LONGITUDINAL ASSOCIATION BETWEEN HOUSE DUST ENDOTOXIN LEVELS AND WHEEZE IN YOUNG CHILDREN. A. Litonjua, D. Milton, J.C. Celedon, L. Ryan, D. Sredl, S.T. Weiss, D.R. Gold. Channing Laboratory, Brigham and Women's Hospital; Harvard Medical School; Harvard School of Public Health, Boston, MA.

Exposure to endotoxin is thought to promote airway inflammation and may play a role in the onset of childhood wheezing. We examined the association of house dust endotoxin (HDE) measured in the living room of 168 homes and wheezing in 173 children with median age at baseline of 2.87 years (range=1.10-4.99) over a period of 4 years. Information on wheezing and lower respiratory illness (LRI) was obtained at baseline, 14, 22, 34, and 46 months. Survival analysis for multiple failure outcomes (wheeze) for each child was performed. HDE was categorized into 2 levels based on the median of the maximum value from each home (81.3 EU/mg of dust). After adjustment for socioeconomic, familial, and perinatal factors; dust mite, cat, and cockroach allergen levels; and LRI in the past year as a time-varying covariate, exposure to HDE above the median was significantly associated with wheeze in the past year: hazard ratio (HR) for a 3-year old child=4.90 ($p<0.01$). This model predicted a decreasing risk over time, such that HR=1.16 for children 6 years old, and HR=0.28 for children 9 years old. We conclude that exposure to higher levels of endotoxin early in life is associated with increased wheezing episodes in children less than 6 years old, but may be protective against further wheezing episodes in children older than 6 years.

This abstract is funded by: NIH-AI/EHS-35786 & NIEHS-07036

PHARMACOLOGICAL CHARACTERIZATION OF AN EXTRACT OF WHEAT GRAIN. E. N. Schachter, E. Zuskin, N. Rienzi, S. Goswami, V Castranova, P Siegel, M. Whitmer, G. Skloot, E. Chung. Mount Sinai School of Medicine, New York, N.Y.

The harvesting and processing of wheat is associated with acute and chronic respiratory disease. A water soluble extract from wheat grain (WGE) collected on a farm near Zagreb, Croatia, was prepared as a 1:10 w/v solution.The dust contained 337 µg of protein/mg of dust and 1101 EU of endotoxin/mg of dust. Dose related contractions of nonsensitized, guinea pig trachea (GPT) were demonstrated using these extracts. WGE was added to the GPTs in 1/2 log dose increments. Response was measured as a percent of maximal carbachol contraction. The effects of mediator modifying drugs, as well as an angiotensin converting enzyme inhibitor (captopril), a calcium channel blocking agent (TMB8) and capsaicin were tested. Atropine inhibited WGE over the entire range of doses tested. Pyrilamine, Acivicin, NDGA, and BPB (a phospholipase A2 inhibitor) moderately reduced WGE-induced constriction. Capsaicin depleted irritant nerves of bronchoconstricting mediators, and also resulted in a modest reduction of WGE-induced constriction as did TMB8 and captopril. Indomethacin had no effect on contraction induced by WGE. We conclude that WGE exerts a non-immunologic constrictor effect on guinea pig tracheal muscle. The mechanism of this effect is complex and capable of being modulated by many mediator modifying agents. Anticholinergic agents in particular exert a profound blocking effect on this extract.

This abstract is funded by: The Catherine and Henry Gaisman Foundation

INHALATION OR INSTILLATION OF HAY DUST INCREASES STORED AND SECRETED MUCOSUBSTANCES IN AIRWAYS OF F344 RATS.
A.M. Jefcoat, J.A. Hotchkiss, J.R. Harkema, N.E. Robinson. Large Animal Clinical Sciences and Pathology, Michigan State University, East Lansing, MI 48824, USA.

Organic dusts rich in bacterial endotoxins are ubiquitous in barn environments. These dusts are associated with occupational respiratory diseases in humans, and with the asthma-like condition recurrent airway obstruction (RAO) of horses. Previous work in our laboratory demonstrated a dose-dependent increase in levels of the mucin-associated sugar α-1,2 fucose in bronchoalveolar lavage fluid (BALF) of F344 rats exposed to endotoxin, and that RAO-affected horses have a persistent elevation of α-1,2 fucose in BALF. We therefore hypothesized that exposure to hay dust would increase α-1,2 fucose in airways of F344 rats. Hay representative of that found in barn environments was used as bedding material for F344 rats. Rats were housed on hay for 3 or 10 days. A single dose of dust suspension prepared from barn hay in sterile saline was nasally instilled into a 3rd group (200 µL/naris, 5 mg dust total exposure). 50,000 endotoxin units/ml of suspension was measured by Limulus amoebocyte assay. BALF was recovered at necropsy, and large diameter airways were collected and stained to highlight stored epithelial mucosubstances. Necropsy of rats housed on hay occurred immediately after end of the housing period, while necropsy of instilled rats took place 72 hours post exposure. Nasally instilled rats and rats housed on hay for 10 days showed a significant increase in stored mucosubstances in 5th generation (G5) airways compared to controls (12x and 4x, respectively). Level of α-1,2 fucose in BALF of nasally-instilled rats was significantly elevated over controls (P = .002). rMuc5AC apomucin level in BALF of instilled rats was not significantly greater than controls, however. Numbers of neutrophils and lymphocytes per ml of lavage fluid were significantly increased in nasally instilled rats as compared to controls. Conclusion: hay dust components, i.e. endotoxin or other factors, increased stored airway mucosubstances and presence of α-1,2 fucose in lavage fluid of F344 rats. Changes in fucose not paralleled by rMuc5AC suggested that differential (increased) fucosylation of secreted mucin core proteins may occur in response to hay dust exposures.

This abstract is funded by: NIH: F32 RR05070

A LONGITUDINAL STUDY OF RESPIRATORY HEALTH OF WORKERS EXPOSED TO COTTON DUST

XR Wang, LD Pan, HX Zhang, BX Sun, HL Dai, EA Eisen, DH Wegman, SA Olenchock, DC Christiani

Rationale: Limited evidence exists with regard to the possible relationship between long-term exposure to cotton dust and chronic effects on health. This study was designed to examine the chronic effects of long-term exposure to cotton dust on respiratory health, and to investigate potentially modifying factors for the effects. ***Methods:*** The respiratory health status of 447 cotton textile workers (study group) and 472 silk textile workers (control group) recruited from Shanghai, China was assessed over 15 years, with four time point surveys. The current analysis focused on respiratory symptom data collected from each survey period with identical standardized questionnaires and the potential effects of exposure to cotton dust, endotoxin and cigarette smoking. ***Results:*** The prevalence of byssinosis among the cotton group increased over time, reaching 15% at the last survey. The cumulative prevalence of byssinosis or work-related chest tightness over the 15 years was 29%. Cumulative incidence was 21.5% for byssinosis and 24.9% for work-related chest tightness. Byssinosis and work-related chest tightness were significantly more common in smokers than in non-smokers. Cotton workers had more chronic bronchitis, cough and dyspnea. Multivariate analysis revealed that these respiratory outcomes were significantly associated with endotoxin, but not with dust, concentrations. ***Conclusion:*** The study suggests that efficient control strategies aimed at lowing airborne endotoxin, and restricting smoking are important for preventing adverse respiratory responses in workers chronically exposed to cotton dust.

This abstract is funded by: NIOSH Grant OH02421 and NIH Grants ES00002, TW00828

2002 1432 4687

RESPIRATORY HEALTH IN NEWLY HIRED COTTON TEXTILE WORKERS

RT Sub Missin

DC Christiani, XR Wang, LD Pan, HX Zhang, BX Sun, HL Dai, EA Eisen, DH Wegman, SA Olenchock

Rationale: The study was conducted to determine early pulmonary responses to cotton dust exposure, including respiratory symptoms and pulmonary function, in previously-unexposed workers. ***Methods:*** The cohort was comprised of 225 newly hired workers at three cotton textile mills in Shanghai, China. Workers were young (average age 18 years), non-smoking, previously unexposed to industrial dust, and healthy. Their respiratory health status was followed up at three months and at one year after working, in addition to the pre-employment examination. ***Results:*** After working for three months, the incidence was 3.6% for usual cough with phlegm, 6.7% for usual dry cough. At one year, however, no workers reported these symptoms except two (1.5%) who reported cough with phlegm. In contrast, detectable changes in spirometry were observed at one year, with an increase of 43ml for FEV_1 at three months versus a decline of 70ml at one year. Workers reporting respiratory symptoms at three months had a greater cross-shift change in FEV_1 (ΔFEV_1) at one year (-2.3%) than those without symptoms (-0.7%). In addition, workers exposed to high levels of endotoxin and cotton dust experienced a greater change either in ΔFEV_1 or in FEV_1 at one year, relative to those exposed to low levels. ***Conclusion:*** Respiratory symptoms are the earliest pulmonary response to cotton dust exposure, followed by observable changes in pulmonary function. In spite of reversibility, the early respiratory symptoms, as well as exposure level of endotoxin or cotton dust, may be associated with excess loss of pulmonary function.

This abstract is funded by: NIOSH Grant OH02421 and NIH Grants ES00002, TW00828

AMERICAN JOURNAL OF

Respiratory and Critical Care Medicine

ISSN 1073–449X

SUPPLEMENT

April 2001 Volume 163 Number 5, Part 2

AMERICAN THORACIC SOCIETY

ABSTRACTS

2001 International Conference

May 18–23, 2001 • San Francisco, California

This special supplement of the *American Journal of Respiratory and Critical Care Medicine* contains abstracts of the scientific papers to be presented at the 2001 International Conference. The abstracts appear in order of presentation, from Sunday, May 20 through Wednesday, May 23 and are identified by session code numbers. To assist in planning a personal schedule at the Conference, the time and place of each presentation is also provided.