toronto, ON, Canada; [2]Department of Public Health Sciences, University of Toronto, Toronto, ON, Canada. Email: maya.obadia@utoronto.ca

Rationale: Cleaners have been shown to be at increased risk for work-related asthma symptoms (WRAS). This study examines if cleaners have an excess of symptoms compared to other building workers (OBW).

Methods: A cross-sectional questionnaire was mailed to cleaners and OBW at the Toronto District School Board and the Woodbine Racetrack in Ontario, Canada. The purpose was to establish the prevalence of physician diagnosed asthma (PDA), and WRAS defined as having 3 or more of the 9 respiratory symptoms, as validated by Venables (1993), in the last 12 months, worse at work.

Results: These initial analyses are limited to 259 cleaners and 302 OBW, with similar response rates and ages. Among the cleaners 84.5% were male, and among the OBW 81.8% were female. WRAS were reported by 18.9% of the cleaners and 6.6% of OBW. After adjusting for smoking, there was no difference in WRAS among males, OR 1.0 (95% CI 0.4 to2.3); however, the prevalence of WRAS was much greater in female cleaners than female OBW, OR 7.6 (95% CI 3.1 to 18.6;$p<0.0001$). Furthermore, there was no significant difference in the prevalence of PDA between cleaners and OBW, OR 1.0 (95% CI 0.6 to 1.6). The cleaners with WRAS reported using latex gloves always or usually, more frequently (80.7%) than those not reporting WRAS (64.9%)($p=0.02$).

Conclusions: Cleaners have shown increased prevalence of WRAS (which appears to be confined to females) despite no difference in prevalence of PDA. Exposures at work, including those to latex, may contribute to these findings.

This Abstract is Funded by: Ontario Workplace Safety and Insurance Board Research Funding

Pharmacological Studies of the Effect of Mushroom Compost on Guinea Pig Trachea

E.N. Schachter[1], E. Zuskin[2], A. Chiarelli[1], S. Bashir[1], V. Castranova[3], M. Whitmer[3], U. Arumugam[1], N. Rienzi[1]. [1]Mount Sinai School of Medicine, New York, NY; [2]Andrija Stampar School of Public Health, Zagreb, Croatia; [3]NIOSH, Morgantown, WV. Email: neil.schachter@mssm.edu

Workers engaged in the growing of mushrooms develop respiratory problems including asthma and hypersensitity pneumonitis. We recently studied the effect of Oyster Mushroom, (Pleurotus ostreatus) extract on isolated guinea pig trachea (GPT). In the current study, we investigate the potential role of agents in the growing medium, the compost, used to cultivate these mushrooms. An extract of mushroom compost (MCE) was prepared as a 1:10 w/v solution. The extract was added to GPT in a series of 12 organ baths, in parallel, in 1/2 log dose increments. Dose related contractions of GPT were demonstrated using MCE. Tissue response was measured as a percent of the tissue's maximal contraction to carbachol. The effects of mediator modifying drugs including atropine, indomethacin, pyrilamine, acivicin, NDGA, BPB (blocks part of the arachidonic acid cascade), TMB8 (blocks intracellular calcium mobilization), capsaicin and captopril (ACE inhibitor) were tested by pre-treating the tissues with these agents. Endotoxin content of the extract was 10,619 EU/mg. Protein analysis revealed 708 mcg/mg of extract. The histamine content was <2mg/100mg of compost. Atropine completely blocked the contractile response of MCE. Pyrilamine, and to a lesser extent, indomethacin partially blocked the constrictor effect of MCE. Acivicin, BPB, NDGA, capsaicin, captopril and TMB8 significantly reduced the contractile effects of MCE ($p<0.05$). As previously studied organic dusts, MCE causes a non-immunologically mediated constriction of airway smooth muscle modulated by inflammatory mediators. These extracts exhibited high contents of endotoxin. Cholinergic receptors appear to be prominently involved in this effect. These findings may be related to respiratory symptoms in workers cultivating mushrooms.

This Abstract is Funded by: None

Do Swine Respiratory Diseases Cause Farmers Chronic Bronchitis? Leukotrienes in Dust from Swine Confinement Buildings

F. Acevedo[1], I. Delin[1]. [1]Institute of Environmental Medicine, Karolinska Institute, Stockholm, Sweden. Email: fernando.acevedo@imm.ki.se

Animal farmers are at high risk and pig farmers are at the highest risk for development of chronic bronchitis. Exposure of healthy non-farmers to dust in a swine farm for three hours causes acute airway inflammation characterized by a vast influx of neutrophilic granulocytes in the airways and increased bronchial responsiveness to metacholine.

Leukotrienes (LT) are potent inflammatory mediators, LTB4 is a neutrophil chemoattractant and activating factor for granulocytes. The levels of LTB4 in plasma, sputum and bronchoalveolar- and nasal lavage fluid are elevated in various human airway diseases. LTB4 is a pivotal mediator in lipopolysaccharide induced lung injury in pigs.

Cysteinyl LTs (C4, D4 and E4) are potent bronchoconstrictors and central mediators in asthma pathogenesis and bronchial hyper responsiveness with increased levels in asthma exacerbations.

More than ten percent of swine show pneumonia or pleuritis at slaughter. The aim of this work was to measure the levels of leukotrienes in dust from swine farms.

Dust was collected from the cage racks 1 m above the floor at 18 houses, over 250 adult pigs each, in 7 industrial swine farms near Stockholm. LTB4 and LTE4 in 0,1 g/mL methanol extracts of dust were quantified by ELISA and absorbance at 280 nm after HPLC separation. The content of LTB4 was 22 ± 8 ng/g and LTE4 78 ± 13 ng/g dust.

The total inhaled LTB4 and LTE4 after three hours exposure in a swine house, 10 mg dust/m3, can exceed 250 pg and 850 pg respectively, most certainly contributing to neutrophilic influx and hyper responsiveness to metacholine as observed. Farmer's cumulative dose LTB4 and LTE4 per 8h work day would exceed 640 and 2500 pg respectively. Our results suggest that swine farmers risk to develop chronic bronchitis can be related to inflammatory mediators in the dust probably proceeding from respiratory diseases of the pigs.

This Abstract is Funded by: The Swedish Heart-Lung Foundation

Respiratory Symptoms and Specific Antibody Levels among Insect Breeders

J. Elms[1], S. Naylor[1], P.A. Tate[1], M. Henson[1], E. Robinson[1], D. Fishwick[1], L.M. Bradshaw[1], A.D. Curran[1]. [1]Health and Safety Laboratory, Buxton, Derbyshire, England. Email: joanne.elms@hsl.gov.uk

RATIONALE: Allergy to insects is relatively common, and previous research has documented respiratory symptoms in workers exposed to insect allergens as a contaminant of their workplace such as grain handlers, fruit growers and bakers. In this project we investigated a group of workers whose job was to breed insects for pet foods, and were exposed to very high numbers of locusts, crickets, mealworms and other insects.

METHODS: 32 workers at a insect breeders in the U.K. completed a respiratory questionnaire, peak flow measurement and 18/32 workers provided a blood sample for RAST testing to locust, meal worm (using extracts derived from the workplace) and to common inhaled allergens (atopy/IgE). Personal sampling was undertaken to measure inhalable dust and total protein.

RESULTS: 11 (34%) subjects reported work related respiratory symptoms (WRRS), of which 7 (64%) were current smokers. Of the 8 workers with WRRS symptoms who provided a blood sample, 3 were sensitised to a workplace allergen. Only one of the 10 workers who did not have WRRS and who provided a blood sample, had specific IgE to a workplace allergen. Of the workplace allergens tested, 1 employee had specific IgE to locust only, 2 to mealworm only and 1 to both locust and meal worm. Inhalable dust and protein concentrations ranged from 0.74 mg/m³ to 17.90 mg/m³ (median = 1.68) and 7 μg/m³ to 416 μg/m³ (median = 78.5μg/m³) respectively.

CONCLUSIONS: This is one of the first studies to demonstrated sensitisation and work-related respiratory symptoms in a group of insect breeders, where the exposure to insect allergen is potentially high.

This Abstract is Funded by: Health and Safety Executive

Towards a Better Understanding of Work-Aggravated Asthma: A Pilot Study

S. Pelissier[1], S. Chaboillez[1], L. Theolis[1], J.L. Malo[1], C. Lemiere[1]. [1]Hôpital du Sacré-Coeur, Montreal, QC, Canada.

Background: Occupational asthma (OA) is characterised by variable airflow limitation and/or airway hyperresponsiveness due to causes and conditions attributable to a particular occupational environment, whereas work-aggravated asthma (WAA) is defined as pre-existing or concurrent asthma that is exacerbated by workplace exposures.

Aim: To compare the clinical and occupational outcome of subjects with OA and WAA, at least one year after the initial diagnosis of OA or WAA.

Methods: Subjects with work-related asthma who had been assessed when working between 2001-2003 were enrolled. Their respiratory symptoms and their occupational status were re-assessed by questionnair[illegible] a methacholine challenge and a sputum induction were repeated an[illegible] between 2001 and 2003.

Results: Fourteen subjects (10M, 4 (6M, 3F) 42.1 ± 10.0 years old with W[illegible] and 33.8 ± 13.3 months (WAA group [illegible] among the subjects with OA and WAA who stopped working after [illegible] diagnosis, one subject went back to school and four retired in the OA group, whereas three subjects with WAA were unemployed. Nine subjects with OA and five subjects with WAA were currently working. Among them, all but one with OA had to leave his/her original workplace. The respiratory symptoms, the pulmonary function tests and the induced sputum cell counts were similar in both subjects with OA and with WAA after removal from their workplace.

Conclusion: Even though no specific occupational agent had induced their asthma, the subjects with WAA were forced to change work because of their asthma symptoms. The clinical, functional and inflammatory outcome of subjects with OA and WAA seem to be similar. The socio-economic outcomes of WAA need to be further investigated.

This Abstract is Funded by: Canadian Institutes of Health Research

Fixed Airway Obstruction in Swine Veterinarians

S.G. Von Essen[1], D.J. Romberger, T.A. Wyatt, M.L. Carlson, N. Bolin, J. Bush, L. Severa, Y.M. Yelinek, L.M. Smith. [1]University of Nebraska Medical Center, Omaha, NE. Email: svonesse@unmc.edu

Exposure to the swine confinement building environment has been previously shown to cause airway disease symptoms and airway obstruction in farmers and veterinarians. It was recently shown that swine veterinarians still commonly have respiratory symptoms and airway obstruction despite design and work practice changes made to improve ventilation and hygiene in swine confinement barns (Andersen CI et al, Am J Ind Med 2004). **RATIONALE:** This study was conducted for the purpose of further defining airway disease in swine veterinarians. **METHODS:** All veterinarians who attended the 2004 American Association of Swine Veterinarians meeting were invited to participate in this study. Study participants included 52 men and 8 women, ages 25 to 72 (mean: 45.5 yrs). Each subject completed a questionnaire concerning work exposures, smoking and respiratory symptoms. **RESULTS:** At least one respiratory symptom (cough ± sputum, wheezing and chest tightness) was reported by 78% of participants. Spirometry was performed and airway obstruction was noted in 13% of subjects (7 mild, 1 moderate obstruction), of which all but one person had no history of cigarette smoking. Albuterol was administered by MDI to those with airway obstruction and spirometry was repeated, demonstrating that seven of nine subjects did not meet ATS criteria for reversibility. **CONCLUSIONS:** Nonsmoking swine veterinarians can develop airway obstruction that does not respond to short-acting $ß_2$ agonist inhalation. Findings suggest that use of albuterol should only be encouraged as a treatment for airway obstruction in persons with airway disease from hog barn exposure if reversibility is demonstrated. Use of other medications for airway disease in these workers should be explored.

This Abstract is Funded by: University of Nebraska Medical Center

AMERICAN THORACIC SOCIETY | 100th ANNIVERSARY

VOLUME 2
ABSTRACTS ISSUE
2005

www.thoracic.org

Proceedings of the American Thoracic Society

1905 2005

ABSTRACTS

ATS 2005 International Conference

May 20–25, San Diego, California

AN OFFICIAL PUBLICATION OF THE AMERICAN THORACIC SOCIETY