825 LEVELS OF AIRBORNE BACTERIA AND FUNGI ASSOCIATED WITH "SICK" AND "HEALTHY" HOMES. P S Thorne and J LeVasseur, Dept. of Preventive Medicine and Environmental Health, Univ. of Iowa, Iowa City, IA.

While chemical hazards associated with sick building syndrome have been well studied, microbiological hazards have not. This is because indoor air quality (IAQ) evaluations have focused on new office buildings which contain a multitude of synthetic building materials. Bioaerosol sampling has often been bypassed as an investigative tool due to lack of expertise and the difficulty of interpreting data in light of the ubiquitous nature of microbes. Hence, microbial IAQ problems have been underreported, particularly in sick homes, and no consensus has emerged as to what constitutes an action level for microbial contamination. In Iowa homes, microbial problems are the most common cause of sick building syndrome. We studied the genera and concentrations of bioaerosols in 40 healthy and sick homes along with chemical contaminants, temperature, humidity, ventilation parameters, and occupant exposure and health data. The homes ranged in age from 1 to 95 years and had concentrations of CO_2, an indicator of air exchange, ranging from 350-2200 ppm. Airborne dust levels were generally less than 0.05 mg/m^3. Levels of airborne viable fungi in homes ranged from 50 to 10,000 CFU/m^3 while bacteria ranged from 350 to 20,000 CFU/m^3. Median values for fungi inside and outside were 1340 and 4670 CFU/m^3, respectively. For bacteria, medians were 725 CFU/m^3 inside and 704 CFU/m^3 outside. The most common genera of fungi were: cladosporium, alternaria, penicillium/aspergillus, and fusarium. Comparison of sick homes matched to comparably aged healthy homes of similar design, illustrated that environmental parameters alone were not sufficient to predict occupant health but did indicate sources of poor IAQ. A definition of sick homes was developed that was based upon contaminant levels rather than occupant symptoms.

826 PRODUCTION OF HYPERSENSITIVITY PNEUMONITIS (HP) IN MICE BY INHALATION OF SPORES OF MICROPOLYSPORA FAENI. S D Kaliszewski, P S Thorne, and S A Bleuer. Dept. of Preventive Medicine and Environmental Health, University of Iowa, Iowa City, IA.

Farmers are exposed daily to an airborne mixture of respiratory irritants, microbial toxins, nuisance dust and a multitude of aeroallergens derived from plants, animals, arthropods, and microbes. Farmer's Lung disease (FLD) is a type of HP characterized by granulomatous interstitial lesions and lymphocytosis. In the midwest, FLD is nearly always linked to exposure to *M. Faeni (Faeni rectivirgula)*, found in "moldy" hay. A murine model was developed using inhalation exposure only, to allow study of the immunologic processes accompanying FLD. *M. faeni* was cultured at 50°C, then washed, concentrated, and homogenized. Aerosols of this preparation were generated into exposure chambers using a PITT#1 nebulizer, yielding an aerosol with a mass median diameter of 1.2 μm (σ_g=3.25) and a mean count diameter of 0.90 μm. At the highest dose, the *M. faeni* exposure system produced concentrations of 5.2 ± 1.5 mg/m^3 and 1.7 x 10^9 spores/m^3. Viable counts exceeded our detection limit: 1 x 10^7 CFU/m^3. Lower exposure levels were obtained by dilution. Groups of 10 mice inhaled *M. faeni* aerosols for 30 min each exposure either once each wk for 4 or 8 wk, 5 day/wk for 1 or 2 wk, 5 days/wk for 2 wk plus a Day 16 challenge, or were sham exposed. Histopathological examination of lung sections demonstrated marked perivascular and peribronchiolar histiocytosis, localized acute inflammatory cells, fibrosis, and giant cells in granulomatous lesions in mice from several exposure protocols but not in any of the sham exposed mice. This study demonstrates that histopathology characteristic of FLD can be induced using an adjuvant-free inhalation model.
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827 ACUTE RESPIRATORY EFFECTS OF ENDOTOXIN-CONTAMINATED MACHINING FLUID AEROSOLS IN GUINEA PIGS. T. GORDON. NYU, Dept of Env Med, Tuxedo, NY.

Exposure to machining fluid (MF) aerosols in the automotive industry is associated with a variety of adverse respiratory effects. The present study examined the role of bacterial endotoxin (ENDO) in the acute pulmonary injury produced by MF aerosols. Animals were exposed to nebulized water, unused MF, or used MF. At the end of a 3 hr exposure, specific airway conductance (SGaw) was not affected by exposure to the vehicle. SGaw decreased from preexposure baseline values by 0, 7, and 40% in animals exposed to 1, 10, or 100 mg/m^3 used MF, respectively. These exposure levels also produced acute lung injury as evidenced by changes in cellular and biochemical indices in lavage fluid. These adverse respiratory effects may have been due to microbial contamination of the used MF as the used MF aerosol exposures were associated with airborne ENDO concentrations of 0.3, 1.9, and 5.3 µg/m^3, respectively. No measureable ENDO was found in the unused MF aerosols. Animals exposed to aerosols of the unused MF had no statistically significant adverse functional, cellular, or biochemical effects except for increases in protein and PMNs at 100 mg/m^3. To examine whether contaminating ENDO was responsible for these respiratory effects, animals were exposed to 10 or 100 mg/m^3 unused MF to which ENDO was added to provide airborne ENDO concentrations similar to those determined in the used MF studies. ENDO contaminated unused MF produced significant decrements in SGaw (14 and 38 % for 0.9 and 8.2 µg/m^3 ENDO, respectively) as well as significant increases in cellular and biochemical indices of acute lung injury in lavage fluid. These results suggest that contamination of MF during use or storage may lead to the documented adverse respiratory effects of aerosolized MFs in the workplace and that ENDO may play a significant role in these effects.

828 A SUBCHRONIC (4-WEEK) INHALATION TOXICITY STUDY OF A HIGH MOLECULAR WEIGHT EMULSION POLYMER IN THE RAT. P E NEWTON[1], L K LAKE[2], H F BOLTE[1], and T G OSIMITZ[2] 1: BIO/DYNAMICS INC., EAST MILLSTONE, NJ 2: S C JOHNSON & SONS, RACINE, WI

A new high molecular weight emulsion polymer (EP) has been developed for a variety of industrial and consumer uses. To determine the inhalation toxicity of an ethanolic emulsion of the polymer, Sprague-Dawley rats were exposed for 4 hours per day, 7 days per week to EP at exposure levels of 0, 2.4, 18 and 78 mg/m3 (nonvolatiles) and 0, 55, 399 and 1919 mg/m3 ethanol (vehicle). An ethanol vehicle control group was exposed to 1859 mg/m3. The original formulation of EP was diluted (1:1) with additional ethanol for aerosol generation purposes. The aerosol had a MMAD of 2.8 microns with a GSD of 1.3. All animals survived the four week study. Ophthalmoscopic exams were negative. Clinical signs included nasal discharge and lacrimation during the first 9 days. Body weight, food consumption, and clinical pathology parameters were unaffected. Lung weights and wet/dry weight ratios were increased in the 18 and 78 mg/m3 groups. Dose related increases in subacute and chronic interstitial inflammation and alveolar/intraalveolar macrophages were seen in the lungs. The air and ethanol vehicle groups responses were comparable. The low exposure group was considered to be the NOAEL. The NOAEL for the original undiluted formulation of EP (nonvolatiles + ethanol) would therefore be 30 mg/m3.

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