TNF-α GENE POLYMORPHISM IN FARMERS WITH A HISTORY OF ORGANIC DUST TOXIC SYNDROME SYMPTOMS.

S Von Essen, SI Rennard, D Sawyer, DJ Romberger, M Baker, R Finnell, C Bennett, L Newman, M Wendl, M Carlson, J Melson, H Eberspacher, N Bolin. University of Nebraska Medical Center and National Jewish Research Hospital, USA

RATIONALE: Midwestern farmers commonly experience organic dust toxic syndrome (ODTS) symptoms after handling stored grain or working in hog confinement barns. Only 1/3 of farmers develop ODTS although virtually all have had at least one of these exposures. TNF-α has been identified in BAL fluid of subjects with ODTS. A polymorphism at the –308 position of TNF-α has been associated with hypersensitivity pneumonitis, an illness which shares clinical features with ODTS. This study evaluated if the –308 polymorphism position is associated with ODTS in midwestern farmers. **METHODS:** We studied 207 farmers at a Nebraska farm trade show, of whom 30% had experienced ODTS. A subset of 35 subjects was selected for initial detailed analysis, of whom 17 reported a history consistent with ODTS in a self-administered questionnaire. Genomic DNA was extracted from whole blood, and the -308 polymorphism assessed by PCR followed by restriction enzyme digestion and gel electrophoresis. **RESULTS:**. 10/35 carried the –308 polymorphism (9 heterozygotes, 1 homozygote). There was no correlation between having had an illness consistent with ODTS and having the TNF-α polymorphism at the –308 position (r=-.15). **CONCLUSIONS:** No association was found between the presence of a TNF-α polymorphism at the –308 position and a history of ODTS. These findings do not support a role for the –308 polymorphism in ODTS. If this polymorphism plays a role in hypersensitivity pneumonitis, the current study suggests the conditions are distinct and supports a different genetic basis for these two conditions.

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AIRWAYS INFLAMMATION AMONG SEWAGE WORKERS

Jörgen Thorn, MD, PhD, Lena Beijer, PhD, Ragnar Rylander, MD, PhD
Department of Environmental Medicine, University of Gothenburg, Sweden

Background. Over the years, several studies report work-related symptoms among employees at sewage treatment plants. To further elucidate the characteristics of the symptoms, a large study was undertaken among sewage workers in Sweden. **Material and methods.** Data on health effects and working environments were collected by a postal questionnaire, administered to sewage workers (n=589) and controls (n=402) in all municipalities in Sweden. Odds ratios (OR) with 95% confidence intervals were calculated while controlling for age, gender and smoking habits. **Results.** Sewage workers had significant increased adjusted OR for respiratory and gastrointestinal symptoms, general symptoms such as headache, unusual tiredness and heaviness in the head as compared with controls. Increased OR was also found for chronic bronchitis, toxic pneumonitis, affected liver enzymes and muscle and joint pains as compared with controls. In sewage workers, joint pains were associated with pains in more than 4 joints and small joints but not with loading, suggesting an inflammatory response. No increased risk for allergy was found among sewage workers and the prevalence of asthma was slightly lower as compared with controls. **Conclusions.** The results suggest that sewage workers have an increased risk for respiratory and general symptoms and diseases without an association with allergy. The symptom profile also suggests a work-related inflammatory response among sewage workers.

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Title: NASAL FUNCTION IN HOG CONFINEMENT WORKERS VS. NORMAL CONTROL SUBJECTS.

S Von Essen, D Romberger, J Sisson, D Leopold, M Snyder, E Lyden, R Kammandel. Univ NE Med Ctr, Omaha, Nebraska

Rationale: Work in the hog confinement barn environment is well known to be associated with rhinitis symptoms as well as the asthma-like syndrome and bronchitis. Little is known about measures of nasal function in hog confinement workers (HCW). *Methods*: A pilot study was conducted to determine if HCW have reduced olfactory ability using the Cross-Cultural Smell Identification Test (CC-SIT). Also, ciliary function was measured using nasal saccharin transit time (NSST). NSST was determined by placing a saccharin tablet particle on the inferior turbinate and measuring the time required for the subjects to taste the saccharin. Subjects also completed a questionnaire and performed spirometry. Participants included 20 nonsmoking HCW and 14 nonsmoking normal control subjects who do not work on farms. *Results*: HCW were more likely to report having rhinitis ("cold") symptoms on the day of testing than were control subjects (35% vs. 0%, p = .03). Mean NSST was not significantly different in the HCW vs. the control subjects (10.5 min. ± 1.6 SEM vs. 8.6 min. ± 0.8). There were no significant differences in mean percentile score for olfactory ability in HCW vs. control subjects (43.0 ± 6.0 SEM vs. 54.2 ± 6.0). *Conclusions*: In summary, this group of hog confinement workers had symptoms of nasal irritation which could be secondary to their occupational exposures. However, they did not have objective measures of reduced olfactory function as measured by the CC-SIT. Also, there was no evidence of impaired ciliary function as measured by the nasal saccharin transit time.

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CELLULAR COMPARTMENT OF PERIPHERAL BLOOD MONONUCLEAR CELLS AND IN VITRO RESPONSE TO SPORE EXTRACTS IN MUSHROOM PLANT WORKER

T Saikai, H Tanaka, A Matsuura*,H Sugawawa**, I Takeya**, K Tsunematsu**, H Sakamoto***, S Abe. Third Dept of Internal Medicine, Sapporo Medical University School of Medicine, Sapporo, *Second Dept of Pathology, Fujita Health University School of Medicine, Nagoya, **Tomakomai Prefectural Hospital, Tomakomai, ***Sapporo Clinical Laboratory, Sapporo, Japan

We have reported that a half of workers complained of respiratory allergic symptoms in a mushroom plant cultivating Hypsizigus Marumoreus (Bunashimeji). Recently, it is reported that CD14 acts as a receptor for not only LPS but also other macrophage activating antigens, and CD1b is a lipid antigen-presenting molecule to T cell receptor. Bunashimeji spore contains lipid components, and it was speculated that the spore might be an antigen of these immunological reactions. To examine the mechanism of these airway immunological responses, we investigated 56 mushroom workers of this plant and 15 control subjects. CD1b, CD3, CD14 and CD161 on the surface of peripheral blood mononuclear cell (PBMC) were detected by Flow cytometry, and IL-4, GM-CSF and IFN-γ in sera were measured. Predominant expression of CD14 and CD1b on the PBMC was seen in the workers as compared with control subjects ($p<0.0001$). Serum IL-4, GM-CSF and IFN-γ levels, and the number of NK, NKTcells have not shown significant differences between two groups. Next, we incubated the PBMC with Bunashimeji spore antigens for 96 hrs, and measured the same cytokine values and the number of NK, NKTcells. IL-4 and GM-CSF concentrations and the NK, NKTcells have not shown the significant differences between two groups, but that of IFN-γ level was significantly decreased in the workers as compared with healthy control groups ($p=0.0001$). It was suggested that CD14 and CD1b might have contribution to immunological reactions in mushroom workers and decreased secretion of IFN-γ might be as a result of Th1/Th2 unbalance.

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THE AIBAL STUDY: ACUTE EFFECTS ON THE AIRWAYS IN YOUNG FARMERS OF WORKING IN SWINE CONFINEMENT UNITS.

M Iversen, H.I Hoffmann, H Takai, T Sigsgaard, E Omland, R Dahl
University of Aarhus and Danish Institute of Agricultural Science, Denmark.

Introduction: Several studies of the acute effects of working in swine buildings have used naive subjects to this environment This is the first study to use ex-farming students where the previous reaction to this environment is known and where smokers are included. **Purpose and methods:** To study the acute effects in persons known to develop symptoms within a few months of work in swine confinement units (cases) and persons without (controls). From a prospective study of farming school students (the SUS-study) a random sample of 8 cases and 8 controls were selected. The number of smokers was balanced (4 in each group). No person worked presently in swine units. Two persons were exposed at one time in a confinement unit where they worked for 3 hours. **Results:** Flow variables (FEV_1, FVC, FE_{25-75}), TLC, and VC did only show small insignificant declines, whereas declines in DLCO were substantial and differed between cases and controls, only cases showing a significant decline. Non-smoking controls +0.5% pred. (P=0.959), smoking controls -6.3% pred. (P=0.290), non smoking cases -10.8% pred. (P=0.038), smoking cases -7.5% pred. (P=0.001). **Conclusion:** Cases and controls show different physiological response to work in swine confinemnet units and the use of exclusively non smokers and naive subjects to this environment in future studies may not be appropriate.

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COMBUSTION PARTICLE ENHANCED NASAL ALLERGIC RESPONSE: A HUMAN EXPERIMENTAL EXPOSURE STUDY.

R. Hauser, T Rice, GG Krishna Murthy, MP Wand, D. Lewis, P. Siegel, J. Paulauskis. Harvard School of Public Health, Boston, MA, National Institute of Occupational Safety and Health, Morgantown, WV, USA.

We conducted a human experimental exposure study to investigate the interaction of particles and allergens. Volunteers with and without atopy were exposed to combustion particles and then challenged with an aeroallergen (determined by skin testing). The particles and allergens were delivered nasally. The whole pollen grains were delivered using a vibrating drum apparatus. The particulates, fuel oil ash, were delivered using a Wright dust feeder. The mean (SD) particle exposure concentration was 1.02 (0.23) mg/m^3 for one-hour. We tested six subjects, three atopic subjects and three without atopy. Each subject participated in three randomized exposure-challenge sessions at least 2 weeks apart (i.e. clean air followed by allergen, particles followed by no allergen, particles followed by allergen). The exposure/challenge sessions occurred out-of-allergy season. Nasal lavage (NL) was performed immediately prior to particle/clean air exposure, and immediately after challenge, and 4, 18, 42 and 66 hours post challenge. Cell counts and differentials were performed on each NL. Total cells/mL and neutrophils/mL increased by 30 x 10^3 ($p=0.06$) and 28x10^3 cells/mL ($p=0.06$), respectively when allergen challenge was preceded by particle exposure as compared to when it was preceded by clean air exposure. We found evidence of an interaction between particulate exposure and allergen challenge. Analysis of nasal lavage cytokine data is ongoing.

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ABSTRACTS

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